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Chamberlain-Wales Resource Management Projects

Location: Chamberlain Creek and Wales Creek and vicinity near Ovando, Montana.
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1.0 PURPOSE & NEED

1.1 INTRODUCTION

This Environmental Assessment (EA) has been prepared to analyze the potential impacts of a variety of proposed forest vegetation treatments and road-related projects located on public lands managed by the U.S. Department of the Interior, Bureau of Land Management (BLM) Missoula Field Office. The EA is a site-specific analysis of potential impacts that could result from the implementation of the Proposed Action or its alternatives. The EA assists the BLM in project planning, ensuring compliance with the National Environmental Policy Act (NEPA), and determining whether any "significant" impacts could result from the analyzed actions. ("Significance" is defined by the Council on Environmental Quality (CEQ) regulations for implementing NEPA and is found in Title 40 Code of Federal Regulations [40 CFR] 1508.27.) An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). A FONSI is a document that briefly presents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts beyond those already addressed in the 1986 Garnet Resource Management Plan (RMP) and Record of Decision (ROD) (USDI-BLM, 1986), hereafter referred to as the Garnet RMP. If the decision maker determines that this project would have "significant" impacts, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA that approves the selected alternative.

A prior version of this EA was released for public comment from November 20 - December 20, 2013. Revisions made to the EA as a result of comments received during this public comment period, as well as from further internal review, are indicated in grey shaded highlighting. One key change to the proposed action in response to public comments and further internal review is the elimination of two prescribed fire units (Unit F11 and Unit WSA-F4), totaling approximately 761 acres from the initial proposed action analyzed in the November 20, 2013 version of this EA.

1.2 BACKGROUND

The BLM would conduct the proposed work within a project area previously defined in the Chamberlain-Wales Ecosystem Assessment (USDI-BLM, 2013a), and located approximately 7 miles southwest of Ovando, Montana (See Figure 1-1, App. E). The planning area totals approximately 61,840 acres, of which approximately 20,570 acres are administered by the BLM. The general geography and land ownership are shown in Figure 1-2. The BLM would conduct timber harvest, prescribed burning, pre-commercial thinning, tree planting, cone collection, fish and wildlife habitat enhancement, helispot establishment, culvert removal, stream and riparian restoration, road obliteration, road maintenance, temporary road construction and rehabilitation. If approved, project implementation would ideally commence in 2014, and be implemented within 10 years.

1.3 PURPOSE AND NEED FOR THE ACTION

In the Chamberlain-Wales Ecosystem Assessment (USDI-BLM, 2013a), the BLM determined that past timber harvests, fire suppression, and bark beetle infestation have

resulted in forest vegetation patch sizes, densities, structures, and species composition that are undesirable for current and future management needs. More specifically:

- ponderosa pine (*Pinus ponderosa*) habitat types are dominated by single to two-storied, competition for moisture and nutrients, and lower resiliency to insects, disease, and fire;

- medium-sized Douglas-fir (*Pseudotsuga menziesii*) that have higher

- density and layering of some Douglas-fir stands are greater than normal due to fire suppression;

- patch size in some Douglas-fir habitat types is small and fragmented due to fire suppression and previous management practices;

- stands with large (15-20 inch diameter) to very large (over 21 inch diameter) western larch (*Larix occidentalis*) are unable to regenerate due to interrupted disturbance cycles; naturally infrequent seed production, and understories dominated by dense lodgepole pine (*Pinus contorta*) or Douglas-fir;

- stands with dense lodgepole pine killed by bark beetle infestation are at risk for higher than normal fire severity. This condition presents potential risks to water quality, fisheries, soil productivity, and wildlife habitat in the event of severe fire.

Additionally;

- four stream-crossing culverts are undersized and are partial or complete barriers to trout migration and passage;

- road drainage maintenance or improvement is needed on 14 sites in order to avoid erosion hazards and sediment delivery risk to streams.

The BLM has identified the following objectives:

1) With even-aged timber harvest and prescribed burning in single story lodgepole pine stands with high beetle mortality:

a) provide fuel breaks to aid wildland fire management in continuous lodgepole pine stands;
b) reduce fuels in beetle-killed lodgepole pine stands;
c) initiate new stands of trees for wildlife habitat enhancement;
d) enhance forage habitat for deer, elk, and moose summer/winter range, and also enhance forage habitat for grizzly bear, Canada lynx, and American wolverine.

2) With uneven-aged timber harvest and prescribed fire in remnant western larch stands:

a) initiate restoration of larch stands by encouraging western larch regeneration through disturbance;
b) create multi-story stand structures to enhance habitat for snowshoe hare and Canada lynx.

3) With pre-commercial thinning focused on the lower, drier habitat types outside of Canada lynx forage or denning habitat, but within 'matrix' habitat (patches of drier or open habitats intermixed among larger expanses of typical Canada lynx habitat), shift tree species arrangement, composition, and density to within the desired historical range of variability (HRV) while improving forest resiliency, diversity, and health.

4) With pre-commercial thinning in young western larch stands as part of a University of Montana research project on snowshoes hares, evaluate the effects of specific thinning treatments on movement, abundance and survival of hares.

5) With pre-commercial thinning and prescribed fire in ponderosa pine stands along the Blackfoot River, enhance summer and winter range conditions for white-tailed deer, elk, and other wildlife while promoting and maintaining ponderosa pine and understory shrub, graminoid, and forb diversity on those sites.

6) With prescribed fire outside of the Wales Creek Wilderness Study Area:

a) restore remnant western larch stands that are currently not regenerating;
b) restore lower elevation ponderosa pine and Douglas-fir savannah types that are being encroached by conifers;
c) create patches in the lodgepole pine stands that have high levels of mountain pine beetle mortality;
d) create patches in the stagnant single-storied lodgepole pine stands to create stand initiation structure of young conifers, and understory shrub, graminoid, and forb diversity for enhanced wildlife habitat.

7) With prescribed burning inside the Wales Creek Wilderness Study Area:

a) restore and enhance natural disturbance processes;
b) create patches within the existing continuous lodgepole pine forest to aid in future wildland fire management;
c) create stand initiation structure to diversify habitat for Canada lynx, grizzly bear, elk, and moose.

8) With tree planting:

a) improve tree stocking in some areas of recently acquired lands;
b) improve species diversity on specific sites;
c) create multi-story structure in single-story lodgepole pine stands to benefit snowshoe hare and Canada lynx.

9) With cone collection, obtain seed from all conifer species for the purpose of growing site-adapted seedlings for future planting.

10) With culvert removal, road obliteration, and road drainage maintenance:

a) provide upstream migration passage for westslope cutthroat trout;
b) restore crossing sites to improve aquatic and riparian habitat;
c) reduce erosion hazards and sediment delivery risks from road drainage structures;
d) protect existing water quality.

1.4 DECISIONS TO BE MADE

The BLM will decide whether or not: (1) to implement the vegetation treatments including fuels reduction, (2) to remove culverts and restore stream and riparian sites, and (3) to implement road maintenance and obliteration or repair work. The BLM may decide to implement either all or a subset of the actions considered in the Proposed Action. If there is a decision to move forward with some or all of these activities the BLM will also decide the extent, location, timing, and project design features associated with each activity.

1.5 CONFORMANCE WITH BLM LAND USE PLAN

The Proposed Action is in conformance with the BLM Garnet Resource Management Plan (RMP) and Record of Decision (USDI-BLM, 1986), as amended. The RMP established Management Areas with specific management goals and guidelines. The Proposed Action complies with these goals and guidelines.

The vegetation treatments conform to Management Area direction and goals in Appendix A of the RMP. The road treatments conform to the BMPs and goals in Appendix B of the RMP. Although the use of prescribed burning in the WSA is not specifically mentioned in the plan, it is consistent with its objectives, goals, and decisions as they relate to Management Area 8 of the RMP and BLM Manual 6330 for WSA management. Under Management Guideline 7, fire management and control actions are to be consistent with the BLM Wilderness Management Policy (USDI-BLM, 2012). The proposed action would be consistent with the Canada Lynx Conservation Assessment and Strategy (LCAS) (USDI and USDA, 2013).

1.6 RELATIONSHIP TO STATUTES, REGULATIONS, OR OTHER PLANS

This document has been prepared by the BLM to comply with NEPA. The primary authority for federal agency proposed actions is found in the Federal Land Policy and Management Act (1976). The Proposed Action presented in this EA is consistent with federal and state legislation pertaining to land management, water and air quality, threatened and endangered species, and antiquities protection.

Section 106 of the National Historic Preservation Act (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 requires Federal agencies to take into account the effects their actions would have on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Cultural resources are locations of past or current human activity, occupation, or

use and include prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places. Cultural resources can also be natural features including native plant localities that are considered to be important to a culture, subculture, or community. Traditional Cultural Properties (TCPs) located throughout the Missoula Field Office area, are places associated with the traditional lifeways, cultural practices or beliefs of a living community. These sites are rooted in the community's history and are important in maintaining cultural identity. Locations of TCPs, are often not known to the BLM, but may still be present in the project area.

Section 7 of The Endangered Species Act (ESA) requires that the Bureau of Land Management (BLM) consult with the U.S. Fish and Wildlife Service (FWS) when land use planning to ensure the proposed actions do not jeopardize the recovery of threatened and endangered species or adversely modify their critical habitats.

The Bull Trout Plan Implementation Biological Opinion (PIBO) and the Inland Native Fish Conservation Strategy (INFISH) (USDA, 1995; USDI, 1998) would be followed in order to prevent adverse effects to bull trout and designated critical habitat. The BLM is required to assure that activities occurring within Riparian Habitat Conservation Areas (RHCAs) do not "retard the attainment" of the PIBO/INFISH Riparian Management Objectives (RMOs). The preferred alternative would have No Effect on the bull trout or designated critical habitat. See Appendix A for detailed rationale.

The Canada lynx amendment to the Garnet Resource Management Plan (USDI-BLM, 2003), and Canada Lynx Conservation Assessment and Strategy (USDI and USDA, 2013) would be followed for vegetation treatment design. In November 2013 the BLM submitted its biological assessment (USDI-BLM, 2013b) for this project to the U.S. Fish and Wildlife Service to initiate section 7, Endangered Species Act consultation for Canada lynx, designated Canada lynx critical habitat, and grizzly bear. The U.S. Fish and Wildlife Service has concurred with the BLM's effects determinations of "may affect, not likely to adversely affect" lynx for both the Canada lynx amendment to the RMP (USDI-FWS, 2004) and effects of this project on lynx and lynx critical habitat (USDI-FWS, 2013a).

Grizzly bear guidance is provided by the Grizzly Bear Recovery Plan (USDI-FWS, 1993), Grizzly Bear Management Plan for Western Montana: final programmatic environmental impact statement 2006-2016 (Dood and others, 2006), and the amended incidental take statement for the biological opinion on the effects of the Missoula BLM RMP on grizzly bears (USDI-FWS, 2012). The BLM initiated section 7 consultation under the Endangered Species Act for effects of this project on grizzly bear in November 2013 (USDI-BLM, 2013b). The U.S. Fish and Wildlife Service has concurred with the BLM's effects determination of "may affect, not likely to adversely affect" grizzly bear for this project (USDI-FWS, 2013a).

Other applicable guidance is provided by the Bald and Golden Eagle Protection Act (USDI-FWS, 1940), the Montana Bald Eagle Management Plan (USDI-FWS, 1994), the Migratory Bird Treaty Act of 1918 (Lundquist and others, 2012), the Montana/Dakotas special status species list (USDI-BLM, 2009), Threatened, Endangered and Candidate

Species in Montana (USDI-FWS, 2013b), and Endangered, Threatened, Proposed, and Candidate Species Montana counties (USDI-FWS, 2013c).

Ongoing weed treatment efforts, and weed treatments occurring in conjunction with the Proposed Action would be consistent with the BLM Integrated Weed Management EA (MT-100-2008-019) and its associated decision (USDI-BLM, 2009a).

Culvert removals would require SPA 124 permits from the Montana Department of Fish, Wildlife, and Parks.

Prescribed burning would comply with the procedures and cooperative agreement of the Idaho/Montana Airshed Group and Airshed Management System.

The BLM entered into a Memorandum of Understanding with the Montana Department of Environmental Quality (USDI-BLM, 2010) regarding the management of water quality on public lands administered by the BLM. The BLM agreed to implement Best Management Practices (BMPs) for land management activities for the protection of water quality. The design features of the proposed action incorporate all applicable BMPs and meet the intent of the MOU.

In the Middle Blackfoot-Nevada Creek Total Maximum Daily Load (TMDL) document, the Montana DEQ identified conservation practices for the purpose of water quality improvement or protection (Montana DEQ, 2008). The following conservation practices are implemented in this EA for proposed culvert removal, stream crossing restoration, and road drainage maintenance, and meet the goals of TMDL management: (1) improvement or restoration of channel form and function, (2) improved capacity for sediment and flow conveyance, (3) reduction in sediment from upland sources through increased filtering and trapping capacity, (4) improved or restored in-stream fish and aquatic habitat through the recruitment of large woody debris, (5) improvement or restoration of channel form and function through streambank stabilization. The Proposed Action includes maintenance and removal of culvert sites to maintain low levels of sedimentation or risk for culvert failure. The TMDL document also states that "maintaining implemented BMPs for full effectiveness and taking preventative actions as future land uses are undertaken to minimize effects on water quality."

The BLM is required to manage riparian habitats to meet or make significant progress toward meeting Proper Functioning Condition (PFC) as per regulation (43 CFR 4180).

BLM policy is to manage soils to 'maintain the productivity of soil resources by minimizing degradation and accelerated erosion' (USDI-BLM, 2008b). Best management practices, design features, mitigation, and rehabilitation are used to meet the policy.

1.7 IDENTIFICATION OF ISSUES

The Chamberlain–Wales Ecosystem Assessment (USDI-BLM, 2013a) was completed in March 2013 and sent out for public comment to solicit any resource issues or concerns.

A scoping package was sent to 132 recipients on April 2, 2013 and it was also posted on the BLM webpage, and a press release was issued. The package contained a scoping cover letter, a description of the draft proposed action and purpose and need, and initial issues under consideration. The BLM received 13 responses to this scoping effort and the Ecosystem Assessment document. With the combined internal and external scoping, the BLM interdisciplinary team (IDT) identified the following resource issues that are analyzed in this EA:

- **Forest Vegetation**: How would proposed treatments impact composition, structure, density and patch size within: (1) the lodgepole pine /subalpine fir (*Abies lasiocarpa*) cover type?; (2) the western larch/mixed conifer cover type?; (3) the ponderosa pine/Douglas-fir cover type?

- **Wildlife and Wildlife Habitat**: How would transportation management and temporary road construction affect wildlife and wildlife habitat? How would vegetation treatments, such as timber harvest with prescribed fire, prescribed fire without timber harvest, various types of thinning, and tree planting affect wildlife and wildlife habitat?

- **Aquatic Habitat and Species:** What is the duration and extent of disturbance to aquatic species with the culvert removal activity? How many miles of stream channel would be made accessible to aquatic species through removal of culverts?

- **Soils and Site Productivity:** How many acres of soils would be detrimentally disturbed (compacted, displaced, burned, or subject to erosion) by timber harvest operations or prescribed burning; construction and rehabilitation of temporary roads; or by road obliteration and culvert removal?

- **Water Quality:** How much sediment would be delivered to streams due to vegetation treatments, road drainage maintenance, road obliteration, or culvert removal? How many feet of stream would be affected by suspended sediment, and for how long would it be affected?

- **Streams and Riparian Condition:** How many acres or miles of streams and riparian habitat would be in Proper Functioning Condition (PFC) as a result of road obliteration and culvert removal, or as a result of timber harvest operations or prescribed burning?

- **Wales Creek Wilderness Study Area:** What impact would the prescribed burning in the WSA have to the characteristics of the WSA that make it suitable for wilderness designation?

- **Invasive Plants:** How would the proposed treatments impact the establishment or spread of invasive plants?

1.8 ISSUES CONSIDERED BUT NOT ANALYZED IN DETAIL

A number of potential issue were raised during public scoping, as well as during internal scoping. These potential issues as well as the rationale for not considering them in detail follow.

- *Effects of ongoing weed treatments on water quality or soils*: The scope of treatment that would occur with this project was analyzed in the Integrated Weed Management EA MT-100-2008-019 (USDI-BLM, 2009). Weed treatments would continue with the Standard Operating Procedures identified in that EA to avoid negative impacts to water quality or soil productivity.

- *Effects of proposed actions on beneficial uses, or other water quality parameters such as water temperature and coliform:* Status determinations were made by the Montana State Division of Environmental Quality (DEQ), who also assigned probable causes, sources, and associated beneficial uses (MT DEQ, 2012). No temperature or coliform causal factors were identified by DEQ, nor any probable sources attributable to BLM-managed lands. The application of Best Management Practices as outlined in the Design Features in section 2.3 address many aspects of water quality protection.

- *Effects of temporary road construction and rehabilitation on water quality, riparian habitat, or streams*. No temporary roads are proposed that would cross riparian areas or streams. Design features for temporary roads do not permit ditch drain extension to streams and so there would be no delivery path for sediment or collection and concentration of flows. Temporary roads would be located on stable landforms to avoid mass failure hazard and stream sedimentation risk.

- *Effects of road drainage maintenance on water quality, or on streams or riparian areas as a result of flow alteration*. These effects would be minor, temporary, and not relevant to a reasoned choice between alternatives. Road maintenance is considered a Best Management Practice (BMP) and includes the maintenance of drainage structures. There is a larger sediment risk associated with road failure resulting from not performing maintenance. Since there were no road drainage flow interception problems identified that were affecting streams or riparian areas during the assessment process, and proposed road maintenance would seek to further reduce any flow contributions, there is unlikely to be any measurable impact.

- *Effects of vegetation treatments and prescribed burning on Riparian Management Objectives (RMO's) and Riparian Habitat Conservation Areas (RHCA's).* The BLM is required to assure that activities occurring within RHCAs do not "retard the attainment" of the RMOs. The proposed action has six vegetation treatment units where activities are proposed within the outer portion of RHCAs. In these instances, the proposed treatments would not retard the attainment of the RMOs. A detailed RHCA analysis with rationale is contained in Appendix A.

- *Effects of all projects on ESA-listed bull trout.* The proposed action would have no effect on the bull trout or designated critical habitat. See Appendix A for detailed rationale.

- *Effects of surface disturbing activities on cultural resources.* Site-specific treatments would follow standard procedures for identification of cultural resources, in compliance with Section 106 of the National Historic Preservation Act (NHPA). The process includes necessary consultations with the Montana State Historic Preservation Office (SHPO), and interested tribes. Consultation regarding specific treatment projects would be initiated with Tribes prior to treatment to avoid negative impacts.

- *Effects of establishing two helispots.* These areas would have less than one acre of clearing in total for all and would occur in old timber harvest areas. The helispots would receive infrequent use associated with occasional wildland fire management activities. Given the low level of use and the small amount of acres affected, there are not likely to be any negative impacts on other resources.

- *Effects of smoke (prescribed burning) and dust (road traffic) on air quality*. The analysis area contains a mix of broad valleys, deep narrow canyons, and broken mountainous terrain with strong diurnal air drainage over the majority of the year. It is remote to any large industrial centers and air quality is generally good. Air quality concerns are likely limited to short term effects. Dust effects would be avoided with design feature for abatement, and smoke effects would be controlled with adherence to the procedures and standards developed by the Montana Idaho Airshed Group.

- *Effects of proposed activities on the local economy.* The local trade areas and economies considered are those in Missoula, Granite, Powell, Deer Lodge, and Silver Bow Counties, since that is where most of the raw materials that would be supplied by the subject public lands are converted or traded. Overall, economic activity in local trade areas continues to diversify. Missoula and Silver Bow Counties have the two largest population centers (Missoula and Butte). Both are trade, medical and education centers for western Montana. A large and growing segment of the economic activity in both Missoula and Butte is not directly reliant on the forest products or agricultural industry. Granite and Powell Counties are more reliant on forest products and agricultural production. The population centers in these counties are relatively small towns and rural communities where wages earned by forest and mill workers and business income from ranching and mining can be very important. Forest product manufacturing plants and businesses that supply logging and agricultural equipment and supplies can be found in nearly every town in the area, including Seeley Lake, Drummond, Deer Lodge, Missoula, and Bonner. The labor and equipment pool in this area is adequate to supply the workforce needed to implement the Proposed Action, although a successful bidder on federal contracts may employ forest workers based outside the local area. Sales of goods and services to tourists, hunters, and anglers continue to grow throughout this area. Rural subdivisions are becoming

more commonplace throughout the area. Some of these subdivisions are planned communities, others are tracts of land developed by the owner for a personal residence. Many of the landowners of these subdivided tracts rely very little on crops, forage, or forest products to produce income.

- *Effects of proposed activities on recreation use of the affected area.* Much of the Chamberlain-Wales Assessment Area is in a Block Management Area managed for backcountry recreation and a quality walk-in hunting experience. Access to the BLM lands in the BMA is limited to non-motorized use via foot, horseback, or bicycle. Motorized vehicle traffic behind year-round gate closures is not allowed by the public, but motorized administrative access is permitted by federal, state, and county officials for official duties. Short-term user conflicts may occur during project implementation including timber hauling and administrative travel on the Chamberlain, East Fork Chamberlain, Pearson, and Cap Wallace access roads, however these activities would be curtailed during the big-game hunting season and overall recreational access opportunities would not be changed.

- *Effects of proposed activities on livestock grazing.* The proposed activities would occur on BLM-managed lands within the Chamberlain-Wales analysis area which does not contain any grazing allotments and livestock grazing is not authorized.

- *Effects of proposed activities on the Bear Creek Flats Area of Critical Environmental Concern (ACEC):* Proposed treatment units T12 (thinning) and F15 (prescribed burning) would not change or detract from the characteristics for which the ACEC was designated, namely the large ponderosa pine trees that exhibit old-growth characteristics, scenic, recreation, wildlife and watershed values.

- *Additional recreational opportunities in the Bear Creek Flats and DuPont parcel acquisition*. The Bear Creek Flats parcel was acquired by the BLM in the early 1990's and the Garnet RMP was amended to include management of the area as an ACEC. Interim Recreation Management guidelines were written in 2000 for the ACEC and adjacent BLM lands, wherein the area was designated as "day use only", prohibiting overnight camping and specifying that SRP's would be considered on a case by case basis. This designation was made to make ACEC management consistent with the Garnet RMP. In 2012, the BLM acquired a parcel north of, and adjacent to, Bear Creek Flats known as 'the DuPont property' for which there is a conservation easement whose purpose is to preserve and protect in perpetuity the open space and substantial relatively natural features and values of the property and to conserve the diverse native vegetation communities on the property and the wildlife inhabiting those communities. Management of these lands are implemented through the Garnet Resource Management Plan. At the time of acquisition, it was decided that until such time as the RMP is revised or formally amended, the acquired land acquired would be managed with the interim RMP Management Area (MA); MA-1 (Riparian Protections Zone) and MA-9 (special Management Areas) and as an addition to the adjacent Bear Creek Flats Area of Critical Environmental Concern (ACEC). Potential changes in MA

designation would be examined in greater detail through the upcoming RMP revision, and are therefore not considered in this EA.

1.9 SUMMARY

This chapter has presented the purpose and need of the proposed action, as well as the relevant issues, i.e., those elements of the human environment that could be affected by the implementation of the proposed project. The 'Proposed Action' and 'No Action' alternatives are presented in Chapter 2. The affected environment is described in Chapter 3 along with current resource conditions. The potential environmental impacts from the implementation of the alternatives are then analyzed in Chapter 4 for each of the identified issues.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This EA analyzes the Proposed Action and the No Action Alternative. The No Action Alternative is considered and analyzed to provide a baseline against which to compare the impacts of the Proposed Action. No other alternatives were brought forward for detailed analysis (see Section 2.4 for further details and rationale concerning alternatives eliminated from detailed analysis). Alternatives must meet the purpose and need for action and must address any unresolved issues with the Proposed Action. The Proposed Action addresses all the issues presented in this EA and additional action alternatives are not evident at this time.

2.2 NO ACTION ALTERNATIVE

In the No Action alternative, the proposed treatments would not occur. Present BLM management activities include ongoing weed treatments, and the recent completion of the Bear Creek Flats Stewardship project which was a 199-acre treatment designed to improve forest health and reduce the severity and intensity of wildfire by reducing fuels and altering the forest community to more closely resemble historic natural conditions. This project occurred within the ponderosa pine/Douglas-fir cover type. Ongoing present management activities also include active wildfire suppression.

2.3 PROPOSED ACTION ALTERNATIVE

The proposed vegetation treatments were designed and prioritized based on the following factors:

- Areas at highest risk to unnatural fire severity and/or intensity, or insect and disease mortality.

- Areas at highest risk to loss of desirable patch size, structure, and species composition or impairment of growth, reproduction, or productivity due to previous insect and disease mortality, or previous management activities.

- Areas currently outside of the HRV for forest structure or composition.

- Areas with impaired ecological function (impaired productivity, growth, reproduction).

Table 2-1 summarizes the vegetation treatment acres and temporary road miles for the proposed action. Unit names are referenced to the map in Figure 2-1.

Table 2-1. Vegetation Treatment Acres and Temporary Road Miles

Harvest and Prescribed Fire		Prescribed Fire only		Thinning		Planting		WSA Prescribed Fire		Temp. Road Construction & Rehab.	
Unit Name	Acres	Unit Name	Acres	Unit Name	Acres	Unit Name	Acres	Unit Name	Acres	Map Label	Miles
HF1	69	F1	100	T1	146	P1	53	WSA F1	430	TR1 (HF7)	0.19
HF2	144	F2	86	T2	69	P2	42	WSA F2	1157	TR2 (HF8)	0.18
HF3	57	F3	21	T3	65	P3	71	WSA F3	566	TR4 (HF3,4)	0.82
HF4	44	F4	51	T4	7	P4	39			TR5 (HF2)	0.79
HF5	37	F5	28	T5	13	P5	147			TR6 (HF7)	0.47
HF6	58	F6	78	T6	33	P6	40				
HF7	103	F7	27	T7	147	P7	46				
HF8	22	F8	189	T8	8	P8	39				
HF9	99	F9	144	T9,T10, T11	37	P9	15				
HF12	40	F10	94	T12	4	P10	96				
		F12	426	T13	54	P11	30				
		F13	99	T14	24	P12	40				
		HF12	140	T15	56	P13	119				
				T16	6	P14	33				
						P15	95				
						P16	61				
						P17	96				
						P18	9				
						P19	27				
						P20	25				
						P21	19				
						P22	189				
673 acres Harvest & Rx Fire		1483 acres Rx Fire		669 acres Thinning		1331 acres Planting		2153 acres WSA Rx Fire*		2.5 miles Temp. Roads	

**approximately half of the 2153 acres would actually be treated. See Prescribed Fire without Fuel Augmentation: Wales Creek Wilderness Study Area. Page 24.*

Timber Harvest with Prescribed Fire: Lodgepole Pine Stand Replacement
(Units HF5, HF6, HF7, HF8 and HF9)

A maximum of 359 acres of single-storied conifer forest are proposed for timber harvest and prescribed fire treatment to reduce the present continuous canopy of conifers, primarily dead serotinous lodgepole pine. These treatments would create early forest successional stages (i.e. stand initiation).

The proposed treatments would be designed to:

- Reduce single-storied lodgepole pine average conifer canopy coverage by >75% in patches ranging from 20 to 300 acres through emulation of a moderate to high severity (to the overstory vegetation) fire in natural patterns consistent with lodgepole pine dominated subalpine fir habitat types within Fire Group 7 (Pfister, 1977; Fischer and Bradley, 1987);

- Protect wildlife travel corridor integrity by locating treatments 300 feet or more from major ridges, saddles, and riparian areas;

- Maintain variability of habitat by creating sinuosity in treatment units by limiting the width of the treatment units to 600 feet from edge to edge to allow for appropriate juxtaposition of foraging areas and hiding cover for wildlife, such as elk, black and grizzly bears;

- Use low to moderate intensity broadcast prescribed fire after mechanical treatments to consume logging slash and other on-site fuels, stimulate shrubs, forbs, and graminoids, and prepare seedbeds for future lodgepole pine stands;

- Use prescribed fires with low severity for both the overstory and the soils, to reduce hazardous fuel loadings to no more than 15 tons per acre while increasing mineral soil exposure by 20 to 50% across treatment areas to create favorable seedbeds for lodgepole pine regeneration;

- Promote and maintain blue huckleberry, where applicable, through low intensity, low severity ground fire and increase available sunlight to huckleberry patches (USDA Forest Service, 2013; Fischer and Bradley, 1987).

Design Features specific to this treatment

In units where broadcast prescribed fire is determined to not be viable, lop and scatter, chipping or grinding, and/or pile burning may be implemented to reduce fuel loading and fire hazard from the non-commercial material left on the site.

Recommended snag densities of 5-10 snags per acre, either in groups or distributed throughout units, leaving the largest snags available. Douglas-fir is preferred when available, but are not common in proposed treatment units, as per the Northern Region Snag Management Protocol" (USDA-FS, 2000). However, safety may be compromised

when prescribed burning and snags may be felled. Leave areas between treatment units and other areas with lodgepole pine cover types currently have >50% tree mortality from pine beetles and therefore the availability of snags for wildlife is not limited.

Units HF6 and HF7 would be designed to include reserve areas of a minimum of 600 feet wide so each opening (i.e. harvest patch) within the units would be no more than 40 acres.

Unit HF9 would be designed with reserve areas within the unit to create edge effect and maintain appropriate site distances. The reserve areas would be located so each opening (i.e. harvest patch) within the unit would not be greater than 20 acres in size.

Within Units HF6, HF7 and HF9, if skid trails must utilize reserve areas, designated skid trails would be required with the Wildlife Biologist assisting in skid trail location in order to minimize impact to the reserve area.

Within Units HF5, HF6 and HF7, harvest activities including slash treatment and temporary road obliteration would be completed if possible within three summer seasons from harvest initiation in order to reduce impact to elk.

Within Units HF8 and HF9, harvest activities including slash treatment and temporary road obliteration would be completed, if possible, within two summer seasons from harvest initiation in order to reduce impact to elk.

Timber harvest would involve ground-based skidding and cable yarding (slopes greater than 40%). Any yarder, forwarder and/or skid trails would be rehabilitated following harvest (decompacted, seeded, mulched).

Seedbed preparation involving prescribed burning should be conducted within the next 10 years while the lodgepole pine seed viability is at its highest (Teste and others, 2011).

Timber Harvest with Prescribed Fire: Western Larch – Mixed Conifer Stand Restoration *(Units HF1, HF2, HF3 and HF4)*

Up to 314 acres would be treated through uneven age group selection timber harvest followed by prescribed fire to develop historic western larch-mixed conifer "old stand" attributes, consume logging slash and create seedbeds through disturbance to encourage natural western larch regeneration. Forest stand improvement including planting of western larch or other conifer species may be conducted if necessary in portions of the treatment area if natural regeneration amounts do not meet the desired stocking levels. Treatments would be intended to maintain and/or create multi-story stand structures to enhance habitat for snowshoe hare and Canada lynx.

The proposed treatments would be designed to:

- Promote western larch regeneration and an uneven age, multi-storied forest structure through timber harvest by creation of 2 to 5-acre patches with the

patches' short axis being a minimum of one to two times the adjacent seed wall height with retention of the best western larch or ponderosa pine, if present, in the group;

- Emulate natural disturbance patterns from fire, insects, and disease by distributing group patches across the treatment area with the groups estimated to cover 20 to 30% of the treatment area following the initial treatment and by creating sinuosity and feathered tree density transitions, where possible, on the patch edges;

- Promote the heterogeneity typical of this forest type by maintaining diversity among other conifer species such as ponderosa pine, Douglas-fir, subalpine fir and Engelmann spruce (*Picea engelmannii*) where applicable throughout size classes and structure layers within the treatment area;

- Reduce logging slash in harvest patches and improve understory shrub, graminoid and forb species diversity in non-harvested patches using low to moderate intensity prescribed fire producing a moderate severity burn in the overstory and in the soils. Prescribed fire would utilize the jackpot method to conduct any burning in the treatment patches;

- Promote western larch "old stand" attributes (see historic wildlife attributes below for additional "old stand" attributes) by retaining, where possible, trees greater than 21 inches dbh;

- Increase mineral soil exposure by at least 50% within the group selection patches to create favorable seedbeds for western larch regeneration;

- Use both ground-based skidding and cable yarding (slopes greater than 40%).

Design Features specific to this treatment

Retain the subalpine fir component outside of the group selection patches to maintain and enhance habitat for snowshoe hare and Canada lynx. During harvest, designated skid trails would be instituted to preserve to the extent possible, the understory subalpine fir.

Protect wildlife travel corridor integrity on ridges by locating group selection patches 300 feet or greater from each side of ridges (600 feet total reserve on ridges) and where possible, away from treatment area boundaries which are adjacent to previously harvested areas still in the seedling/small sapling stage.

Provide historic wildlife attributes such as snags and large down logs, and improve the quantity and quality of forage and browse species. To preserve/promote these attributes:

–Retain, where possible, groups of snags, favoring wind-firm species such as ponderosa pine and western larch. The recommended snag density is 4 snags per acre at least 20 inches dbh, favoring western larch and ponderosa pine where available,

and Douglas-fir as a second choice, as stated in the Northern Region Snag Management Protocol" (USDA-FS, 2000).

–Retain areas with higher components of down woody debris or if limited down woody debris is present, augment the site during treatment to add down woody debris;

–Improve forage quantity and quality through low to moderate severity prescribed burning post-harvest.

Any yarder, forwarder and/or skid trails would be rehabilitated following timber harvest (decompacted, seeded, mulched).

Forest Stand and Wildlife Habitat Enhancement in Sapling/Pole-Sized Stands
(Units T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16)

Up to 669 acres of pre-commercial thinning would occur primarily on the lower, drier habitat types. Improved forest resiliency, diversity and health would occur through treatments by shifting tree species composition, density and arrangement to fall within the HRV (desired condition). Pre-commercial thinning would not occur in Canada lynx forage or denning habitat, except for Units T9, T10, and T11. All other potential treatment areas are considered Canada lynx 'matrix' habitat (smaller patches of drier or open habitats intermixed among larger expanses of typical lynx habitat) or are not within lynx habitat (i.e. dry ponderosa pine dominated sites).

These stands are typically regeneration harvests from the mid-1980's through the mid-1990's. The harvests are predominantly on recently acquired industrial forest land (except T1 and half of T10) and are currently overstocked, or will transition to over-stocked in the next decade.

The forest stand and wildlife habitat enhancements are categorized into three types of treatment:

- Research/Study site (T9, T10 and T11): Approximately 37 acres of dense sapling/small pole stands within the western larch/mixed conifer type would be established as a variable density thinning research site to study the effects of thinning on snowshoe hare. The area would contain research areas with both control (non-thinned) and test (pre-commercial thinned) areas delineated. Estimated size of the thinning area within these three units would not exceed 37 acres.

- Ponderosa pine restoration (T1, T2, T3, T4, T5, T6, T7, T8, T12, and T13): Approximately 546 acres of dense sapling/small pole stands within the ponderosa pine/Douglas-fir conifer type would be pre-commercially thinned. These stands are from regeneration harvests on recently acquired land (T13) or from conifers restocking the site following the 1991 Clearwater Game Range Fire (T1).

- Mixed conifer restoration (T14, T15, and T16): Approximately 86 acres occur within the Canada lynx 'matrix' habitat. These sites are composed of mixed conifer species on relatively drier sites located at lower elevations within the analysis area. These sites are dominated by either ponderosa pine and/or Douglas-fir.

T1through T8 and T12 through T16 are dense sapling/small pole stands that would be pre-commercially thinned with site-specific prescriptions designed to:

- Reduce competition and increase tree vigor by reducing average conifer overstory canopy coverage by approximately 50%, through variable spacing between 6 and 24 feet;

- Develop mixed species stands, where possible, composed of the best trees selected for growth, form, and disease and insect resistance characteristics;

- Promote seral tree species such as ponderosa pine, quaking aspen, black cottonwood and western larch, where applicable and possible;

- Create stand structure by reserving any subalpine fir and Engelmann spruce if present;

- Maintain and restore, where possible, key wildlife habitat elements such as snags, large down logs and quantity and quality of browse and forage species (i.e. serviceberry, fescues, etc.);

- Reduce infections of diseases such as dwarf mistletoe within the conifers;

- Reduce hazardous fuels in the long term (greater than 10 years).

Design Features specific to this treatment

Proposed treatment unit T1 would be inventoried prior to thinning to determine if Howell's gumweed (*Grindellia howellii*) is present. If found, individual plants would be flagged and avoided during treatment.

Prescribed Fire with Fuel Augmentation *(Units F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, HF12, F12 and F13)*

Prescribed fire would be implemented on up to 1,483 acres outside of the Wales Creek Wilderness Study Area. The objectives of this prescribed burning fall into four categories:

- To restore remnant larch stands that are currently not regenerating (F2, F3, F7, and F8). Sapling to pole-sized trees would be hand slashed in sufficient quantities to support a medium to high intensity burn to create moderate severity

in the soils and the stagnant Douglas-fir and lodgepole pine layer. The burn would be intended to reduce the average stagnant Douglas-fir and lodgepole pine canopy by 50 to 75% and increase mineral soil exposure by at least 50% to create patches of bare ground needed for larch regeneration.

- To restore lower elevation ponderosa pine and Douglas-fir savannah types that are being encroached by conifers (F1, F4, F5, and F12). Sapling to pole-sized trees would be hand slashed to augment the fuels in sufficient quantities to support a low intensity burn, resulting in low severity in the overstory and soils. This fuel augmentation would help during the prescribed burning phase of the project to target the seeding, sapling, and small pole sized trees that are encroaching, while providing protection for the medium to large size trees and desired seedlings and saplings. The burn would be intended to reduce the encroaching conifers by 50 to 75%, while keeping mortality in the medium to large tress at less than 10%. Another objective would be to not reduce duff depth by more than 25 to 50% across the unit.

- To create patches in the lodgepole pine stands that have high levels of mountain pine beetle mortality (F6 and F13).

- To create patches in the stagnant single-storied lodgepole pine stands (F9, F10, and HF12) to create understory shrub, graminoid, and forb diversity for wildlife habitat enhancement. Some of the stands proposed for burning in Frazier Creek do not have beetle mortality, but are stagnant small diameter lodgepole pine stands with no understory.

For categories 3 and 4 above, sapling to pole-sized trees would be hand slashed in sufficient quantities to support a high intensity burn resulting in moderate to high severity in the overstory and low severity in the soils. The burn would be intended to reduce the average overstory canopy by 50 to 75% and increase mineral soil exposure by at least 50%. Larger stems may be felled or girdled as necessary after the burn to meet course down woody debris and snag requirements.

A portion of HF12 (approximately 85 acres in T14N R13W Sec. 25) is currently on land owned by The Nature Conservancy (TNC). The BLM is in the process of acquiring this land from TNC. The action proposed assumes a completed land acquisition on this parcel. Implementation on this portion of the proposed action would only occur if the acquisition is completed or if TNC would want to continue as a partner with the BLM during implementation.

In HF12, post and pole harvest treatments would be used prior to prescribed burning in the lodgepole pine stands to assist in the preparation/fuel augmentation of the burn units. Any post and pole operations would be conducted from the currently existing roads. No new roads, including temporary would be constructed. The total acres for post and pole harvests would not exceed 40 acres.

Control lines may be used on all or portions of the unit boundaries. These control lines may be roads, trails, rock scree, or constructed firelines. Firelines may be constructed by hand or using fireline explosives. Existing roads and trails accessing these units would be maintained for use during implementation.

These treatments are designed to change the structure of wildland vegetation and biomass distribution for the purpose of altering potential fire behavior, particularly in areas of lodgepole pine with high mountain pine beetle mortality. Fuel management techniques that have proven effective in changing wildland behavior and effects include prescribed burning (Pollet and Omi, 2002), and other mechanical manipulation of living and dead vegetation (Pyne and others, 1996). Forest fuel treatments that reduce canopy fuels must often be accompanied by surface fuel treatment; otherwise surface fuel hazard can be increased (Van Wagtendonk, 1996).

Prescribed Fire without Fuel Augmentation: Wales Creek Wilderness Study Area
(Units WSA F1, WSA F2, WSA F3)

Prescribed burning in the Wales Creek Wilderness Study Area (WSA) would be conducted in four units totaling 2,153 acres. Prescribed fires would be ignited within these units in ignition zones located where a combination of high fuel loading, decadent herbaceous shrubs, mountain pine beetle mortality exist, or stagnant lodgepole pine stands exist. The size of the ignition zones would be between 20 and 100 acres, and could cumulatively cover up to 50% of the prescribed burn units (a total of 1,076 acres). The purpose of these burns is to restore and enhance natural disturbance processes, to create patches within the existing lodgepole pine and mixed conifer forest, to aid in future wildfire management, and to enhance wildlife habitat.

The proposed treatments would be designed to:

- Produce low to moderate intensity burns resulting in moderate severity in the overstory and low severity in the soils;
- Reduce fuel loading in ignition zones by 50 to 75%;
- Reduce lodgepole pine canopy coverage by 50 to 80% within ignition zones;
- Be ignited with aerial firing devices including a plastic sphere dispenser and/or a helitorch;
- Stimulate understory shrubs, graminoids, and forbs;
- Aid in future wildland fire management;
- Utilize existing natural features such as terrain, ridges, trails, rock scree, wet draws and/or fuel type changes for control features. Existing roads and trails accessing these units would be maintained for use during implementation;

- Reduce duff depth by 25 to 50% across the unit.

Design Features specific to this treatment

Firing and control boundaries would avoid straight edges to resemble more natural fire occurrences.

Control tactics would be the minimum amount needed to achieve desired results.

Fire control efforts would use Minimum Impact Suppression Tactics (MIST)(USDI and USDA, 1996). Heavy equipment would not be used inside the WSA.

Chainsaw use would follow MIST and may be authorized in limited instances where large dead standing trees or dense concentrations of dead and down material compromise personnel safety or control of firelines.

Tree Planting: Habitat Improvement and Forest Restoration *(Units P1 through P22)*

Up to 1,331 acres of tree planting would occur throughout the project area. The purposes of the tree planting are to improve tree stocking in some areas previously burned by wildfire and on portions of recently acquired lands, improve forest resiliency, diversity and health by shifting tree species composition, density and arrangement to within the HRV (desired condition), and to create multi-story structure in single-story lodgepole pine stands to benefit snowshoe hare and Canada lynx.

- Multi-storied structure creation in lodgepole pine stands (P10-P18): Approximately 579 acres of single-storied lodgepole pine forest would have a mulit-storied structure created through tree planting for habitat improvement for snowshoe hare and Canada lynx. These treatments would be designed to create structure in stands currently lacking the multi-storied structure and tree species mix favored by snowshoe hare. Structure would be created by: (1) planting, where applicable, Engelmann spruce under the existing lodgepole pine overstory canopy; (2) promoting natural regeneration of subalpine fir and lodgepole pine within these stands; and (3) in appropriate locations, where natural regeneration of subalpine fir and lodgepole pine is not sufficient, augmenting the stocking of these areas by planting subalpine fir and/or lodgepole pine.

- Ponderosa pine site restoration (P1): Approximately 53 acres of a currently understocked ponderosa pine site would be planted with ponderosa pine to reforest the site which was burned in the 1991 Game Range Fire.

- Mixed conifer stand forest resiliency and conifer diversity (P2-P9, P19-P22): Approximately 699 acres of mixed conifer forest would have tree planting occur to improve forest resiliency, conifer diversity and stocking by interplanting the sites with appropriate tree species (i.e. ponderosa pine, western larch, Douglas-fir, lodgepole pine, Engelmann spruce, quaking aspen, black cottonwood) at appropriate densities.

Table 2-2 summarizes all proposed vegetation treatments.

Cone Collection

Cones from all species of conifers would be collected from BLM lands for the purpose of reforestation. The collection trees would be climbed and sometimes felled in order to collect cones. Trees felled for the purpose of cone collection would not exceed 50 trees over a five year period and would only occur if it was deemed necessary to fell the trees due to safety issues for the climbers such as branches being too brittle to support the cone collector. Cones and seeds would be utilized for the proposed action (planting) or future forest restoration projects. A portion of the seed may be used for future rehabilitation after wildfires or other disturbances.

Design Features specific to this treatment

Trees chosen for cone collection would be dominant and/or co-dominant within the stand structure (MTDC, Reforestation Toolbox). They would exhibit healthy crowns, good phenotype, and be relatively insect and disease-free.

Where possible, cone collection would occur within timber harvest units but could occur anywhere on BLM lands within the assessment area.

Trees for cone collection would be dispersed well across the collection areas (MTDC, Reforestation Toolbox).

Western larch cone collection would target the medium to large size classes (<21" DBH).

Climbing or pruning of the western larch would be utilized if possible. Felling would occur if neither climbing or pruning of the western larch could be done safely.

Table 2-2. Vegetation Treatments Summary

Treatment Type	Map Units	Acres
Lodgepole pine stand replacement. Prescribed fire with timber harvest.	HF5 thru HF9, Portion of HF12 (40 ac)	359
Western larch-mixed conifer stand restoration. Prescribed fire with timber harvest.	HF1 thru HF4	314
Pre-commercial thinning	T1 thru T16	669
Prescribed fire with fuel augmentation outside of WSA Larch restoration Ponderosa pine/Douglas-fir restoration Lodgepole pine with beetle mortality Stagnant lodgepole pine	 F2, F3, F7, F8 F1, F4, F5, F12 F6, F13 F9, F10, HF12	 323 605 177 378
Prescribed fire without fuel augmentation-Wales Creek WSA	WSAF1 thru WSAF3	2153*
Tree planting: Habitat improvement and forest restoration	P1 thru P22.	1331

**approximately half of the 2153 acres would actually be treated. See Prescribed Fire without Fuel Augmentation: Wales Creek Wilderness Study Area. Page 24.*

Temporary Road Construction and Rehabilitation (HF2, HF3, HF4, HF7, HF8)

To provide access to the upland forest prescribed fire with timber harvest treatment areas a maximum of 2.5 miles of new roads would be built. All of these roads would be temporary and, where practical, mechanical harvesters and forwarders which do not require road construction would be used to reduce the proposed road mileage. These roads are shown in Figure 2-2.

Design Features specific to this treatment

After use, temporary roads would be decompacted and outsloped. Soil, rock, slash cover and large woody debris would be replaced. Slope recontouring would be used where needed to provide slope stability. Rehabilitation would be generally completed within three years after timber harvest operations are complete.

Temporary roads would not be constructed with extended inboard drainage ditches routed to stream crossings.

Culvert Removal

Four stream-crossing culverts are undersized and are partial or complete barriers to upstream passage for westslope cutthroat trout, a BLM Special Status species. The BLM is required to initiate proactive conservation measures that reduce or eliminate threats to Special Status Species to minimize the likelihood of and need for listing of these species under the Endangered Species Act. These culverts are shown in Figure 2-2.

Design Features specific to this treatment

The following design features would be used to minimize sediment delivery and other impacts to streams during culvert removal. These measures may include any combination of the following as needed on a site-specific basis:

Work would be done in late summer during periods of low/intermittent streamflow;

Sediment fence and/or straw bales would be installed in and along channel margins up- and downstream of culverts to minimize stream sedimentation;

Woody debris would be placed in the channel downstream to trap bank/bed sediments that may be released in streamflow;

Fill material removed from around culverts would be placed in stable areas outside of stream channels and flood plains;

To prevent headcutting, channel beds would be armored with angular rock and woody debris where necessary;

Conifer brush fascines would be installed at the toe of recontoured banks to provide instream roughness and trap sediments originating from recontoured slopes;

Slopes would be re-contoured to match up-and downstream slope angles. Bare and exposed soil would be seeded with a weed-free and certified native grass seed mix, covered with woody debris, and planted with native shrubs and conifers. Where necessary, coir fabric would be installed to prevent loss of soil;

Equipment used for instream work would be cleaned of external oil, grease, dirt and mud; and leaks repaired prior to arriving at the project site. Equipment would be inspected daily for leaks or accumulations of grease, and identified problems would be corrected before entering streams or areas that drain directly to streams or wetlands. This cleaning would also remove all dirt and plant parts to ensure that noxious weeds and aquatic invasive species are not brought to the site;

Project implementation would include application of standard provisions to minimize equipment fuel/oil leakage and spills;

Any required permits for disturbance of water or wetlands would be obtained prior to initiating work (Army Corps of Engineers 404 permit, Montana SPA 124 permit). Any mitigation measures identified in the permitting process would be incorporated into the project plans;

Culvert removals would be accomplished during the mid- to late summer low-flow period and within the timing window established by Montana Fish Wildlife and Parks.

Road Drainage Maintenance and Improvement

Repair and maintenance work would be done on 14 sites in order to avoid erosion and potential sediment delivery to nearby streams. The drainage maintenance includes the reshaping or cleaning of inboard ditches, the inlets or outlets of ditch relief culverts, reshaping or establishing rolling dips or waterbars, and reshaping the running surface if necessary.

Design Features specific to this treatment

All road drainage maintenance would be conducted during dry road conditions to minimize road erosion, sedimentation, or road surface damage.

Road Obliteration

Obliteration and site restoration would be done on three segments (totaling 0.95 miles) of road to restore site productivity, stream crossings, or riparian habitat (Figure 2-2). One site has a nearby portion of road fill slumping downslope toward Pearson Creek and would require slope recontouring on 0.3 miles. Two of the segments (totaling 0.65 miles) are associated with two of the proposed culvert removals, and the third segment is in a draw bottom that has concentrated surface flow and erosion during snowmelt or saturated soil conditions. Obliteration would consist of decompaction of the running surface and re-contouring the road prism as necessary to match the hillslope, followed by placement of forest debris and native plant seed.

Helispot Development

Two helispots (H1 and H2; Figure 2-1) would be established near the border of the Wales Creek WSA to aid in initial attack of wildfires within the WSA. These helispots would be located in previously managed areas that are already open thus would require little improvement. These helispots would have a clear and level touchdown pad measuring 20 by 20 feet, and a safety circle measuring 90 feet in diameter, suitable for a Type II helicopter. H1 occurs on lands presently owned by The Nature Conservancy, however this land is currently in the process of being acquired by the BLM. H1 would only be developed once BLM takes ownership of these lands.

Road Travel Management Designations

The existing transportation status and management of the road system in the project area is described for this EA. There are approximately 98 miles of road on BLM lands in the planning area, of which only 10 miles are open to public motorized use. The remaining 88 miles are available for administrative use. Many of the short spur roads (Class 3 roads) have become blocked with brush and small trees and are not easily travelled by vehicles during administrative access and some routes are difficult for recreational horse, bicycle, and foot travel. Roads that are un-passable in this manner provide added wildlife security. For the purpose of this EA, the roads are assigned to one of three classes to describe the current and intended use level (see Figure 2-2).

Class 1 roads (46 miles) are important for more frequent administrative use and would receive periodic maintenance as needed to keep them clear and trafficable for administrative access as necessary.

Class 2 roads (26 miles) are important for short-term (10 years) access needs associated with the proposed activities. They would receive maintenance as needed and would be used for administrative access such as forestry, resource monitoring, or fire suppression as necessary. During longer periods of non-use however, they may become occluded with fallen trees and partially grown over. Drainage structures such as waterbars, dips, and culverts would be maintained for BMP purposes. Any dead-end roads with stream-crossing culverts would be managed as Class 1 or 2 at least up to the culvert crossing.

Class 3 roads (26 miles) are not needed for the short-term (10 years) access needs for the proposed activities, but there may be a need in the long-term for future vegetation management needs. The road prism would be retained (not obliterated) but drainage structures may be modified as needed to be self-maintaining (out-sloping and dips instead of ditch drains and relief culverts). These roads are typically short spurs and many are presently occluded with fallen trees and/or grown in with brush and are not passable. These roads would not be used for ordinary administrative use such as monitoring or inventory, but may be used for fire suppression or future (long-term) vegetation management as necessary.

Figure 2-2 also depicts an existing snowmobile route. There is no proposal to alter this route but current management includes periodic removal of debris as needed to allow for safe snowmobile travel.

Other Design Features

Wildlife and Wildlife Habitat

Vegetation treatments would incorporate guidelines provided in the "Northern Region Snag Management Protocol" (USDA-FS, 2000) and "Trees and Logs Important to Wildlife in the Interior Columbia River Basin" (Bull and others, 1997) to maintain and/or improve snag or large woody debris. Green tree replacement snags would be present in treated and untreated forest habitat.

Vegetation treatments would not occur from June 1 to July 15 to protect big game calving and fawning, and the nesting season for Bird Species of Concern. Lodgepole pine replacement burns are an exception and may occur during the first two weeks of June to reduce risk of escaped fire.

If active nests of Bird Species of Concern are located, 40 acres around the nest would be deferred from any ground disturbing activities from April 15-August 15. The area would be evaluated to determine if treatment modification should be considered, such as excluding the 40 acre buffer zone around the nest from treatment. Nest locations would be potentially identified during pre-treatment monitoring, during pre-treatment layout, and during treatment activity monitoring by administrative staff and BLM contractors.

If active Pileated woodpecker nests are located outside the June 1-July 15 period, vegetation treatments would be deferred and a 40 acre buffer would be established to protect the nest site until young fledge from the nest. Further evaluations would occur with the potential outcome of modifying the project to further avoid or minimize impacts.

Vegetation treatment blocks would be established to minimize effects to grizzly bear, elk, and other wildlife (Figure 2-1). Blocks would be spatially and temporally arranged to reduce the areal extent and duration of disturbance. Project implementation would be completed in one block before being initiated in the next block.

Vegetation treatments would discontinue and potentially be modified in areas where an active eagle, goshawk, great gray owl, or flammulated owl nest is discovered. Treatments would be evaluated and potentially resume after the nesting season. For the goshawk, nesting may occur from March 1 to September 30 (Reynolds, 1992).

Vegetation treatments involving timber harvest would be considered for winter operations to reduce impacts to elk and grizzly bear summer range.

Vegetation treatments would be designed to maintain wildlife travel corridors along major ridges, saddles, and riparian areas. Within the treatment unit boundaries of HF 1, 2, 3, 4, 7, 9, and 12; F4, 6, 10, and 13; and WSAF 1, 2, and 3, prescribed burning would be conducted with firing techniques to minimize to the extent possible the reduction in cover

within 300 feet of major ridges, saddles, or riparian areas. Within the treatment unit boundaries of HF 1, 2 ,3, 4, 7, 9, and 12; and T2, 3 ,4, and 8, tree harvest and thinning would be conducted via layout and location of treatment areas to minimize the reduction in cover within 300 feet of major ridges, saddles, and riparian areas.

Maintain variability of habitat by creating sinuosity in harvest and harvest/fire treatment units by limiting the width of treatment units HF5, 6, 7, 8, and 9 to 600 feet from edge to edge to allow for appropriate juxtaposition of foraging areas.

Temporary and existing roads would be managed to maintain wildlife security.

Prescribed fires would have fire lines rehabilitated, fuel augmentation evenly distributed, and pre and post treatment of noxious weeds.

Contractors would follow the *Missoula Field Office Food/Attractant Storage Strategy for conservation of the Grizzly Bear and Other Wildlife* (USDI-BLM, 2006).

Recreation and Visuals

Vegetation treatment unit boundaries would avoid straight edges where possible in order to more resemble natural openings.

Vegetation treatment unit boundaries would avoid an abrupt edge appearance where possible by retaining scattered, full-crowned trees along the boundary.

Vegetation treatment units would retain stringers of trees where possible.

Skidding operation would be limited to dry or frozen ground to reduce soil disturbance and the likelihood of skid trails being apparent to a casual observer.

Sites where slash piles are burned would be scarified and vegetated with native grass seed to reduce the visual impact.

For actions implemented through contract or permit, no motorized vehicle use would be allowed in the Blackfoot Block Management Area beginning on the Friday before the opening day of the general big game hunting season through the end of the second weekend, during the last nine days of the season, and during the weekends.

Cultural Resources

Section 106 of the National Historic Preservation Act (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 requires Federal agencies to take into account the effects their actions would have on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Cultural resources are locations of past or current human activity, occupation, or use and include prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places. Cultural resources can also be natural features including native plant localities that are considered to be important to a culture, subculture, or community.

Traditional Cultural Properties (TCPs) are places associated with the traditional lifeways, cultural practices or beliefs of a living community. These sites are rooted in the community's history and are important in maintaining cultural identity. Locations of TCPs, are often not known to the BLM, but may still be present in the project area.

Surface disturbing treatments have the potential to impact cultural resources and some native plant species utilized by tribes. Specific treatment proposals would follow standard procedures for identifying cultural resources, in compliance with Section 106 of the National Historic Preservation Act (NHPA). The process includes necessary consultations with the Montana State Historic Preservation Office (SHPO), and interested tribes. Consultation regarding specific treatment projects would be initiated with Tribes prior to treatment.

Invasive Plants

Contracts for vegetation treatments, road, or culvert work would stipulate that all off-road equipment would be power-washed prior to arriving on public land.

Weed detection, monitoring, and management actions would be conducted before, during and after implementation of the proposed activities.

Herbicide application would continue under, and conform to, the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (USDI-BLM, 2007).

The design features from the BLM Integrated Weed Management Environmental Assessment MT-100-2008-019 (USDI-BLM, 2009) are incorporated here and would be applied for this proposed action.

Existing roads used to transport heavy equipment and haul forest products would be treated with herbicides to control all detectable noxious weeds prior to operations.

All temporary roads would be inspected for noxious weeds and treated prior to rehabilitation, followed by revegetation with a certified weed-free seed mixture of forbs and grasses.

Areas of Critical Environmental Concern (ACEC)

Proposed treatment units T12 and F15 within the Bear Creek Flats ACEC would follow ACEC guidance (USDI-BLM, 1994; BLM, 1986).

Riparian Habitat Conservation Areas (RHCAs)

Proposed treatment units would incorporate the Riparian Habitat Conservation Area (RHCA) management direction as specified by the BLM Interim Bull Trout Conservation Strategy and the Plan-Implementation Biological Opinion. In RHCAs, primary management emphasis would be given to the protection and maintenance of features and processes critical to riparian and aquatic ecosystem function. These features include large

standing and down wood, understory and streamside shrubs, and vegetation important for maintaining streamside soil stability and microclimate. Default RHCA boundaries would be as follows:

Category 1: Fish-bearing streams: Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet including both sides of the stream channel), whichever is greatest.

Category 2: Permanently flowing non-fishbearing streams**:** Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet including both sides of the steam channel), whichever is greatest.

Category 3: Ponds, lakes, reservoirs and wetlands greater than 1 acre: not present in the Analysis Area.

Category 4: Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas. This category includes features with high variability in size and site-specific characteristics. At a minimum the RHCAs must include:

a. the extent of landslides and landslide-prone areas;
b. The intermittent stream channel and the area to the top of the inner gorge;
c. The intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation;
d. For Priority Watersheds (bull trout present), the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greatest.

Site potential tree height would be verified during final treatment unit layout.

Stream channels where fish presence has not been previously determined would be surveyed prior to final treatment unit layout.

A fishery biologist would participate in treatment unit layout to ensure that RHCA objectives are met.

No tree felling, ground-based skidding, or yarding would occur in the interior portion (one site potential tree height) of RHCAs.

Limited selective cutting and removal of trees may occur within the outer portion (one site-potential tree height) of RHCAs in units HF3, HF4, HF5, and HF9 to achieve specific vegetative condition or fuel management objectives. Cutting and removal of trees would ensure that shade, microclimate, large down woody material and other important RHCA features and Riparian Management Objectives (USDA, 1995) were given priority consideration.

Prescribed fire would be conducted in the outer portion of RHCAs in units F3 and F9, if necessary, to accomplish burning in adjacent uplands with the objective of simulating the low fire intensity, burned/unburned mosaic that is characteristic of the natural disturbance processes. Fire prescriptions would be developed to prevent fire from reaching intensities that would result in elimination of the duff/organic layers and exposure of mineral soils. No more than ten percent consumption of grasses and shrubs is desired adjacent to the wetted channel.

Prescribed fire would be hand-ignited adjacent to RHCAs unless doing so would compromise the safety of personnel.

Only hand-constructed fireline would be used within the RHCAs. These lines would be constructed with proper drainage structures. Upon completion of the prescribed burn, the lines within RHCAs would be fully rehabilitated (replacement of soil, duff, litter, slash).

Mixing of fuels (gasoline, diesel, and oils), fueling of equipment, and storage of fuel would not be conducted in RHCAs unless there are no other alternatives. Refueling sites within RHCAs would be designated by the fisheries biologist and have an approved spill containment plan.

Toxic materials, including spheres and torch fuel, would be transported, stored, and used to minimize accidental spillage and/or introduction into streams.

Helicopter landing sites or refueling areas would not be established in RHCAs.

Drafting of water from streams would require that the intake hose be fitted with a screen mesh equal to or smaller than 3/32 inch.

Soil and water quality protection

State of Montana Forestry Best Management Practices, and Streamside Management Zones as per the Montana Stream Protection Act, would be implemented.

Skid trail locations would avoid soils or conditions that are highly prone to compaction, displacement, or erosion (Favor soils with higher rock content, avoid skidding on saturated soils, favor skidding on frozen or snow-covered soils).

Air Quality

Prescribed burning operations would follow procedures and standards developed by the Montana State Airshed Group to insure adequate smoke dispersal in order to prevent

deterioration in air quality. These procedures and standards are considered "Best Available Control Technology" as determined by the Montana Department of Environmental Quality which regulates open burning in Montana.

Dust abatement measures would be used as needed during periods with dry road conditions and heavier traffic use. These may be included as contractual provisions.

2.4 ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED ANALYSIS

An alternative to implement all the vegetation treatment recommendations from the Chamberlain Ecosystem Assessment (USDI-BLM, 2013a) was eliminated from detailed analysis because the scale and extent of potential treatments recommended strictly to restore vegetation communities would not be consistent with standards in the Canada Lynx Conservation Assessment and Strategy.

An alternative to clear vegetation to create helispots in the Wales Creek Wilderness Study Area for the purpose of supporting wildland fire suppression activities was considered but eliminated from detailed analysis because such vegetation clearance would not be consistent with BLM requirements to maintain wilderness characteristics in the WSA. Two helispots (H1 and H2; Figure 2-1) would be established near the border of the Wales Creek WSA to aid in initial attack of wildfires within the WSA.

An alternative to forego the proposed burning in the WSA was considered but eliminated from further analysis because it does not meet the Purpose and Need and it is already analyzed with the No Action alternative. Moreover, the deciding official may choose to implement all or a portion of the Proposed Action, which might include a scenario of not implementing prescribed burning in the WSA.

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified by the Interdisciplinary Team.

3.2 CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

Certain resources are protected by specific laws, regulations, or policies (e.g., Executive Orders). BLM refers to these resources as "Critical Elements of the Human Environment" and addresses them in this EA. Critical Elements that are identified in Table 3-1 as being present and potentially affected would be analyzed further in this chapter.

3.3 AFFECTED ISSUES/RESOURCES BROUGHT FORWARD FOR ANALYSIS

- Effects of the alternatives on composition, structure, density, and patch size within the lodgepole pine /subalpine fir cover type.
- Effects of the alternatives on composition, structure, density, and patch size within the western larch/mixed conifer cover type.
- Effects of the alternatives on composition, structure, density, and patch size within the ponderosa pine/Douglas-fir cover type.
- Effects of transportation management and temporary road construction on wildlife and wildlife habitat.
- Effects of vegetation treatments on wildlife and wildlife habitat.
- Effects of the timber harvest, burning, temporary roads, road obliteration, culvert removal on soils and site productivity.
- Effects of road drainage maintenance, road obliteration, culvert removal on water quality due to sedimentation.
- Effects of road obliteration, culvert removal, harvest, burning on stream and riparian condition due to flow alteration.
- Effects of culvert removal on aquatic species, habitat, and access.
- Effects of vegetation treatments on aquatic species and habitat through sedimentation.
- Effect of prescribed burning on Wales Creek WSA designation suitability.
- Effects of vegetation treatments and temporary road construction on cultural resources.

3.3.1 Forest Vegetation, Fuels & Fire Management

Vegetation data was collected utilizing: (1) aerial photo delineation of stands followed by (2) ground inventory during the summer and fall of 2011 on BLM lands, (3) ground inventory data on DNRC lands (conducted by DNRC during the summer of 2010) and (4) aerial photo interpretation of private land. A geodatabase containing both the DNRC and BLM inventory data was created and used for this assessment. Fire data was obtained through the historical Blackfoot Forest Protection Association (BFPA) records and DNRC fire data. The BFPA records cover 1923 to 1936, and the DNRC data cover 1981 to 2010.

Discussion pertaining to all cover types

Forest vegetation within the analysis area was stratified into dominant cover types to assess current condition and ecological trends associated with the vegetation composition, structure, density, patterns (i.e. patch size) and process along environmental gradients. Forest vegetation within the analysis area is distributed between warmer ponderosa pine/Douglas-fir cover types at low elevations to western larch/mixed conifer cover types at mid-elevation and cooler lodgepole pine/subalpine fir type at mid to high-elevations. The remaining land within the analysis area is distributed between natural parks/grasslands (non-forested), agriculture lands, scree slopes and water. The cover types described in the Affected Environment and subsequent analyses are derived from the Habitat Type Groups (Pfister, 1977) discussed in the Chamberlain-Wales Ecosystem

Table 3-1. Critical Elements of the Human Environment		
Determi-nation*	**Resource**	**Rationale for Determination***
CRITICAL ELEMENTS		
NI	Air Quality	Prescribed burning activities would be coordinated with the Montana Idaho Airshed group for smoke dispersion through the Airshed Management System to minimize impacts to air quality. Design features would minimize dust.
NI	Areas of Critical Environmental Concern	Proposed actions within the Bear Creek Flats ACEC follow ACEC guidance for that area.
NI	Cultural Resources	BLM would consult with State Historic Preservation Office prior to implementation of project level activities and conduct Class III Cultural Resource Inventories. If cultural resources are located during the inventory, mitigation measures would be applied to reduce or eliminate adverse effects.
NP	Environmental Justice	No adverse impacts that would disproportionately adversely impact minority or low-income populations.
NP	Farmlands (Prime or Unique)	Not present on proposed treatments.
NI	Floodplains	No floodplain development is proposed as defined in E.O. 11988
PI	Invasive, Non-native Species	New activities with potential for weed spread.
NP	Native American Religious Concerns	BLM met with Salish and Kootenai tribes on two separate occasions to discuss both the ecosystem assessment phase and preliminary proposed projects on April 16, 2012 and March 14, 2013, respectively. No issues or concerns were brought forward in those meetings. BLM would consult again on project level implementation annually.
NP	Threatened, Endangered or Candidate Plant Species	There are no known Threatened, Endangered or Candidate Plant Species in the planning area.
PI NI	Threatened, Endangered or Candidate Animal Species	(PI) Grizzly bear, Canada lynx, and Wolverine are present with potential for impacts. (NI) Bull Trout (Threatened): Application of design features combined with distance of activities from bull-trout occupied habitats ensures no effect to the fish or designated critical habitat.
NP	Wastes (hazardous or solid)	Not present
PI	Water Quality (drinking/ground)	Drinking water use classifications present. 303d listings and TMDLs with BMPs/design features discussed in EA.
PI	Wetlands/Riparian Zones	Present with protective design features discussed in EA.
NP	Wild and Scenic Rivers	Not present
PI	Wilderness	Actions are proposed in the Wales Creek Wilderness Study Area
NP = not present in the area impacted by the proposed or alternative actions NI = present, but not affected to a degree that detailed analysis is required PI = present with potential for impact.		

Assessment (USDI-BLM, 2013a). Refer to Table 3-2 for acreage and percentage distribution of the three cover types.

Fire has been important in shaping vegetation structure and composition in the Interior Colombia Basin for thousands of years (Johnson and others, 1994) and was the dominant

disturbance process which historically sustained forest ecosystems and biodiversity at the watershed scale. Fires continued to have these important roles until the 1940's, when fire suppression was effective enough to limit the role of natural fire throughout the region (Pyne, 1982). Prior to organized suppression, fires burned in the open ponderosa pine forest types every 20 years, the interior Douglas-fir and larch every 52 years, and in the lodgeploe pine every 112 years (Barrett and others, 1997). These mean fire intervals and associated vegetation correspond well to what is found in the analysis area.

Currently the role of fire is very limited in the analysis area due to the policy of full fire suppression that has been in effect since 1921. The Blackfoot Fire Protection Association (BFPA) was formed in that year and provided forest fire protection to 1.2 million acres of private, state, and federal land. Over several decades the BFPA built a system of roads, trails, and lookouts that made the organization highly effective in suppressing most fires at 10 acres or less in their protection. In 1970, the BFPA transitioned fire suppression responsibilities to the State of Montana Department of Natural Resources and Conservation (DNRC). According to DNRC data from 1981 to 2010, 106 fires have been suppressed in the analysis area: 96% of them were kept below 10 acres in size, and 88% of them were started by lightning. These numbers are similar to the historic BFPA data for the analysis area from 1923 to 1936. Since 1921, very few fires have escaped initial attack and affected any major vegetation change across the landscape. The last substantial fire event was the East Fork Chamberlain Fire in 1994.

Lodgepole pine/subalpine fir cover type

The lodgepole pine/subalpine fir (includes the minor spruce cover types) cover type occurs over 20% of the analysis area. The BLM lands in this cover type constitute 16% of

Table 3-2. Chamberlain Ecosystem Analysis Area by cover type.

Cover Type	Total Acres In Cover Type	Percent of Cover Type Represented in the Chamberlain Analysis Area	Acres on BLM Managed Land in Cover Type	Percent of Cover Type Represented on BLM lands in Chamberlain Analysis Area
Lodgepole pine/ Subalpine fir	12,253	20%	10,141	49%
Western larch/ Mixed-conifer	23,460	38%	7,661	37%
Ponderosa pine/ Douglas-fir	19,968	32%	2,288	11%

Total acres in analysis area: 61,840
Total BLM managed acres in analysis area: 20,570
These groupings total 90% of the land within the Chamberlain analysis area with the remaining 10% occurring in meadows (non-forest), water, scree, agriculture.

the analysis area and 49% of the BLM managed lands. Refer to Table 3-3 for a description of the density and structure of this cover type. Of the pole and larger size class stands, 20% are represented by relatively dense two to multiple-storied structure. Greater than 60% of this cover type occurs as pole and larger single-storied stands. As aresult of the size class distribution, the risk for mountain pine beetle infestation was high and led to the current mountain pine beetle epidemic and associated lodgepole pine mortality. The upper third (elevation) of the analysis area is dominated by lodgepole pine stands with 69% of those stands occurring as pole to medium size class (5 to 14.9 inches

dbh) single storied stands. These stands currently exhibit 40 to 85% mortality from mountain pine beetle in trees over 6" dbh.

Table 3-3: Lodgepole pine/Subalpine Fir Cover Type: Summary of Current Structure/Composition/Density

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	17	2,023	LP/AF
Pole (5.0-8.9)	51	6,290	LP/ES
Medium (9.0 -14.9)	28	3,480	LP/ES/DF
Large (15-20.9)	3	416	ES/LP/DF
Very Large (21.0 +)	<1	2	ES
Non-stocked/Non-forest	<1	42	*n/a*
Total acres in cover type		12,253	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	3	385
15-39%	9	1,081
40-69%	67	8,262
70-100%	21	2,528
Total acres in cover type		12,253

LP (lodgepole pine), AF (subalpine fir), ES (Engelmann spruce), DF (Douglas-fir)

The resulting fuel load from falling lodgepole pine snags and those that will continue to fall over the next 10 to 30 years can increase the severity of fires (Page and Jenkins, 2007). Regenerating stands can have an increase in fire severity as well due to the increase in total live understory fuels and due to the high downed fuel loading (Page and Jenkins, 2007). Prior to the current mountain pine beetle epidemic, single-story pole-sized lodgepole stands had a lower risk for a high severity, stand replacement fire due to limited ladder or downed fuels (Brown and Smith, 2000). Current fire free (i.e. fires of historical size and amounts) intervals exceed 85 to 150 years in much of the lodgepole pine/subalpine fir cover type.

Current patch size for this cover type has 62% of the patches occurring in the less than 50 acre patch range. Historically, 60 to 70% of this type occurred in the greater than 500 acre patch size.

From 1981 to 2010, 30 fires were suppressed in this cover type, 96% of which were less than 10 acres. Since 1921, only three known fires escaped initial attack and affected the vegetation within this type: the 1929 Elk Creek Fire, the 1961 Elk Creek Fire (approximately 1500) acres, and the 1994 East Fork Chamberlain Fire (1220 acres). These three fires burned in both the lodgepole pine/subalpine fir cover type and the western larch/mixed conifer cover type. The Elk Creek Fire of 1929 started in Elk Creek, and burned into the Chamberlain and Murray Douglas analysis areas. According to 1934 aerial photos and extensive field inventory in the drainage it is clear that this was a mostly lethal, high severity, stand replacement fire in this cover type. Many of the dense stands of lodgepole pine were initiated by this fire. The 1961 Elk Creek Fire burned portions of Elk Creek, Chamberlain Meadows, and the headwaters of Wales Creek. It

was a predominantly lethal, high severity, stand replacement fire. Dense stands of lodgepole pine were also initiated by this fire.

The East Fork Chamberlain Fire was started by lightning and burned in a mostly lethal, high severity, stand replacement fire in this cover type. The fire area within this cover type is now characterized by dense stands of sapling sized lodgepole pine with heavy fuel loadings.

Within the WSA, present stand conditions are the result of the absence of wildland fire and its ecologically important disturbance role. Most of the drainage is made up of stands of even aged homogenous lodgepole pine. Stands of mixed conifers (Douglas-fir, western larch, Engelmann spruce, subalpine fir) can be found sporadically throughout the drainage as well. Due to age and size class, many of the lodgepole pine stands in Wales Creek are experiencing moderate to heavy mortality from recent mountain pine beetle infestation.

Western larch/mixed conifer cover type

The western larch cover type currently represents 38% of the analysis area. The BLM lands in this cover type constitutes 12% of the analysis area and 37% of the BLM managed lands. Refer to Table 3-4 for a description of the density and structure of this cover type. At least 60% of these stands (medium and larger size classes) are two to multi-storied stand structure.

Table 3-4: Western Larch/Mixed Conifer Cover Type: Summary of Current Structure/Composition/Density

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	7	1,715	LP/DF/WL
Pole (5.0-8.9)	20	4,696	LP/DF/WL
Medium (9.0 -14.9)	47	11,097	DF/LP/WL
Large (15-20.9)	21	5,015	DF/LP/WL
Very Large (21.0 +)	4	811	DF/WL
Non-stocked/Non-forest	1	126	*n/a*
Total acres in cover type		23,460	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	1	227
15-39%	7	1,716
40-69%	46	10,850
70-100%	46	10,667
Total acres in cover type		23,460

LP (lodgepole pine), DF (Douglas-fir), WL (western larch

The ingrowth of non-seral species such as Douglas-fir and subalpine fir in the understory of the western larch stands has led to an increased risk of higher severity fire due to higher density of trees and increased ladder fuels. Currently, Douglas-fir is exhibiting a greater dominance, particularly in the medium size class, and at higher densities than the HRV. This has resulted in increased risk of high severity fire and insect and disease damage in unmanaged stands. Extended fire-free intervals (50 to greater than 75 years)

in low and mixed severity fire regimes combined with past land use practices have contributed to this condition.

Current patch size for this cover type has over 90% of the patches occurring in the less than 150 acre patch range. Historically, 50 to 70% of this type occurred in the greater than 500 acre patch size.

From 1981 to 2010, there were 38 fires in this cover type, 97% of which were less than 10 acres. The 1929 and 1961 Elk Creek fires, and the 1994 East Fork Chamberlain Fire burned in this cover type. According to 1934 aerial photos and extensive field inventory in the drainage, it is clear that the 1929 Elk Creek Fire had a mixed severity burn in this cover type allowing some of the overstory trees (Douglas-fir and western larch) to survive the fire. The 1961 Elk Creek Fire has similar effects in this cover type. Within the fire perimeter of the East Fork Chamberlain Fire where previous harvest treatments had occurred, the fire burned at low to moderate intensity as a mosaic of non-lethal to mixed severity fire allowing many overstory trees (Douglas-fir and western larch) to survive the fire.

Ponderosa pine/Douglas-fir cover type

The ponderosa pine/Douglas-fir cover type occurs over 32% of the analysis area. The BLM lands in this cover type constitute 4% of the analysis area and comprises 11% of the BLM managed lands. Refer to Table 3-5 for a description of the density and structure of this cover type. Eighty-four percent of these stands (medium and larger size classes) are two-storied to multi-storied structure.

Table 3-5: Ponderosa Pine/Douglas-fir Cover Type: Summary of Current Structure/Composition/Density

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	3	480	DF/PP
Pole (5.0-8.9)	4	709	DF/PP
Medium (9.0 -14.9)	43	8,701	DF/PP
Large (15-20.9)	38	7,526	PP/DF
Very Large (21.0 +)	12	2,357	PP/DF
Non-stocked/Non-forest	<1	195	*n/a*
Total acres in cover type		19,968	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	2	414
15-39%	19.5	3,910
40-69%	59	11,744
70-100%	19.5	3,900
Total acres in cover type		19,968

DF (Douglas-fir), PP (ponderosa pine)

Currently, Douglas-fir is exhibiting a greater prevalence than ponderosa pine, and at higher densities than the HRV. Size classes dominating this cover type currently are medium to large, while historically it was the large to very large size classes that were predominant in this cover type.

Ingrowth of trees, primarily shade-tolerant species such as Douglas-fir, has increased tree density beyond the HRV, thereby increasing vegetation competition for limited moisture and nutrients, creating ladder fuels, and increasing the risk of higher severity fire than would have historically occurred. Extended fire free intervals (greater than 50 years) in the low and mixed severity fire regimes combined with past land use practices have contributed to this condition.

Current patch size for this cover type has 96 to 97% of the patches occurring in the less than 150 acre patch range. Historically, 25 to 45% of this type occurred in the 250 to greater-than-500 acre patch sizes.

From 1981-2010, there were 39 fires in this cover type, 95% of which were less than 10 acres. One exception is the 1991 human-caused Game Range Fire (7,628 acres) which started at Highway 83 and burned into the most northern portion of the analysis area (Sperry Grade) where it burned primarily as a mosaic of mixed severity and stand replacement, high severity fire in predominantly ponderosa pine. Some of the burned area is still in a bunchgrass meadow state predisposed to a high risk of noxious weed infestations. Due to limited natural seed sources after the fire, some areas that were forested prior to the fire have been planted with ponderosa pine to establish conifers back on the site.

3.3.2 Wildlife and Wildlife Habitat

The affected environment describes the existing conditions and trends for terrestrial wildlife and wildlife habitat in the context of the wildlife issues identified in section 1.7. Special status species (threatened and endangered, sensitive), big game, and Montana bird and animal species of concern which inhabit the analysis area and may be potentially impacted are presented in this section.

Special Status Species: (Threatened, Endangered, and Candidate)

Terrestrial threatened, endangered, and candidate species, protected under the Endangered Species Act and designated by the U.S. Fish and Wildlife Service (USDI-FWS, 2013), inhabiting the analysis area include grizzly bear, Canada lynx, and wolverine. Vegetation management is the effects indicator analyzed in Section 4.2. Acres of vegetation are the unit of measure. Except for grizzly bear, roads are not an impact issue.

Grizzly Bear (threatened): The grizzly bear is a year-round resident. The analysis area is 10 miles south of the Northern Continental Divide Grizzly Bear Recovery Zone. Bear biologists have estimated that there are currently 1,000 grizzly bears in the Northern Continental Divide ecosystem and delisting efforts are being planned (Dood and others, 2006). The analysis area has excellent grizzly bear habitat, with large security areas (>2,500 acres) and road closures during non-denning periods. Grizzly bear populations have expanded during the last decade. The Garnet Mountain Black Bear DNA Summary (2004), which was part of the Montana Fish, Wildlife, and Parks Black bear study (Mace and Chilton-Radandt, 2011), did not detect grizzly bears, however, grizzly bears currently

are reported on a regular basis, including sows with cubs. Evidence of denning has also been reported (personal record). The grizzly bear population in the analysis area appears to be expanding, but numbers are unknown. Recent pine beetle mortality has enhanced grizzly bear habitat conditions by stimulating understory vegetation and berry production. Snags have blown over providing cover and potential den sites. Class 2 and 3 roads are blown in with windfall, or grown in with brush and trees, diminishing administrative use and enhancing habitat security. Currently open road density in the Chamberlain project area is less than 1 mi/mi^2, which is within the Montana Fish, Wildlife, and Parks recommended standard (Dood and others, 2006). The Grizzly Bear Management Plan for Western Montana EIS (Dood and others, 2006) is the reference for grizzly bear impact analysis. In addition to vegetation management and treatment acres, road management is another impact indicator analyzed in section 4.2, and miles of road used during treatments is the unit of measure.

The FWS issued the BLM, Missoula Field Office a Biological Opinion and Incidental Take Statement in October, 2006 regarding the effects of the Missoula Field Office Garnet Resource Management Plan on grizzly bears (USDI-FWS, 2006b. In the terms and conditions section of the Incidental Take Statement the FWS stated: "At the end of a 5-year period commencing with the implementation of the biological opinion and incidental take statement, the FWS will review the environmental baseline including annual monitoring reports described below to determine if conditions warrant modification or extension of the incidental take exemption." The FWS reviewed direct, indirect, and cumulative effects analyses in the 2006 biological opinion, new information on the status of the species, updated baseline for the BLM lands, and monitoring reports and determined an extension of the incidental take exemption is reasonable and so warrants an amended incidental take statement for the 2006 proposed action. The amended incidental take statement for the biological opinion on the effects of the Missoula BLM RMP on grizzly bears was issued on October 11, 2012 (USDI-FWS 2012).

The revised Incidental Take Statement is based on the continued implementation of RMP management activities, as well as the updated baseline conditions and grizzly bear status information. In accordance with the reinitiation criteria the amount of incidental take anticipated in the amended statement would be exceeded and reinitiation of formal consultation would be required if the net increase in newly constructed permanent system roads in the action area exceeds a net increase of 5 miles post-2006 through 2022, the amount of temporary road construction exceeds 27 miles through 2022, or if more than one grizzly bear is removed from the BLM lands over the next 10 years due to food/attractant storage issues or as a result of livestock grazing conflicts. One mile of permanent road was decommissioned in 2013 in the Hoodoo Mountains 10 miles east of Chamberlain. Current road calculations indicate that as of 2013, 4.5 miles of new permanent system road could be constructed on Missoula Field Office Lands north of Interstate-90. Permanent road construction is not prescribed in the Chamberlain project; one mile of permanent system road would be decommissioned as part of the proposed action augmenting the net increase to 5.5 miles. The proposed action would construct 2.5 miles of temporary road leaving a balance of 27.5 miles.

Canada lynx (threatened): Canada lynx is a year-round resident. The Garnet Resource Area Resource Management Plan Canada lynx amendment and Canada lynx Critical Habitat, which utilizes the Lynx Conservation Assessment and Strategy of the Interagency Lynx Biology Team (USDI and USFS, 2013) and the Final Rule for Critical Lynx Habitat (USDI-FWS, 2009), respectively, are used for analysis. The analysis area lies within the Garnet Range which is the most southern latitude in the United States with an endemic Canada lynx population (John Squires, personal communication). The Garnet Range, and the analysis area, is part of Unit 3, Northern Rockies Critical Habitat (USDI-FWS 2009). The proposed action encompasses the Chamberlain Complex and the northern portion of the McElwain Complex Lynx Analysis Units (LAUs). The adjacent Elk Creek LAU is to the southwest (Figure 3-1). The Canada lynx in the Garnet Mountains has decreased compared to historic levels (John Squires, personal communication). Live-trapping efforts in the Garnet Mountains in 2010 yielded two males, one of which died the following spring. Lynx surveys have not been conducted since 2010 and the present population is unknown (John Squires, personal communication). Ninety-four percent of the Chamberlain LAU complex is categorized as suitable lynx habitat, McElwain LAU complex is categorized as 95% suitable habitat, and Elk Creek LAU is categorized as 85% suitable habitat. Both LAUs are structurally composed of early stand initiation (spring, summer, fall forage), stand initiation (year-round forage), mature multi-story (den/forage), stem exclusion (non-forage), and matrix (non-snowshoe hare) habitat.

Suitable lynx habitat in the Chamberlain Complex LAU is currently 94%, adjacent McElwain Complex LAU is currently at 95%, and Elk Creek LAU is currently 85% suitable. The Chamberlain Complex LAU is comprised of 23,330 acres of lynx habitat of which 1,333 acres (6 %) is in early stand initiation (unsuitable habitat). Five thousand acres (21%) of stand initiation in Chamberlain LAU provides year-round habitat for snowshoe hares and Canada lynx. The remaining 16,997 acres of lynx habitat is composed of single-story, stem exclusion, and multistory habitat, intermixed with matrix habitat (meadows and dry habitat types). The Chamberlain LAU contains 11,997 acres (51%) of denning habitat. The McElwain Complex LAU is comprised of 48,571 acres of lynx habitat, 2,658 acres (5%) of which is in early stand initiation; 3,500 acres (7%) is stand initiation; and the remaining 42,413 acres consist of single-story, multi-story, stem exclusion, and matrix habitat. The McElwain LAU contains 30,000 acres (62%) of lynx denning habitat. The Elk Creek LAU is comprised of 19,541 acres of lynx habitat, 2,931 acres (15%) of which is in early stand initiation; 3,908 acres (20%) is stand initiation; and the remaining 12,702 acres consist of single-story, multi-story, stem exclusion, and matrix habitat. The Elk Creek LAU contains 8,402 acres (43%) of lynx denning habitat.

Wolverine (candidate): The wolverine is considered transient in the analysis area. It is a generalist in its foraging habits and utilizes a variety of vegetation types currently available. Snow track records and other sightings are periodically reported during winter and spring, respectively (Jim Sparks, personal observation; John Squires, personal communication). Wolverine studies have not been conducted in the analysis area or other parts of the Garnet Range. The analysis area contains good forage habitat, but poor denning habitat. High elevation snow cover typically persists into late May, but elevations are less than 7,000 feet. Wolverines generally den at elevations above 7874 feet which is higher than what is available in the analysis area. The analysis area is 10

mi^2 and home ranges for wolverines in Glacier National Park average 55 mi^2 for females and 193 mi^2 for males (Foresman, 2012). The analysis area represents 18% of a female's home range and .05% of a male's home range. Two U.S. Fish and Wildlife Service reports (USDI-FWS, 2010 and 2013d) on the ESA listing status of wolverine contain information regarding the basis for impact analysis. Climate change and trapping are regarded as the major risks to wolverine viability (USDI-FWS, 2010; USDI-FWS, 2013d). Climate change may result in diminished snow pack, which may affect wolverine population viability. A large portion of the analysis area is closed to motorized vehicles yearlong other than for snowmobiles from December 2 until snow melt. Current road management limits trapping access, other than snowmobile use, and trapping mortality is considered low.

Special Status Species: (Sensitive)

Terrestrial sensitive species are designated by the State Director (USDI-BLM, 2009) and are managed under the authority of the Federal Land Policy and Management Act. Terrestrial sensitive species inhabiting, or potentially inhabiting the analysis area include: Townsend's big-eared bat, fringed myotis, long-eared myotis, long-legged myotis, fisher, gray wolf, bald eagle, golden eagle, northern goshawk, great gray owl, flammulated owl, black-backed woodpecker, and American three-toed woodpecker. Vegetation management is the effects indicator examined in section 4.2. Acres of vegetation treatment are the unit of measure. Roads are not an issue (Foresman, 2012) for these species and are not evaluated for impacts.

Forest Bats: Townsend's big-eared bat, fringed myotis, long-eared myotis, and long-legged myotis have been recorded in the Garnet Mountains and other locations around Missoula Field Office lands. These species have been detected during bat surveys for abandoned mine closures (Missoula Field Office files). Surveys have not been conducted in the analysis area, since abandoned mines are not present. Townsend's bat utilize a variety of cover types, including Douglas-fir forests, are a year-round resident in Montana that roost in caves and mine openings. Fringed myotis utilize a variety of forest cover types and roost in caves and mine openings, but no information exists regarding over-wintering. Long-eared myotis utilize late seral forests and are year-round residents in Montana that roost in caves, mine openings, bark of trees, and rock outcroppings. They have been recorded in recent burn areas roosting under the bark of burned trees. Long-legged myotis prefer coniferous forests, and roost in caves and mines, and under the thick bark of trees.

Fisher: Fisher have been recorded in Missoula County (Foresman, 2012), however they have not been recently recorded in the analysis area. Snow surveys have been conducted throughout the Garnet Range, but fisher tracks or DNA have not been detected or collected from survey efforts. Habitat is present and consists of late succession conifer forests, especially Engelmann spruce, Douglas-fir, and riparian zones with high canopy cover. Forest structure is very important, especially coarse woody debris, snags, and a wide range of tree ages. Snowshoe hares, red squirrels, mice and voles are preferred prey species. Natal and maternal den sites are located in cavities of large living and dead trees.

Gray Wolf: Gray wolf populations have expanded in Montana to the extent that wolves were delisted in 2012. Wolves have been present in the Chamberlain Creek drainage for nearly a decade. The Chamberlain wolf pack has historically had issues with livestock depredation and attempts have been made over the years to eliminate the pack. However, the pack has persisted and currently has up to 4 adults. Reproduction has not been confirmed this year. A collared female from the Arrastra Creek wolf pack dispersed in the Spring of 2013 and joined the Chamberlain pack. Wolf information is obtained from Wilson (2013). Wolves prey on a wide variety of mammals, especially elk, deer, and moose. Excellent wolf habitat exists in the analysis area offering remote den and foraging habitat. Livestock grazing is not permitted on BLM lands in the analysis area.

Bald and golden eagles: Both eagles inhabit the analysis area. The analysis area currently has large trees suitable for nesting. Foraging, perching, roosting, and nesting habitat for bald and golden eagles is currently sufficient to support multiple territories. Bald eagle nest territories are not confirmed there, but eagles forage in the area especially for carrion during the general hunting season. Bald eagles have large home ranges and resident birds with established territories nest to the north along the Blackfoot River. Fish, waterfowl, small mammals, and carrion are primary food sources for the bald eagle. Golden eagle nests are not known to be present, but eagles forage in the area especially for carrion during the general hunting season. Golden eagles nest in the uplands, especially along cliffs, and are often found in large conifer trees. A large inactive eagle nest is located in a large western larch tree less than a half mile north of thinning unit T8. Eagle nest territory information is inventoried and monitored annually (DuBois, 2012). Information from the Montana Field Guide (Montana NHP and Montana FWP, 2013) is used as the basis for impact analysis.

Northern Goshawk: Goshawks inhabit the analysis area and sightings regularly occur but known nest territories are not documented (Jim Sparks, personal observations). The analysis area has diverse cover types suitable for 5-10 northern goshawk territories (based on 1,000-10,000 acres per home range territory depending on age and sex as well as habitat quantity and quality). Large trees for nesting and mixed forests for foraging are currently available. Diverse habitat is present throughout the analysis area providing excellent nest, post-fledging, and forage locations which together define goshawk home range. Mid to late successional stage conifer forest composed of Douglas-fir, ponderosa pine, and lodgepole pine, with >50% canopy closure, and high stem exclusion are optimum nest habitats. Post fledging habitat is dominated by small-sized trees, with >50% canopy closure. Forage habitat is generally composed of large trees with well-developed canopies and adequate flight space beneath canopies. Food items are comprised of red squirrels, chipmunks, snowshoe hares, ground squirrels, and various forest birds, including robins, flickers, and woodpeckers. McGrath (2003), Smith and Keinath (2004), and Sampson (2006) are used for analysis.

Great Gray and Flammulated Owl: Both species are present and forage and nest in the analysis area (Jim Sparks, personal observation). Large trees and snags are present for nesting. The great gray owl is typically non-migratory, but is known to migrate in times of food scarcity. The flammulated owl is a summer resident and migrates south during the fall. Excellent nest and forage habitat occurs for both species. Great gray owl sightings have been reported, and the flammulated owl has been recorded on the

Greenough Breeding Bird Survey (USDI-USGS 2013). The great gray owl prefers to nest in late succession stage Douglas-fir forests. Stick nests constructed by northern goshawks and red-tailed hawks are utilized. The flammulated owl prefers to nest in late succession ponderosa pine and ponderosa pine/Douglas-fir forests. Nest sites are typically old pileated woodpecker and northern flicker cavities located in large snags. The great gray owl forages for small mammals along forest edges between early and late succession forests. The flammulated owl forages for insects in the understory of mid to late succession assessment. Information from the Montana Field Guide (Montana NHP and Montana FWP, 2013) and Sampson (2006) are used as the basis for impact analysis.

Black-Backed and American Three-Toed Woodpecker: The three-toed woodpecker has been recorded on the Greenough Breeding Bird Survey; but the black-backed woodpecker has not been recorded on the survey or in the analysis area for the past ten years. The black-backed woodpecker is a fire-obligate and is usually more restricted to burned forests than other bird species. With the lack of recent fires, they are difficult to detect in the analysis area. The black-backed woodpecker often forages and nests in burn areas and is a year-round resident. The most recent fire was the East Chamberlain burn in 1994. Black-backed woodpeckers are also drawn to areas of recent pine beetle outbreaks. American three-toed woodpeckers are not fire-obligates, but move into areas following recent fires and pine beetle outbreaks. Like the black-backed woodpecker, three-toed woodpeckers inhabit coniferous forest. Three-toed woodpeckers are closely related to black-backs and share the same genus. Therefore, many of their life histories are very similar, although resource portioning for nest trees and forage behavior are unique. Both species are non-migratory. Both species have benefited from the recent pine bark beetle epidemic. Nest territories for the three-toed woodpecker have probably increased with increased forage opportunities. No recent fires have occurred, which would enhance black-backed habitat. Backhouse (2005) is used as the reference for analysis.

Big Game Species

Vegetation and road management are the effects indicators analyzed in section 4.2. Acres of vegetation treatment and miles of road used during treatments are the units of measure.

Elk: The Chamberlain and Lindbergh elk herds inhabit the analysis area. Both herds were studied by the University of Montana, the BLM, and other entities from 1977-1996 as part of the Montana Cooperative Elk-Logging Study of Montana (Burcham and others, 1998). The study showed that elk use large blocks of forest cover for habitat security and avoid open roads year-round. Elk are found in the analysis area during spring, summer, and fall, but winter at lower elevations on private lands. Elk move from winter range back to the analysis area in June after calving on private land (Jay Kolbe, personal communication). Small bands of elk periodically winter on south aspects when access to forage is available. Elk populations are stable in the analysis area (Jay Kolbe, personal communication).

Moose: Shiras moose is a year-round resident. The University of Montana conducted a study on the sympatric relationship between moose and elk in Chamberlain Creek in 1997-2000 (Burcham and others, 2000). Moose were found nearer to riparian areas, while

elk were found further from riparian areas. Moose showed strong selection for clear-cuts and burned areas and showed seasonal avoidance of roads. Moose also used large blocks of forest cover for habitat security. Moose have declined in the Chamberlain-Wales area during the last 10-15 years with a current maximum population of 20 individuals (Jay Kolbe, personal communication).

Mule and White-Tailed Deer: Both deer species are year-round residents. Mule deer typically inhabit dry-upland sites, while white-tailed deer are most often found in wetter locations. Habitat use is wide-spread and incorporates the majority of the analysis area's vegetation groups. Research studies have not been conducted. There are 200-300 mule deer during the summer, but this population is low compared to historic numbers (Jay Kolbe, personal communication). White-tailed deer populations are generally stable or increasing. Studies on deer have not occurred in the project and surrounding area. Summer and winter habitat may be defined by elevation gradients and snow depth.

Mountain Lion: Lions are year-round residents. Montana Fish, Wildlife, and Parks conducted a mountain lion study in the Garnet Range from 1997-2006 (Robinson and DeSimone, 2011). Lion movement is closely associated with their principle prey species, deer and elk. Population modeling suggested the lion population in the Blackfoot watershed was declining annually from 8-12% prior to the protection of the Garnet study area from hunting in 2001, but recovered to near 1998 levels by the end of the study in 2007. Home ranges for females are 100 mi^2 and for males, 200 mi^2 in the Garnet Range.

Black Bear: Black bears are common in the analysis area. They are year-round residents, and forage and den throughout the area. They are generalists and eat a wide variety of foods ranging from grass, to berries, to carrion. Coniferous forests are preferred habitat. The Garnet Mountains were part of a Montana Fish, Wildlife, and Parks Montana black bear study (Mace and Chilton-Radandt 2011). Sixty-three individual bears were genotyped in the Garnets, which includes the analysis area. The sex ratio of genotyped bears was 70% female and 30% male. The study estimated between 172 and 280 individuals make up the Garnet Range black bear population.

Montana Species of Concern

Montana Species of Concern are native Montana animals considered at risk by the Montana Natural Heritage Program and the Montana Department of Fish, Wildlife, and Parks (Montana Natural Heritage Program 2013). These species are considered at risk due to declining population trends, threats to their habitats, and/or restricted distribution. Vegetation management is the effects indicator analyzed in section 4.2. Acres of vegetation treatment are the unit of measure. Roads are not an impact issue. Status determinations for species potentially inhabiting the analysis area are:

S2B (at risk because of very limited and/or declining numbers, range, and/or habitat making it vulnerable to global extinction or extirpation in Montana and breeding for a migratory species).

S3 (potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas). These species include grizzly bear,

Canada lynx, wolverine, fisher, fringed myotis, Townsend's big-eared bat, golden eagle, northern goshawk, great gray owl, flammulated owl, black-backed woodpecker, pileated woodpecker, Clark's nutcracker, brown creeper, Cassin's finch, and evening grosbeak. Several of these species are previously discussed in the *Special Status Species* section.

S3B (potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas and breeding for a migratory species). The flammulated owl is an S3B species and is previously discussed in the *Special Status Species* section.

Lewis's Woodpecker (S2B): In 2003, a Lewis's woodpecker was reported in the 1991 burn on the Blackfoot/Clearwater Game Range (Jim Sparks, personal observation). Lewis's woodpecker inhabits lower elevation ponderosa pine cover types. It is migratory and present from May to September. It prefers late-successional ponderosa pine trees/forests and generally prefers older burned areas rather than newer burns. It nests in natural cavities, excavates cavities in soft snags of ponderosa pine and black cottonwood, and forages on tree beetles and flying insects (Buckhouse, 2005; Montana NHP and Montana FWP, 2013).

Pileated Woodpecker (S3): Pileated woodpecker has been recorded on the Greenough Breeding Bird Survey (USDI-USGS 2013). Pileated woodpeckers are year-round residents inhabiting low to mid-elevation late succession western larch, ponderosa pine, Douglas-fir, and western larch forests. They nest from March to July in cavities of large snags, and often make multiple nest chambers in the same snag. They forage on wood-boring insects such carpenter ants and beetles (Buckhouse, 2005; Montana NHP and Montana FWP, 2013; Sampson, 2006).

Clark's Nutcracker (S3): Clark's nutcracker has been recorded on the Greenough Breeding Bird Survey (USDI-USGS, 2013). Clark's nutcracker is a year-round resident inhabiting mixed conifer forests from low elevation ponderosa pine to high elevation lodgepole pine forests; is gregarious and nests in early spring (February – April) in coniferous trees; has a diet consisting of seeds of ponderosa pine, whitebark pine, lodgepole pine, Douglas-fir, and subalpine fir; and cache seeds aiding in the establishment of future forests (Montana NHP and Montana FWP, 2013). Chamberlain may have a trace of whitebark pine, but occurrence is very rare and does not provide a food source for the Clark's nutcracker. Ponderosa pine cover types may be the best habitat in Chamberlain for nutcrackers.

Brown Creeper (S3): The brown creeper has been recorded on the Greenough Breeding Bird Survey (USDI-USGS, 2013). They are a year-round resident that breed in late succession mixed coniferous forest and nest from May to July. They construct nests under the bark of coniferous trees. They are bark-gleaners and forage on spiders and various insects (Montana NHP and Montana FWP, 2013). Mountain pine beetle activity in the analysis area has averaged 50% mortality in lodgepole pine and has created favorable conditions for the brown creeper in the last decade. Brown creeper populations may have increased due to extensive tree mortality from pine beetle attacks.

Cassin's Finch (S3): Cassin's finch has been recorded on the Greenough Breeding Bird Survey (USDI-USGS, 2013). They are predominantly migratory, arriving in Montana in March and migrating south by September or October. They inhabit mid to late-successional coniferous forests of Ponderosa pine, Douglas-fir, and lodgepole pine. They build a cup nest in a live tree and breed from late May to July. They are abundant in young, post-fire coniferous forests, and forage on the ground for seeds and insects (Montana NHP and Montana FWP, 2013).

Evening Grosbeak (S3): Evening grosbeak have been recorded on the Greenough Breeding Bird Survey (USDI-USGS, 2013). They are a summer resident but may overwinter if food sources are available. They are highly irruptive and may be seen from year to year or not at all. They nest in June and July in mature mixed-coniferous and spruce-fir forests. They build a flattened saucer-shaped nest in a live tree or shrub, and forage on seeds and insects such as spruce budworm (Montana NHP and Montana FWP, 2013).

3.3.3 Soils and Site Productivity

Areas with past harvest operations (particularly 1970's to present) were evaluated in 2011-2012 for indicators of long-term soil impacts typically associated with harvest operations. Long-term impacts were not evident on the oldest low-elevation harvests conducted in the 1970's. Skid trails and landings were evaluated for soil compaction indicators (suppressed tree regeneration, surface runoff or patterns) as well as direct evidence of soil loss through erosion or displacement. Of the approximately 1700 acres of past harvest evaluated on BLM lands, 0.9 acres were found with evidence of compaction or displacement from harvest operations. These past impacts were solely attributed to old landings and skid trails. Fireline construction by bulldozers in 1994 accounted for approximately 4 acres of similar impacts in East Fork Chamberlain Creek and Pearson Creek. While there is no planning threshold regarding soil impact acreage, BLM policy is to maintain productivity by minimizing degradation and accelerated erosion (USDI-BLM, 2008b). An RMP objective (USDI-BLM, 1986) is to maintain productivity, and the standard operating procedure is to do so via application of BMPs. Best management practices, design features, mitigation, and rehabilitation would be used in the proposed action. The appropriate geographic scale for evaluating soil impacts is the activity area, since soil impacts are not likely to occur where no potentially ground disturbing actions occur.

3.3.4 Water Quality

The following information was obtained from the Montana Department of Environmental Quality Clean Water Act Information Center website, which provides current water quality status, probable causes and sources of impairment, beneficial use assignments, and Total Maximum Daily Load (TMDL) development status or published TMDLs.

The watersheds in the affected environment are within the Middle Blackfoot-Nevada Creek TMDL planning area (Montana DEQ, 2008). In 2011-2012 BLM conducted field surveys on BLM lands for the pollutant causes and sources as listed by DEQ. This effort focused on more site-specific assessment of sediment sources.

In 2000, the DEQ determined that Chamberlain Creek was 'fully supporting' all beneficial uses and has maintained that status through at least TMDL publication in 2008. As a result, Chamberlain Creek was not included in the 2004 base parameter assessment and was not listed as impaired in 2006. Furthermore, the DEQ determined that a sediment TMDL will not be required for Chamberlain Creek (Montana DEQ, 2008), and that no reductions in sediment load were required (Montana DEQ, 2008, p.317).

The formerly-listed segment occurred from the mouth to the East Fork confluence which is about 2 miles downstream from BLM-administered lands. There are no actions proposed near this listed segment.

Field assessments in 2011-12 identified no sediment contributions or other pollutant concerns on BLM-administered public lands. Sediment derived from road erosion in Sec. 9 (T.14N, R.13W) in the Spring of 2011 was corrected with a road obliteration and riparian restoration project by the State that same year.

Frazier Creek is a 303d-listed waterbody (MT76F004010) from the headwaters to the mouth for a total of 4.4 miles. BLM lands comprise the uppermost 1 mile of stream. DEQ lists the 'probable causes' as sediment, nutrients, and nitrogen, while the 'probable sources' are flow alteration, agriculture, and irrigation (Montana DEQ, 2012). None of these sources (uses) occur on the BLM lands in Frazier Creek. Field assessments on BLM lands in 1995 and 2011 revealed no pollutant concerns or delivery from past silvicultural activities or roads.

Stream conditions in BLM Section 36 are very good with functional and healthy riparian habitat. Water quality from the BLM-managed section of lands in the headwaters is likely to be good. The Middle Blackfoot TMDL (DEQ, 2008) evaluated the BLM portion of Frazier Creek headwaters as follows: *"Frazier Creek consists of three reaches…. Fraz1 is located in the headwaters, where the creek flows through a highly confined, densely forested valley bottom. Results of the aerial assessment identified no indicators of degradation within this reach"*.

Wales Creek is listed (MT76F004050) from the reservoir to the mouth. The reservoir is about 1 mile downstream from BLM-administered lands. BLM lands are within a Wilderness Study Area and as such are not subject to most management activities. Past BLM management does not appear to be contributing to the sources or causes for listing downstream in the listed segment.

Field surveys throughout the planning area in 2011 included the evaluation of erosion and sediment delivery hazards. Past timber harvest units showed very few indications of any erosion or sediment delivery, with more recent harvests of the 1970's through 1990's showing no evidence of sediment delivery. This was likely due to the application of BMPs such as Streamside Management Zones. Road drainage systems (culverts, ditches) in the analysis area had a few sites where hazards were noted and are proposed for maintenance or repair. Viewing numerous stream segments during the high-runoff period of Spring 2011 presented an excellent opportunity to locate any such hazards. While turbidity was not measured during runoff, water clarity during bankfull discharge was

very high and streambottom material was visible. Flow was noted on some road surfaces (compacted material) but were either controlled by side-sloping, ditches, waterbars, dips, or vegetation cover. A few sites were noted with minor erosion and/or sediment delivery. Repair and maintenance of these sites are part of the Proposed Action.

An appropriate geographic scale for evaluating potential water quality impacts is the "delivery reach" immediately adjacent to potential source or activity. Multiple delivery sources and reaches can be aggregated downstream if necessary. Since sediment delivery is the main water quality concern for the proposed action, the adjacent delivery reach is appropriate.

3.3.5 Streams and Riparian Conditions

Riparian health assessments were conducted in 1995 and 2010-11. The 1995 assessments utilized Montana Riparian Wetland Association methods (Hansen and others, 1995). After 2001, the assessments utilized the BLM's Proper Functioning Condition (PFC) checklist (Prichard and others, 1998) and focus more strictly on cause-effect identification in order to link assessment more directly with management needs. The intent of the current surveys was to identify and evaluate causal factors for "non-functional" or "at risk" conditions, and to identify the potential stressors to riparian health, hydrology, stream function, and water quality, and develop management actions for improving or maintaining conditions as desired. The appropriate geographic scale for analysis is the stream reach.

The 2011 evaluations indicate that 98% of the total stream miles in the assessment area are categorized as PFC (Table 3-6). Lentic riparian habitats total about 4 acres and occur as small ponded areas near lotic streams in Chamberlain Meadows and Wales Creek, and as a cutoff oxbow of the Blackfoot River near the Russell Gates recreational site. There were large acreages of "flowing-lentic" systems associated with wet meadow complexes in upper Chamberlain Creek. This acreage proved to be difficult to quantify with either aerial photomapping or GPS due to disconnected and indistinct soil/vegetation boundaries. "Flowing lentic" systems lack either distinct ponding or channel formation and thus cannot be easily assessed with either lotic or lentic PFC methods. However they represent substantial riparian plant communities, soils, and habitats. Many springs, seeps, and wallows fall under this category as well when they are not immediately adjacent to otherwise lotic or lentic systems. For this assessment, these flowing lentic systems were assessed in combination with adjacent lotic reaches.

Approximately 2.6 miles of Wales Creek within the WSA was evaluated for PFC in 1995. Total riparian habitat was estimated at 30 miles in the drainage at that time. Walk-through surveys conducted in 2011 evaluated about 10 miles of stream including both larger mainstem segments as well as smaller headwater systems. This sampling and the lack of stream or riparian risk activities indicated that the entire portion of the drainage on BLM-administered lands is PFC. Some notable risk elements which should be considered for long-term riparian health include noxious weeds (presently confined to the jeep road in Section 12, the valley bottom trails, and the meadow at the Section 10/11 line); and the extensive mortality of pole and medium sized lodgepole pine which are presently falling out of the stand and may present a large fuel hazard and a risk for soil

damage and altered stream runoff in the event of a high-severity wildfire. Springs and seeps are abundant throughout the Wales Creek drainage. The drainage has a highly dissected topography with numerous hollows, dry draws, and first-order drainageways.

Table 3-6. Condition Status for riparian areas.

Drainage	Proper Functioning Condition (PFC)		Functioning at Risk (FAR)		Non-functioning (NF)	
	miles	acres	miles	acres	miles	acres
Chamberlain	15.49	61.77	.47	.29	0.4	0.1
Bear	3.44	5	0	0	0	0
E.Fk.Chamberlain	1.87	2.81	.33	.4	0	0
Pearson	6.72	9.37	0	0	0	0
Frazier	1.77	2.76	0	0	0	0
Wales Creek	30 (est.)	35 (est.)	0	0	0	0

Hydrologic conditions were assessed by evaluating overall soil and vegetation conditions (stand conditions, erosion/runoff indicators), as well as more direct hydrologic modifications such as road drainage, diversions, impoundments, or stream channel modifications.

Roads on BLM-administered lands were evaluated for signs of flow interception, concentration, routing, and drainage network extension. Road problems were found to be fairly small scale and mostly related to minor erosion and sediment delivery concerns, rather than hydrologic concerns such as drainage interception or extension. The State had recently completed improvements to the roads on adjacent State lands.

A higher-than-average snowpack and high runoff provided an excellent opportunity to observe any problems or hazards. Fourteen sites were located where minor improvements to road ditches and ditch relief culvert inlets are needed. All culvert crossings on larger streams appeared to be functioning well with only minor inlet cleaning needed. One short road segment located in an ephemeral draw in Section 19 and 20 of Chamberlain Creek was recommended for obliteration and rehabilitation to reduce overland flow.

The East Fork Chamberlain wildfire occurred in the middle portion of the assessment area in 1994 (see 3.3.1). Timber harvest occurred on all private lands in the East Fork throughout the 1980's and 90's. BLM timber harvest included a mix of small clearcuts and larger partial cuts in the late 1970's and early 1980's. Old harvest areas were inspected for indicators of hydrologic modification. Stand regeneration is good to excellent in most areas. Ground-based logging in Section 31 caused soil compaction and displacement on landings and skid trails resulting in poor tree regeneration and some weed infestation. Similar compaction and reduced infiltration capacity was found in Section 35 of Frazier Creek associated with short sections of old skid trails and roadside log landings. The stream channels draining these areas do not reveal any indications of channel destabilization or erosion.

In 20011-12, streams with higher amounts of timber harvest in their associated drainage areas were evaluated for evidence of channel morphologic changes (such as erosion or aggradation) as a result of past harvests from the 70's through 90's, and the 1994 East Fork Chamberlain wildfire. Six subdrainage areas were evaluated and no stream/riparian morphologic changes were observable in five of the six subdrainages as summarized below:

Lost Horse: 30% of the subdrainage had been harvested around 20 years ago. These areas now have predominately advanced regeneration with sapling and small pole sized trees. No stream/riparian morphologic changes were observable, suggesting that any hydrologic change that may have occurred had not impacted the stream system. The stream reaches were rated PFC in 2011.

Section 29: 47% of the subdrainage had been harvested around 20 to 30 years ago. These areas now have predominantly advanced regeneration with sapling and small pole sized trees with over half the old harvest area covered in fairly dense regeneration . No stream/riparian morphologic changes were observable, suggesting that any hydrologic change that may have occurred had not impacted the stream system. The stream reaches were rated PFC in 2011.

Section 33: 42% of the subdrainage had been harvested around 15 to 30 years ago. These areas now have moderately dense to dense tree regeneration and brush. About 20% of the subdrainage burned in a 1994 wildfire, with much of the burned area covered with regeneration of saplings. No stream/riparian morphologic changes were observable, suggesting that any hydrologic change that may have occurred had not impacted the stream system. The stream reaches were rated PFC in 2011.

East Fork Chamberlain: 56% of the subdrainage had been harvested over a period from 20 to 40 years ago. Approximately 72% of the subdrainage burned in a 1994 wildfire. The area now has moderately dense to dense regeneration, with drier sites having sparse regeneration. The East Fork of Chamberlain Creek showed a few indications of past bed and bank changes (some old but stabilized overbank gravel deposits, angular riffle and pool bed materials, overbank woody debris jams). These are believed to be largely attributable to post-fire flows from the 1994 East Fork Chamberlain wildfire. Past riparian logging in Sec. 17 from the 1970s may have contributed to some of these past impacts also. There did not appear to be ongoing stream channel morphologic changes occurring. The mainstem stream reach was rated PFC in 2011. A small tributary was rated functioning-at-risk with notations regarding past logging and road disturbance.

East Fork Pearson: 18% of the subdrainage was harvested over a period of 15 to 40 years ago. Sparse to moderately dense regeneration and brush now occur in these old treatment units. No stream/riparian morphologic changes were observable, suggesting that any hydrologic change that may have occurred had not impacted the stream system. The stream reaches were rated PFC in 2011.

Upper Frazier: 12% of the subdrainage was harvested about 15 years ago. Sparse regeneration of seedling and sapling lodgepole pine and short brush now occur in two old harvest areas, and there is moderately dense to dense regeneration of lodgepole pine,

Douglas-fir, and subalpine fir with brush in the remaining old harvest area. The regeneration is intermixed seedling, sapling, and small pole sized trees. No stream/riparian morphologic changes were observable, suggesting that any hydrologic change that may have occurred had not impacted the stream system. The stream reaches were rated PFC in 2011.

Stednick (1996) suggested that approximately 15% of the watershed vegetation cover must be harvested for measureable increase in water yield in the Rocky Mountain/Inland Intermountain region, however the variability is large with very low correlation. He further suggests that high variability may be due to variations in harvest location, harvest type, and pretreatment vegetation cover. Bosch and Hewlett (1982) suggest cover reductions less than 20% are not detected in streamflow. Observed stream channel response to water yield changes from harvest in the project area do not appear noticeable up to 47% harvest area in smaller catchments (around 500 acres). The channel types in these steeper headwater catchments are not responsive to peak flow changes (Grant and others, 2008).

3.3.6 Aquatic Habitat and Species

Habitat data presented in this section was collected primarily during the 2010-2013 field seasons using the USFS R1/R4 inventory protocol (Overton and others, 1997) and a modified Hankin and Reeves protocol (Hankin and Reeves, 1998; Moore and others, 2006). Additional habitat and species presence data was collected by the BLM during the 2002-2009 field seasons. The condition of the PIBO/INFISH Riparian Management Objectives (RMOs) was evaluated across all planning area streams in 2011 and 2013. Supplemental habitat and species data collected by Montana Fish Wildlife and Parks, Montana Natural Heritage Program, and others were used where appropriate and available.

Fish species distribution was determined through examination of existing Montana Fish, Wildlife, & Parks (FWP) records accessed through the Montana Fisheries Information System (MFISH) database, as well as other sources such as Plum Creek Timber Company records, historic BLM records dating back to 1976, and electrofishing, snorkel, and spawning surveys conducted by BLM personnel between 2000 and 2012.

Amphibian surveys were conducted by BLM and Montana Natural Heritage Program staff in 2010 and 2011. Intensive timed surveys were conducted on BLM-managed lands adjacent to the Blackfoot River, the upper Chamberlain Creek drainage, and the Chamberlain Meadows area in 2011. Sweep net surveys of suitable habitat in Wales Creek were conducted in 2011. In areas not surveyed, potential habitat for amphibians was identified and mapped.

Presence and distribution of the freshwater mussel (*Margariterifera falcate)* was determined through FWP records (accessed through the MFISH database: http://fwp.mt.gov/fishing/mFish/). Additionally, mussel surveys were conducted by BLM personnel in suitable habitat within Chamberlain and Wales Creeks in 2010 and 2011. Bear, Pearson, and East Fork Chamberlain Creeks were not surveyed due to a lack of suitable habitat as characterized by Stagliano (2010).

Issue 1: Aquatic Species

The assessment area provides a diverse array of lotic and lentic habitat for a variety of native and non-native species. There are approximately 16.35 miles of fishbearing streams distributed across five subwatersheds, providing habitat for seven native and three non-native fishes species. The most widespread fish species group is the Salmonidae (trout, charr, and whitefish). Other groups present include the Cottidae (sculpin), Cyprinidae (minnows and dace), and Catastomidae (suckers). See Table 3-7 and Figure 3-2.

There are abundant headwater wetlands, springs, and seeps that provide habitat for amphibians such as the boreal toad, Columbia spotted frog, and the long-toed salamander. The area provides habitat for western pearlshell mussel (*Margaritifera falcata),* a regionally uncommon species widely considered to be in serious decline (Stagliano, 2010).

Westslope cutthroat trout are the most widespread and abundant species in all streams in the Chamberlain-Wales Planning area. Except where their distribution is limited by anthropogenic barriers, they are believed to occupy 100% of their historic habitat. They are additionally the only fish species present within stream segments where in-water project work (i.e., culvert removal) is proposed.

Most of the westslope cutthroat trout in the planning area are resident forms. Currently, only Bear Creek provides unimpeded access for spawning runs of fluvial cutthroat. Although lower Chamberlain Creek supports a strong population of fluvial cutthroat (Schmetterling, 2001), waterfalls limit access to fluvial fish in the upper Chamberlain Creek project area. Fluvial fish have been located in East Fork Chamberlain below the project area (Pierce and others, 2004), but culvert barriers and general habitat suitability (primarily stream size) on non-federal lands limit fluvial access to BLM-managed reaches of the upper East Fork. Reservoirs, culverts, and irrigation diversions limit access for fluvial fish in Wales and Frazier Creeks. A partial barrier on private land at the mouth of Pearson Creek was removed in 2013, restoring full access for fluvial cutthroat into the Pearson Creek system.

Bull trout are present in the Blackfoot River and are sporadically present in Chamberlain Creek, downstream from the project area (Pierce and others, 2008). The furthest upstream record of a bull trout was a 12” fish at stream mile 4.9, immediately downstream from the project area boundary (Wheeless and Peek, 1980). No bull trout have been recorded in proximity to the project area since that time.

The bull trout was listed as Threatened under the Endangered Species Act in 1998. Critical Habitat was designated in 2010. Within the planning area, the Blackfoot River is the only stream with designated Critical Habitat.

There are several non-salmonid fish species present in the planning area (Table 3-6), but they are restricted to the Blackfoot River. Non-native species are also present in the Blackfoot but have not been sampled in segments of streams in the vicinity of proposed

Table 3-7. Aquatic Species in the analysis area.		
Species	**BLM Management Status**	**Presence and distribution in the Planning Area**
NATIVE SPECIES		
Westslope cutthroat trout	BLM Sensitive	All streams in planning area, from mainstem Blackfoot River to headwaters
Bull trout	ESA listed-threatened BLM Special Status	Blackfoot R; sporadically present in Chamberlain Ck downstream from project areas
Sculpin spp.		Chamberlain Ck; Blackfoot River
Largescale sucker		Blackfoot River
Longnose dace		
Mountain whitefish		
Redside shiner		
Boreal toad	BLM Sensitive	Breeding habitat in vernal ponds and backwaters in Chamberlain Meadows area, backwaters and beaver ponds of upper Wales Creek. Adults found sporadically in streamside and riparian areas throughout planning area
Columbia spotted frog		
Long-toed salamander		Vernal ponds and backwaters in Chamberlain Meadows area, Wales Creek backwaters and beaver ponds.
Western pearlshell mussel		Wales Creek
NON-NATIVE SPECIES		
Brown trout		Blackfoot River
Brook trout		Blackfoot River, sporadically present in Chamberlain Creek within project area
Rainbow trout		Blackfoot River

projects, with the exception of brook trout, which are found in low densities in Sec. 20 in Chamberlain Creek, adjacent to several proposed vegetation treatments.

Amphibians have been noted throughout the planning area. Tadpoles of frogs and toads as well as salamander larvae have been found in slack-water habitats associated with backwaters and beaver ponds in Wales and Chamberlain Creeks as well as the extensive wetlands present in the Chamberlain Meadows area. No amphibians have been located in areas proposed for in-water work.

The western pearlshell mussel (*Margaritifera falcate)* is found in abundance in lower Wales Creek. No mussels have been located in the headwaters of Wales Creek where prescribed fire is proposed.

Issue 2: Sediment

Based on field surveys and the State TMDL evaluation process, sediment levels in aquatic habitats throughout the planning area are likely at background or natural levels (see Section 3.3.4).

Issue 3: Access to Aquatic Habitat

The first phase of road building in the lower portions of the major streams in the planning area was conducted by the Anaconda Company around the turn of the last century (1900). The road network was expanded further into the affected drainages by subsequent owners including the U.S. Plywood, Champion Timber, and Plum Creek Timber Companies. BLM road construction in the 70s and 80s included construction of additional stream crossings in the upper East Fork Chamberlain, Pearson and Bear Creek drainages. Older

stream crossing structures (culverts) were generally not designed to allow for upstream passage by aquatic organisms. As a result, upstream passage for stream-dwelling organisms in portions of the planning area has been partially or completely blocked for over a hundred years.

Legacy culverts have recently been removed on state-owned lands downstream from the planning area. In 2010, Montana DNRC removed culverts on mainstem Chamberlain and Bear Creek. In June of 2013, a barrier at the mouth of Pearson Creek was removed, restoring passage between Pearson Creek and the Blackfoot River.

On BLM-managed lands, the culverts currently blocking upstream passage are generally located in the upper portions of project subwatersheds, near the headwaters. The species most affected by these culverts are westslope cutthroat trout. Cutthroat are the primary residents of these headwater channels and often migrate into headwaters with intermittent channels to spawn (Meyer and others, 2007). Currently, culverts on BLM-managed sections of East Fork Chamberlain and Bear Creeks present complete barriers to upstream migration, while two culverts on Pearson Creek block upstream passage during periods of high flows (e.g., when cutthroat make upstream spawning migrations). See Table 3-8.

Table 3-8. Configuration of culvert barriers in analysis area streams

Stream	Total Stream Miles	BLM Culvert barrier locations (stream mile)	Inaccessible stream miles due to barriers	Percent potential habitat inaccessible[1]
East Fork Chamberlain	4.1	3.0	1.1	Up to 27%
Pearson	8	5.9, 6.25	2.1	Up to 26%
Bear	4.7	2.9	1.8	Up to 38%

[1]*actual increase in available habitat depends on seasonal persistence of surface flow, which varies annually.*

3.3.7 Wales Creek Wilderness Study Area (WSA)

The WSA consists of 11,580 acres of BLM-administered public lands, about 6400 acres of which occur within the project area. No other state or federal lands are within the WSA. The WSA is characterized by rather steep forested drainages with stands of spruce, lodgepole pine, Douglas-fir and subalpine fir. Mining, grazing and firefighting activities have left a few structures and other imprints of human activity on portions of the WSA.

However, the majority of the WSA is essentially undisturbed by direct human activity. All 11,580 acres of the WSA were studied under the authority of Section 603 of the Federal Land Policy and Management Act (FLPMA), and an EIS and Record of Decision recommended "no wilderness" because of conflicts with other resources values (USDI-BLM, 1991). Also in the EIS, it was recommended that the 4,900 acre Wales Creek drainage be managed as a Special Management Area in which no development would occur except to improve wildlife habitat, thereby preserving fragile hydrologic resources and maintaining unroaded backcountry use and values. The remaining 6,680 acres would be managed for their commercial forest values with an emphasis on maintaining or enhancing wildlife habitat. This management scenario was acceptable to a majority of people commenting on wilderness recommendations in the EIS.

The Wales Creek WSA encompasses the last major unroaded drainage in the western Garnet Range. It is surrounded by managed timberlands and rural development, yet it gives the visitor the impression of being undeveloped. The numerous drainages and dense stands of timber provide outstanding opportunities for visitors to be physically and visually separated from one another. From higher elevations, visitors can look out and see towns, past logging operations, ranches, roads and mining activities. These sights are unavoidable, but do not seriously interfere with the opportunity to find solitude within the WSA. From the same vantage points, the visitor can also see unroaded expanses of the WSA drainages and once inside these drainages, surrounding human activities are hidden from sight and for the most part, sound. The WSA supports moose and elk herds, and big game hunting is the major recreation use of the WSA. The WSA has value for the roadless hunting experience it affords. Because of its size, ruggedness, diversity and opportunities for quality hunting, the Wales Creek WSA provides outstanding opportunities for primitive and unconfined recreation. The WSA contains at least four warm springs. The springs are not sufficiently hot to develop as a geothermal resource. Wildlife values are considered highly substantial in the WSA.

Per the Wilderness Study Area Interim Management Policy and current BLM Manual 6330, management of the WSA has been minimal, with the exception of fire suppression. For the last 90 years, naturally occurring wildland fires started by lightning have been actively suppressed on lands that now comprise the WSA. (See Section 3.3.1.1 for WSA fire history)

3.3.8 Special Status Plants

The analysis area for special status plants consists of the proposed project sites where there is potential for disturbance. The BLM Montana/Dakotas Special Status Species list (USDI-BLM 2009), Montana Natural Heritage database information, and BLM Missoula Field Office inventory records were reviewed and there are no federally listed plant species occurring in the project areas. However, two BLM-listed sensitive plant species, the Howell's gumweed (*Grindelia howellii*) (Montana Natural Heritage Program, 2013) and White-veined wintergreen (*Pyrola picta*), occur in the project areas. Howell's gumweed occurs along roadsides in the Sperry Grade area, and white-veined wintergreen occurs in higher-elevation forests. White-vein wintergreen is common in Montana and is not a species of concern. For the areas affected by this EA, white-veined wintergreen is common and will not be further addressed.

3.3.9 Invasive Plants

The current distribution of noxious weeds is largely associated with past timber management activities. Infestations are commonly within 10 meters of a road or other disturbed sites such as landings or camp areas. Infestations well away from roads are likely due to wildlife and recreational use. These observations are consistent with Bryson and Carter (2004).

Approximately 3,000 acres of BLM lands within the Chamberlain-Wales Ecosystem Assessment Area have a high potential for weed infestation, whereas approximately 4,300 acres of BLM lands are nearly weed free or have very low potential for infestation (such as higher elevations and/or northerly aspects). Where infestation has lower potential, management of weeds would have a higher rate of success.

Weed species of particular interest in the analysis area include the following;

Yellow hawkweed (*Hieracium caespitosum*) is a state-listed category 2A noxious weed and is considered highly invasive and a serious threat to plant communities in the assessment area. Approximately 150 acres in the upper Chamberlain Creek drainage are affected, and present the most serious noxious weed concern.

Spotted knapweed (*Centaurea stoebe)* is currently found throughout the Chamberlain-Wales Assessment Area. Populations found on the lower elevation sites range between 10% - 50% weed canopy cover in association with tree canopy cover less than 40%. Higher elevations sites regardless of tree canopy cover range between <1%-5% weed cover.

Leafy spurge (*Euphorbia esula)* is found in the Bear Creek flats area along the Blackfoot River. This site is managed under a cooperative agreement with the Blackfoot River Leafy Spurge Project.

Dalmatian toadflax (*Linaria dalmatica)* has not been found in the Chamberlain-Wales Assessment Area, however ongoing monitoring and inventory would detect any new infestations.

Canada thistle *(Cirsium arvense)* is found throughout the Chamberlain-Wales Assessment Area in low densities (scattered occurrences with less than 5% canopy cover).

Oxeye daisy *(Leucanthemum vulgare),* hounds-tongue *(Cynoglossum officinale),* and musk thistle *(Carduus nutans)* are present in low densities primarily along roadsides and landings. It is rarely found outside of these areas.

3.3.10 Cultural Resources

A literature search of databases at the BLM Missoula Field Office and State Historic Preservation Office found that 19 Class III Cultural Resource Inventories were conducted on about 2637 acres (4.5%) of the Chamberlain-Wales Ecosystem Assessment Area.

Within the area, 1867 acres (71%) of inventoried lands are BLM, 613 acres (23%) are State lands, and the remaining 157 acres (6%) are overlapping inventories (the same acreage inventoried more than once). These inventories were conducted pursuant to Section 106 of the National Historic Preservation Act (NHPA), under which a Class III Cultural Resource Inventory is required prior to any surface disturbing activities such as road construction or timber harvest to identify cultural sites that may require protection.

Twelve of the 19 inventories occurred on BLM-administered lands and five cultural sites have been recorded. Three are historic sites on BLM lands and two are prehistoric sites on private lands. One of the prehistoric sites has culturally modified trees (CMTs) and is eligible for the National Register of Historic Places. The other prehistoric site is a lithic scatter and eligibility is unknown. Two historic sites are trash scatters and are not eligible for the National Register and the third historic site is a segment of the Big Blackfoot Railroad grade constructed by 1916 and is eligible for the National Register.

The Cokahlarishkit trail ("River to the Road to the Buffalo") was used by indigenous groups as well as the return trip of the Lewis and Clark Expedition. The trail essentially follows the Blackfoot River and although there is little physical evidence of the trail remaining, Godin and Adams (2003) recorded segments of the trail and indicated some segments were located on the north side of the river. Two parcels of BLM-administered lands abut the Blackfoot River in the Chamberlain vicinity (Sperry Grade and Bear Creek Flats). Neither parcel contains evidence of the Cokahlarishkit trail, however a portion of the Big Blackfoot Railroad grade was recorded in the Sperry Grade parcel by Godin and Adams (2003) . The railroad may have been built on top of the Cokahlarishkit/Lewis and Clark Trail in this parcel. Non-BLM lands were not inventoried as part of the 2002 effort by Godin and Adams, so it is unknown if segments of the trail or railroad grade occur on these lands.

Since only 4.5% of the Chamberlain-Wales Ecosystem Assessment area was inventoried, the BLM reviewed 14 additional inventories conducted within two miles of the Assessment boundary to help determine whether cultural sites may be found in future inventories. These other inventories recorded 10 additional cultural sites. Of the 15 sites in total, 11 are prehistoric and four are historic.

Based on the higher percentage of recorded prehistoric sites and their proximity to the Cokahlarishkit Trail, a higher percentage of prehistoric sites would likely be found in future Class III Cultural Resource Inventories. Most of the recorded sites thus far are within one mile of the trail.

Since the area is not substantially mineralized, historic mining sites are not expected to be found. However, because of the historic logging and proximity to the Big Blackfoot Railroad there is potential to find historic sites such as trash scatters associated with historic logging.

3.3.11 Lewis and Clark National Historic Trail

On July 3, 1806, Lewis and Clark divided into two parties and left Travelers Rest, located near present day Lolo, Montana, to continue on their return trip home. Lewis, his party

of nine men and several guides, travelling on horseback, began their journey through Hellgate Canyon (near present day Missoula, Montana), up the Blackfoot River and across the Continental Divide. Lewis and his men followed the "Cokahlaharishkit Trail". The “Cokahlaharishkit Trail” was a trail used for centuries prior to 1806 by Native Americans to access buffalo hunting lands east of the Continental Divide. The trail generally follows the Blackfoot River although segments veer away from the river. According to the General Land Office maps and maps created by Lewis and Clark expert Bob Bergantino, around the Ninemile Prairie area of the Lower Blackfoot River, the trail leaves the area next to the river and takes a more overland route heading towards the Clearwater River, then the trail begins to parallel Highway 200 or was covered by Highway 200 until around the turn off to Scotty Brown Bridge. At this area, the trail continues overland, north of the River, touches the northern tip of Kleinschmidt Lake and eventually meets up with Highway 200 near Ward Creek. From there it more or less follows the base of the mountains, along Highway 200 except near Kershaw Mountain. About a mile east of Arrastra Creek, the trail follows a ridge up to a hill that Mr. Bergantino interprets, using Lewis’ and Gass’ journals, as possibly being the “bald topped hill” and then down towards Patterson Prairie.

The Lewis and Clark Trail was designated a National Historic Trail after the National Parks and Recreation Act of 1978, Public Law 95-625, amended the National Trails System Act to include the new category of National Historic Trails. According to the Foundation Document (2012),

The purpose of the Lewis and Clark National Historic Trail is to commemorate the 1804 to 1806 Lewis and Clark Expedition through the identification; protection; interpretation; public use and enjoyment; and preservation of historic, cultural, and natural resources associated with the expedition and its place in U.S. and tribal history.

The Secretary of the Interior was given the trail administrator responsibility and long-term administration of the trail was delegated to the National Park Service (NPS). In the 1982 Comprehensive Management Plan, the NPS recommended two types of development for Lewis’s return trip between Traveler’s Rest and Great Falls - a motor trail and a land trail. They proposed that the land trail would be located on the south side of the Blackfoot River between McNamara and Roundup Bridge and that Johnsrud Park and Ninemile Prairie Access were to be trailheads for the land trail. The motor trail would be along Highway 200.

The Lewis and Clark National Historic Trail (LCNHT) can be divided into 4 segments on BLM administered lands in the Missoula Field Office Area. Those segments are 1) Johnsrud Park to Whitaker Bridge; 2) Whitaker Bridge to Nine Mile Prairie; 3) Sperry Grade; and 4) Marcum Mountain. Recreational opportunities on BLM administered public lands differ depending on the segment. Segments 1 & 2 offer a wide variety of recreational opportunities for people seeking to experience the trail - i.e. hiking, mountain biking, floating, fishing, picnicking and camping. Because the LCNHT follows much of Highway 200 through Segments 3 and 4 and because of the terrain in these segments, the main recreational opportunity on BLM administered lands for those seeking the Lewis and Clark National Historic Trail experience would be an auto tour (motor trail).

In 2002, all four segments were inventoried for cultural resources at a Class III level – the most intensive level. The inventory not only looked for trail remnants, but also looked for historic sites associated with the trail. Trail remnants were identified on 3 of the segments. The only segment that trail remnants were not identified was Segment 3 – Sperry Grade.

The northern boundary of the Chamberlain-Wales Ecosystem Assessment area parallels the Blackfoot River. Because in this area the Lewis and Clark National Historic Trail parallels Highway 200, the LCNHT is to the north of the watershed assessment boundary except for on the Sperry Grade area.

The Sperry Grade area consists of an isolated parcel of BLM land that was acquired in the 1990s. Prior to that, it was owned by Champion International. Much of the timber was harvested throughout the years it was owned by Champion. In addition, a large fire burned through the area in 1991. Since the acquisition of the parcel, the BLM Missoula Field Office has planted trees in the area. The landscape of Sperry Grade goes from a river valley with oxbow lakes to rolling mountainous terrain. A road off of Highway 200 is the main access to the parcel. Access is limited by a gate which is closed starting in September. In addition, because this parcel is part of the Blackfoot-Clearwater Game Range, no entry is allowed from November 11 through May 14. The majority of the Sperry Grade tract is in Habitat Type Group 1. No special status plants are known to exist on this parcel. Approximately 75% of Sperry Grade has some level of weed infestation consisting of spotted knapweed, leafy spurge, yellow toadflax, dalmatian toadflax, cheatgrass, hound's tongue and common tansy. Spotted knapweed and cheat grass are the predominant weed species. Bio-control releases for knapweed, toadflax, and Leafy spurge have occurred over last ten years.

BLM Manual 6280 outlines the management of the National Scenic and Historic Trails. Proposed actions which may adversely impact designated National Trails need to be analyzed. In the Sperry Grade area, two forest vegetation related treatments are proposed – pre-commercial thinning and planting. Because the purpose of both treatments is to restore the habitat to historic conditions and because both projects are not ground disturbing, there is very little, if any, potential for them to adversely impact the LCNHT. Both projects are located on the northern half of the parcel near the top of a ridge and over the other side. The pre-commercial thinning will occur on more gentle slopes, while the planting will be on steeper slopes.

Another proposed project area (Bear Creek Flats) is approximately ½ mile south of the LCNHT as identified by the GLO records and Bob Bergantino's efforts to map the trail. The rest of the proposed projects are over 4 miles south of the LCNHT.

3.3.12 Recreation

Recreationists use the Chamberlain Watershed area to fish and float the Blackfoot River, hunt in the oldest Walk-in Block Management Area in the state, snowmobile, and gather antlers on the Blackfoot-Clearwater Game Range. In addition, the Lewis and Clark

National Historic Trail, in places, borders the Watershed area. For more information on the National Historic Trail, see the Cultural Resources section.

The Blackfoot River which borders the Watershed is a popular fishing and floating area. Data collected in 2009 indicates that approximately 16,999 fishing days occurred from the North Fork down through the Watershed. The river is open to organized groups and commercial outfitter and guides. These groups are restricted to a maximum group size of 21 to 30 depending on what reach, as defined in the *Blackfoot River Recreation Management Plan* (MTFWP, 2010), they are using. The area of the river that borders the Watershed Assessment area was defined as Reach 3 (Harry Morgan Fishing Access Site to Russell Gates Fishing Access Site) and Reach 4 (Russell Gates Fishing Access Site to Roundup Fishing Access Site). Reach 3 is to be managed for a lower volume of recreation use and to maintain the undeveloped character of this part of the river corridor. The desired outcome for Reach 4 is to also manage for a lower volume of recreational use while also allowing larger group sizes during the whitewater season (May 1 through June 15). During the whitewater season, the group size for Reach 4 is increased to 40. Competitive events on both reaches may be permitted on a case-by-case basis. Camping is limited in both reaches. Montana Fish, Wildlife and Parks is working with various landowners to develop float in only campsites throughout the Blackfoot River Corridor.

Some of the lands within the Chamberlain Watershed are part of the popular Blackfoot Block Management Area (BMA). No hunting outfitters are allowed in this area. Access to the tracts of BLM lands within the assessment area is limited. The BLM lands are heavily roaded with travel restrictions in effect year round. In an effort to maintain a quality walk-in hunting experience during the hunting season, motorized vehicle travel is not allowed on the BMA except on the public roads that are shown on the BMA map. In addition, nonmotorized travel is open only to foot, horseback and nonmotorized bicycle. However, landowners in the course of their administrative work and federal, state and county officials in the course of their official duties are exempt from the vehicle restrictions put in place during the hunting season.

The BLM authorizes three outfitter and guides in the assessment area. One permitted guide takes people on horse rides which starts on private property, passes through the Bear Creek Flats area and finishes back on private land. The other two offer guided snowmobile trips on a few of the snowmobile trails within the watershed.

The Bear Creek Flats area was acquired in the early 1990s and in 1994, the Garnet Resource Area RMP was amended deciding to manage most of this area as an Area of Critical Environmental Concern (ACEC) to preserve its wildlife, watershed, recreation and scenic values. Specifically, the management goals for the ACEC are to protect, maintain, and enhance (where feasible) the riverine riparian zone; the fisheries habitats; Bald Eagle feeding, roosting and potential nesting areas; big game winter habitat; the small stand of old growth Ponderosa Pine on Bear Creek Flats; the scenic values of the tract; and recreation uses that are compatible with the primary values of the tract (wildlife, riparian, scenic, etc.). The RMP placed this area under Management Area 9 (MA-9) which indicates that developed recreation facilities, including campgrounds and picnic grounds, will not be constructed unless consistent with the primary goals of the area. In 2000, Interim Recreation Management guidelines were written for the ACEC

and all BLM lands directly adjacent to the ACEC. The guidelines designated the area as "Day Use Only", prohibited all overnight camping and stated that SRPs not involving overnight camping will be considered on a case by case basis. The Interim guidelines were written as a result of several inquiries about SRPs with overnight camping at Bear Creek Flats and it was determined that this use was inconsistent with the Garnet RMP. In 2012, an area of land (known as the Dupont Property) north and adjacent to Bear Creek Flats was acquired. With the acquisition came a conservation easement that limited the uses of the land. Some of the limitations related to recreation include:

- No construction or placement of residences, mobile homes, recreational vehicles, towers, outside lighting or other buildings or structures for any purpose, including but not limited to, hunting and fishing camps or boat launching sites is allowed.
- No new roads or vehicle trails can be built.
- No off-road use of snowmobiles, bicycles or other vehicles (motorized and nonmotorized) is permitted except for agricultural purposes.
- The establishment or maintenance of any commercial or industrial activity, specifically including but not limited to game farms, commercial hunting and fishing and/or outfitting operations, motels or hotels, trailer or recreational vehicle parks is not allowed.
- The use of the property for overnight boat camps is not allowed.

At the time of the acquisition, it was also decided that until the Garnet RMP is revised or formally amended, this property would be managed as an addition to the adjacent Bear Creek Flats ACEC with the same management areas (MA-1 and MA-9).

3.4 Mitigation Measures

No additional measures have be en i dentified o ther t han t hose i ncorporated i nto t he proposed action and design features in section 2.3.

3.5 Monitoring and/or Compliance

The BLM would conduct implementation monitoring to ensure that treatments are executed as designed. This monitoring would occur during contract administration and project supervision.

The BLM would conduct effectiveness monitoring to determine if desired post-treatment resource conditions are met.

The BLM has established implementation and effectiveness monitoring protocols for forestry and fuels management. The BLM would adhere to these procedures unless improved methods, new science findings, or agency requirements necessitate a change to the procedures. Baseline prescribed burn monitoring utilizes photo plots. First-order fire effects and long-term effectiveness monitoring would be conducted following standard BLM Missoula Field Office prescribed fire and fuels monitoring protocols.

Desired conditions for the structure, composition, density and patch size of forest vegetation would be monitored by the BLM using adaptive management principles, and applied to both implementation and effectiveness monitoring efforts.

A portion of the vegetation treatments would contain commercial/salable timber products. The BLM would implement these treatments and offer the products through a timber sale. BLM timber sales are subject to monitoring for the duration of the sale contract to ensure compliance with the timber sale contract and Montana Forestry BMPs. Non-commercial contracted vegetation treatments, such as thinning, planting and fuel augmentation would also be subject to standard contract compliance and implementation monitoring. Implementation monitoring follows standardized formal forestry plot protocol outlined in all non-commercial forestry vegetation contracts.

Effectiveness monitoring for non-burning vegetation activities (harvest, thinning, planting) would involve formal sampling outlined in the Missoula Field Office Integrated Resource Monitoring protocol for vegetation management projects. This monitoring establishes baseline (pre-treatment) vegetation plots and transects. Additional monitoring on the same plots and transects is conducted post-treatment and in succeeding years for long-term effectiveness of treatments. Vegetation metrics such as plant species, coverage of species, vegetation height, regeneration, and fuel loading would be monitored.

The BLM would conduct baseline monitoring for cultural resources and special status plants prior to implementation of any treatments that have potential to affect these resources. These monitoring results would be used for treatment modifications, inventory data, and adaptive management.

4.0 ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

This chapter describes the changes to resources that would occur if the No Action or Proposed Action alternatives were implemented.

4.2 IMPACTS OF THE NO ACTION ALTERNATIVE

4.2.1 Forest Vegetation, Fuels & Fire Management

This section analyzes the impacts of the No Action alternative to forest vegetation, fuels, and fire management in the analysis area. Forest vegetation impact indicators include stand density and structure, species composition, and patch size. Unless stated otherwise, impacts were analyzed at the scale of the Chamberlain-Wales analysis area boundary. Canopy coverage may be used as a surrogate for tree density in this analysis. As in Chapters 2 and 3 of this EA, forest vegetation has been grouped into three cover types: (1) ponderosa pine/Douglas-fir; (2) western larch/mixed conifer; and (3) lodgepole pine/subalpine fir.

None of the proposed vegetation treatments would occur, however fire suppression would continue into the foreseeable future.

There would be no direct impacts since active vegetation management on BLM managed lands within the analysis area would not occur. Indirect effects would vary but departure from the HRV would continue across the area.

Forest vegetation would continue toward higher tree densities and composition change on many sites as ingrowth of shade-tolerant conifers outcompete the shade-intolerant species (western larch, ponderosa pine and quaking aspen). The absence of disturbances (such as fire) reduces regeneration of shade-intolerant species. The higher tree densities and compositional shift toward shade-tolerant species would result in increased wildfire intensity or large insect and disease outbreaks further reducing the presence of remaining shade-intolerant species. Forest structure would vary over time depending on successional stage(s) of the stands and disturbance intervals. As an example, stands currently in an early seral/stand initiation structural stage would transition to a pole/stem exclusion stage and eventually develop mature stand structure. Without disturbance, early seral structure would be reduced across the area leading to a reduction in vegetation diversity.

The stands proposed for pre-commercial thinning are overstocked, or would become over-stocked in the next decade (except T1 and half of T10). Stand vigor would decline and the risk from insect damage (mountain pine beetle or western spruce budworm) and crown fire would increase. Wildlife forage and browse understory species would also decrease as these stands move toward stem exclusion.

Unless a large-scale natural disturbance occurs that shifts cover types closer to the HRV, patch size would continue to be fragmented and would be smaller than what historically occurred. One possible exception is that which would occur in the lodgepole pine/subalpine fir cover type recently affected by a large-scale mountain pine beetle outbreak. In these stands, patch size may shift toward the HRV due to rapid mortality in the lodgepole pine overstory.

Conifer encroachment would continue to occur into the few open parks and grasslands until a disturbance, such as wildfire or insect and disease outbreak, reduces conifer encroachment.

Alteration of historic fire regimes may occur in all three cover types. The understory fires that historically occurred in the ponderosa pine/Douglas-fir cover type may transition further into a mixed severity fire regime as understory tree density increases and stand structure exhibits increased ladder fuels. The mixed severity fire regime of the western larch/mixed conifer cover type would trend toward a higher percentage of the cover type at risk to stand replacement fire than what historically occurred. This effect would be due to increased tree density and structural changes such as increased ladder fuel development. In the lodgepole pine/subalpine fir cover type, fuel loading would increase due to pine mortality from a recent mountain pine beetle outbreak. Stand replacement fire occurrence may increase and create larger patch sizes than what occurred historically, as well as increased landscape homogeneity.

Indirect impacts would result from the No Action alternative. Stands historically dominated by seral species would continue to progress from seral species dominance toward climax species dominance. Without appropriate disturbance in ecosystems that evolved with disturbance, shade tolerant species would dominate instead of seral species. As discussed by Harvey and Morgan (2001) and Harvey and others (1998) this shift from seral species to shade tolerant dominance can lead to destabilization of the ecosystems which have occurred on these sites by changes in the tree species, forest structure (i.e. lowering of canopy heights and increasing stand density), site nutrient cycling and nutrient storage in the soil, insect and disease cycles and fire cycles, as well as, the overall genetic makeup of these forests. An example of this is that nutrients and nutrient turnover in deep-rooted seral species dominated stands generally has more vertical displacement than in shade-tolerant (climax) species stands where the nutrients are concentrated in the shallow soil horizons. When nutrients are concentrated in the shallow soil horizons, the nutrients are at a greater risk of loss from wildfire or other disturbances. As the lack of appropriate disturbance continues, seral species eventually would be unable to produce seed, or areas available for species propagation would become non-existent (Harvey and Morgan, 2001).

The treatments designed to increase stand vigor, long-term resistance to crown fire and insect and disease damage, would not occur. This would increase the risk of stress-induced insect and disease damage in response to increasingly higher tree densities and competition while ultimately predisposing stands to higher risk of crown fire (Amman and others, 1977; Carlson, 1989; Cole, 1978; Fiedler and others, 2004; Graham and others, 1999; Safranyik and Wilson, 2006).

Fire suppression at current levels may reduce biological diversity while creating homogenous conditions across the forested landscape. The long-term ecological implications of these conditions are currently unknown (Arno and Fiedler, 2005).

Quigley and others (1996) noted in the mid 1990's that fire suppression and reduced disturbance on the landscape has resulted in low severity and mixed severity fire regimes currently shifting among the various forest types as the proportion of stand replacement fire almost doubles from pre-1900 levels. Accelerated levels of stand replacement fires, based on fuel modeling and observations, create ample woody fuels that can remain flammable for upward of a century, thereby exacerbating the risk of more severe fires occurring on the same sites (Arno and Fiedler, 2005). These trends would likely continue in the analysis area with the No Action alternative.

Lodgepole pine /subalpine fir cover type

COMPOSITION: Since no treatments would be initiated, and until a wildfire occurs, this cover type would continue to trend toward climax-dominated sites where shade-tolerant species such as subalpine fir would increase, and seral species such as lodgepole pine would decrease in dominance. Single-storied lodgepole pine stands dominated by trees with serotinous cones may take up to 50-100 years for the shade tolerant species (subalpine fir, Engelmann spruce) to dominate the site (Pfister, 2013; USDA-FS, 2013).

Lodgepole pine germinates and reproduces most successfully on a seedbed of bare mineral soil with full sunlight and limited competition from other vegetation. Serotinous cones on lodgepole require temperatures between 45° and 60° C (113° to 140° F) for the cones to open and the seeds to release (Burns and Honkala, 1990). Without an appropriate disturbance agent to expose mineral soil and reduce competition from other vegetation during initial regeneration and seedling survival, lodgepole pine regeneration on the site may be reduced or delayed (Burns and Honkala, 1990; Davis and others, 1980).

Vegetation diversity is being reduced since fire disturbance in this type allows for development of shrub fields and understory forb and grass components (Arno and Fiedler 2005).

DENSITY/STRUCTURE: Due to mountain pine beetle activity and associated lodgepole pine mortality over the last seven years, tree density is lower than the last 50 to 85 years when the last large scale wildfires occurred. Stands of older and larger size class lodgepole pine where the highest tree mortality occurred would become dominated by shrubs, forbs and graminoids for a period of time as conifer seedlings slowly establish. In more mesic portions of this cover type, shrub fields may dominate the sites until a disturbance such as a wildfire occurs (Pfister, 1977). Without intermittent disturbance, these areas would eventually transition into a climax species dominated forest composed heavily of subalpine fir and Engelmann spruce in the coming decades (Davis and others, 1980). Density of the conifers and structure of stands in this cover type would vary over time dependent on successional stage and disturbance intervals. The pole-sized, dense lodgepole pine stands with low mortality from mountain pine beetle would continue to be predominately single-storied stands with little understory regeneration of conifers, shrubs, forbs or graminoids. This condition would persist until a disturbance event creates an early seral condition, the extent of which would be dependent on severity and intensity of the disturbance event.

PATCH SIZE: Many patches are currently smaller than the HRV for this cover type. Current patch fragmentation from previous land management actions, primarily timber harvest, would continue into the future until a naturally occurring large-scale disturbance such as a wildfire would enlarge the patch. Over time, the effects on patch size from mountain pine beetle outbreak may result in a shift in patch size to more historic sizes due to mortality in much of the lodgepole pine overstory. However, the potential trend with higher fuel loadings from lodgepole pine mortality and no active management would likely lead to an increased risk of larger stand replacement fires, which may create patch sizes beyond HRV and increase landscape homogeneity.

Fuel loading or buildup is an important factor for fire interval lengths (Brown and Smith, 2000). Because of tree mortality caused by mountain pine beetle over the last 7 years, fuel loading in many stands in this cover type would increase exponentially within the next 5 to 10 years as lodgepole pine snags fall down. This would cause higher fuel loading for 20 to 30 years (Page and Jenkins, 2007). The fuel bed would become much more continuous over a larger contiguous area. Large accumulations of dead material caused by beetle infestations increases the severity of fire behavior when these stands

burn (Brown 1975). The quantity of larger size class fuel on the ground can promote long term smoldering and slow-spreading surface fires, which can increase severity by raising total heat release and increasing duration of burning (Davis et al. 1980, Smith and Fischer 1997). The current mountain pine beetle epidemic may result in higher than historic fuel loading at the landscape scale (Taylor and Carrol 2003, Taylor et al. 2006). If shade-tolerant species became dominant, understory species diversity would be reduced and fires would burn over larger contiguous areas rather than the patchy mosaics that occurred historically when fuel-filled stands were fewer and more spatially separated (Arno and Fiedler, 2005).

Western larch/mixed conifer cover type

COMPOSITION: Historical logging that targeted removal of dominant seral species has caused an accelerated shift in species composition to a higher percentage of Douglas-fir, while altering forest structure to become more multi-layered, dense, and composed of younger age-class stands (Losensky, 1997). Such conditions create greater stagnation in the stands. For example, in the Douglas-fir/ninebark habitat type (ninebark phase), if not subjected to disturbance, the stand will generally at 50 years of age convert to nearly pure Douglas-fir as ponderosa pine and western larch experience regeneration failure (Arno and others, 1985). This successional pattern would continue into the near future unless a natural disturbance occurs. Deciduous species such as aspen and Scouler's willow would continue to decline as conifer canopy coverage increases. This trend could be interrupted by natural disturbances which open the canopy and allow seral, shade-intolerant species to regenerate provided a seed source exists.

Without fire as a disturbance agent, seral species would gradually decline as Douglas-fir, subalpine fir and/or spruce become dominant (Davis and others, 1980). As the disturbance interval lengthens, the shade-intolerant species (quaking aspen, western larch, ponderosa pine) would decrease and become replaced by shade-tolerant conifers (Brown and Smith, 2000; Arno and Fiedler, 2005). Vegetation biodiversity can continue to decrease as the fire regime changes (Brown and Smith, 2000).

DENSITY/STRUCTURE: Without disturbance, conifer density would continue to increase, creating less mosaic and expanding spatial continuity. These conditions would increase insect and disease outbreak hazards, as well as increase potential for stand-replacement fire outside of the historic scale, interval, and pattern. When historical logging targeted removal of dominant seral species, stand structure became more multi-layered, dense, and younger age-class. Without disturbance these stands would continue to have high stem densities.

Shifts in fire regimes away from the historical type and occurrence would continue, which would cause understory conifers to out-compete the older overstory trees for moisture and nutrients. The increased stress on larger diameter trees would create higher susceptibility to insect, disease, and fires. These larger trees may have lessened resistance to even the low and moderate intensity fires that historically occurred (Arno and Fiedler, 2005).

The seedling, sapling, and small pole-size stands (typically created from regeneration harvests from the mid-1970's through the mid-1990's) are currently over-stocked or would become over-stocked in the next decade. The resulting increase in stand density would cause a decline in tree and stand vigor, as well as slower tree growth (Brown and Smith, 2000).

Higher stand densities in this cover type would continue to create greater competition for site nutrients and moisture resulting in: reduced coverage of understory forbs and shrubs, lower biodiversity, and increased vulnerability of the dominant trees to insect, disease, and wildfire (Brown and Smith, 2000; Arno and others, 1995). Higher stand densities, shifts in species composition and forest structure to more shade-tolerant species, and greater structural homogeneity would decrease forest resiliency.

PATCH SIZE: As lack of disturbance continues, shade-tolerant species such as subalpine fir, Douglas-fir and Engelmann spruce would dominate within this cover type. Dominance by climax, shade-tolerant species would reduce diversity and fires would burn over larger contiguous areas rather than the patchy mosaics that occurred historically when fuel-filled stands were fewer and more spatially separated (Arno and Fiedler, 2005).

Patch size alteration would be dependent on the type and scale of natural disturbance. The effects of disturbance are in turn partly influenced by vegetative successional pathways. Due to fire suppression and reduced fire disturbance, stand replacement fire regimes are replacing low and mixed-severity regimes, and have almost doubled from pre-1900 levels (Quigley and others, 1996). Accelerated levels of stand replacement fires would create ample woody fuels that can remain flammable for upward of a century and exacerbate risk of more severe fires (Arno and Fiedler, 2005).

Ponderosa pine/Douglas-fir cover type

COMPOSITION: Fire exclusion can result in almost pure stands of Douglas-fir since ponderosa pine needs disturbance to regenerate on these habitat types (Davis and others, 1980). Without disturbance to create openings, quaking aspen would continue to decline. Douglas-fir is the climax species for habitat types that occur in this cover type. Without disturbance, multi-storied Douglas-fir stands would continue to develop and dominate all successional stages.

DENSITY/STRUCTURE: Arno and others (1995) showed how similar sites have increased in basal area and trees per acre since 1900. This trend would continue until disturbance alters stand density. The continued increase in basal area and trees per acre is attributed primarily to Douglas-fir ingrowth, particularly in the understory. Higher tree density creates greater competition with existing older, overstory trees for moisture and nutrients. Competition increases stress on larger diameter trees, which in turn would create higher susceptibility and predisposition to insect and disease, and lowered resistance to even the low and moderate intensity fires that historically occurred (Arno and Fiedler, 2005).

The seedling, sapling, and small pole-sized stands (typically created from regeneration harvests from the mid-1950's through the mid-1990's, or from the 1991 Game Range wildfire) are currently over-stocked or would become over-stocked in the next decade. This trend would continue unless a disturbance event occurs. The resulting increase in stand density would cause a decline in tree and stand vigor, as well as slower tree growth (Brown and Smith, 2000).

Higher stand densities in this cover type would continue to create greater competition for site nutrients and moisture resulting in: reduced coverage of understory forbs and shrubs, lower biodiversity, and increased vulnerability of the dominant trees to insect, disease, and wildfire (Brown and Smith, 2000; Arno and others, 1995). As these stands age and competitive stress continues, mortality could increase and alter stand structure reducing the very large diameter trees which historically comprised about 50 to 90% of the cover type structure.

Patch size alteration would be dependent on the type and scale of natural disturbance. The effects of disturbance are in turn partly influenced by vegetative successional pathways. Due to fire suppression and reduced fire disturbance, stand replacement fire regimes are replacing low and mixed-severity regimes, and have almost doubled from pre-1900 levels (Quigley and others, 1996). Accelerated levels of stand replacement fires would create ample woody fuels that can remain flammable for upward of a century and exacerbate risk of more severe fires (Arno and Fiedler, 2005).

4.2.2 Wildlife and Wildlife Habitat

Unless otherwise noted (Canada lynx, elk, lions), the geographic scope of effects is limited to BLM lands within the Chamberlain-Wales analysis area (Figure 1-1). In the No Action alternative, short-term (<10 years) habitat conditions would remain similar to current conditions. Over the long-term (>10 years) habitat conditions would evolve as vegetation changes in composition, structure, and function. Short and long-term effects are discussed for the species of interest.

Unless otherwise noted (Canada lynx, elk, lions), the geographic scope of effects is limited to BLM lands within the Chamberlain-Wales analysis area (Figure 1-1). In the No Action alternative, short-term (<10 years) habitat conditions would remain similar to current conditions. Over the long-term (>10 years) habitat conditions would be shaped by past, present, and future disturbance and vegetation community succession, and influenced by natural disturbances such as: fire, insects, disease, and weather. Past anthropogenic disturbance such as timber harvest and prescribed fire shaped patch dynamics. Disturbance would define the dynamics of patches and how they function on the landscape scale. The internal structure of patches would be determined by species composition, structure, and function (Pickett and Thompson, 1978).

Lodgepole pine/subalpine fir, western larch/mixed conifer, and ponderosa pine/Douglas-fir cover types are influenced by patch dynamics. Special status and wildlife species inhabit these cover types and their populations fluctuate in response to patch dynamics. The Chamberlain wildlife community remains as it did historically, regardless of influences of natural and anthropogenic disturbances and regardless of the historic range

of variability of cover types. Short and long-term habitat conditions of the No Action alternative would support the Chamberlain wildlife community at various population levels.

Section 4.2.1 describes anticipated changes to vegetation conditions, and therefore wildlife habitat, under the No Action alternative.

Special Status Species: (Threatened, Endangered, Candidate)

Grizzly Bear (threatened): The grizzly bear would not be adversely affected. Pine beetle mortality in lodgepole pine forests would continue to provide enhanced forage and berry production. Downed trees would continue to provide cover and potential den sites. Class 2 and 3 roads would continue to be blown in with windfall diminishing administrative use and enhancing habitat security. Currently open road density of less than 1 mi/mi^2 would stay the same, which is within the Montana Fish, Wildlife, and Parks recommended standard (Dood and others, 2006).

Canada Lynx (threatened): The effects analysis area for the Canada lynx includes two Lynx Analysis Units (Chamberlain Complex and McElwain Complex), and Unit 3 of the Northern Rockies Critical Habitat. If no natural disturbance occurs, and if there are no anthropogenic habitat alterations on non-BLM lands, suitable lynx habitat would increase from 94 to 100% in the Chamberlain Complex LAU, and from 95 to 100% in the McElwain Complex LAU. Unsuitable habitat would become suitable as areas currently with early stand-initiation structure (no winter foraging habitat) evolve to later stand initiation structure (year-round foraging habitat). This transition would occur on 1,333 acres in the Chamberlain Complex and 2,658 acres in the McElwain Complex if habitat remains unaffected by natural disturbance and anthropogenic alteration. Short and long-term Canada lynx habitat would be maintained with no effect to lynx and lynx critical habitat (USDI and USDA, 2013; USDI-FWS, 2009) other than changes imposed by natural disturbance and as described in section 4.2.1.

Wolverine (candidate): Current road management would be retained under the No Action alternative, and would continue to limit trapping access, other than snowmobile use, and the risk of trapping mortality.

Special Status Species: (Sensitive Species)

Forest Bats: Bat foraging habitat would not be impacted. Roosting habitat for long-eared and long-legged myotis would be maintained. Riparian habitat, late succession structure, snags, and live tree habitat would continue to develop through natural ecological processes. Natural disturbance processes (fire, insects, disease) would occur, enhancing foraging and roosting habitat, especially for long-eared and long-legged myotis. As per the Northern Region Snag Management Protocol, snags occur in pulses of high density, persisting for short periods (5-25 years) then are gone until the next fire event or other disturbance. This is the ecology of these vegetative response units USDA-FS, 2000.

Fisher: Roads would continue to be closed to motor vehicle access, but allowing for snowmobile use during winter months, which would maintain trapping pressure at current

low levels. Low trapping access would minimize trapping mortality. Habitat security and forage and den sites would be maintained. Wildfire, insects and disease would continue to kill trees, providing snags and down logs used by fisher for denning, foraging, and resting.

Gray Wolf: Since the area is closed to motorized vehicles, other than snowmobile access during winter, wolf hunting and trapping mortality would be low since the road closure keeps hunting and trapping activity low. Habitat security would remain high and would not be influenced by administrative road use, regardless of treatment block. A greater proportion of the project area would be utilized by wolves and their prey by maintaining current road use levels and allowing class 2 and 3 roads to close themselves with blowdown. Since 50% or more of lodgepole pine cover type has died in the last decade, an abundance of understory early successional forage is available for elk, deer, and other potential prey for the next 10-20 years. The result would be a suitable prey base of ungulates for wolves. Maintaining habitat security and a large prey base would benefit wolves.

Bald and Golden Eagle: The analysis area would continue to have large trees suitable for eagle nesting. Foraging, perching, roosting, and nesting habitat for bald and golden eagles would continue to support multiple territories. Current road use level would maintain conditions for new nest territories. The No Action alternative would maintain solitude which would enhance eagle use. Riparian areas, which have suitable large live trees for potential eagle nests, would not be disturbed

Northern Goshawk: Large trees for nesting and mixed forests for foraging would remain available. Administrative road use may disturb nesting goshawks but current road use levels may maintain conditions for new nest territories.

Great Gray and Flammulated Owl: Large trees and snags would continue to provide nesting habitat. Foraging habitat would remain suitable to maintain small mammal prey for great gray owls and insect prey for flammulated owls.

Black-Backed and American Three-Toed Woodpecker: Both species would continue to benefit from the recent pine bark beetle epidemic. Nest territories and forage opportunities for the three-toed woodpecker would be maintained. Given the recent trend of wildfire occurrence surrounding the project area, and the level of mortality in pine beetle attacked trees, wildfires in the analysis area are anticipated, even with the continued policy of full suppression.

Big Game Species

Elk: The effects analysis area for elk is the Chamberlain and Lindbergh herd home ranges. Summer forage, cover, and habitat security would be maintained. Early succession forage habitat would continue to be ample on BLM and surrounding lands. Early succession summer habitat would continue to be in large previously clearcut areas on recently acquired Plum Creek lands. Hiding and thermal cover on BLM lands would continue to be adjacent to summer forage habitat. Where open shrub habitat exists, small bands of elk would over-winter. Hiding and thermal cover would be available on private

lands at lower elevation. Maintaining road use levels of the No Action alternative would directly and indirectly benefit elk habitat security.

Moose: Moose would continue to inhabit the area year-round. Moose would utilize upland and riparian forest habitat for forage and cover. Conifer forests with shrub understories would provide forage and cover, especially during winter. East Chamberlain burn and old clearcuts at upper elevation and on north aspects would provide cover and forage. Many of the stands in this habitat are in the 15 to 50 year-old range. Riparian shrub communities provide cover and forage. The current road travel restrictions would remain the same, which is important for moose habitat security.

Mule Deer and White-Tailed Deer: Mule and white-tailed deer would continue to utilize browse species, such as shrubs at low elevation where snow depths are less than 2 feet. South facing aspects at all elevations would maintain both deer species. Roads would continue to be managed as closed, which enhances habitat security.

Mountain Lion: The effects analysis area is the Chamberlain and Lindbergh elk herd home ranges. Lions utilize habitat used by their prey (elk and deer) and would follow prey during daily movements and from summer to winter range. This would include movement, back and forth, from public to private lands. Cover for ambushing and stalking prey would be maintained. Maintaining a closed road system would benefit lions and their primary prey. The Garnet range would continue to be a population source for lions in and around the Blackfoot Valley.

Black Bear: The No Action alternative would maintain forage and cover. Grass, herbaceous vegetation, and animal prey and carrion would remain available. Berry production would continue to enhance black bear habitat. Hiding cover and den site availability would be maintained. Black bears may dig dens in the ground or den under heavy blowdown, which is occurring in the project area as beetle killed trees fall to the ground. Managing roads as closed would enhance habitat security.

Bird Species of Concern

Lewis's Woodpecker: Ponderosa pine cover types would be available for foraging and nesting. Bark beetles and other insects would be available for forage. Hunting techniques, like fly-catching, would be a viable technique for capturing insects. Large snags would be available for nesting.

Pileated Woodpecker: Ponderosa pine and Douglas-fir cover types would be available for forage and nest sites. Bark beetles and carpenter ants would be available in recently dead trees and older snags, respectively. Ponderosa pine habitat composed of large snags would be available for forage and nest sites.

Clark's Nutcracker: Upper and lower elevation conifer cover types would be available for forage and nest sites. Cone production in young and older conifers would be available. Conifer forests would be available for late winter and early spring nesting.

Brown Creeper: Lodgepole pine, Douglas-fir, subalpine fir, and Engelmann spruce forests would be available for foraging and nesting. Pine beetle mortality in lodgepole pine forests has created an abundance of forage and nest sites.

Cassin's Finch: Douglas-fir, mixed Douglas-fir/lodgepole pine, and ponderosa pine would continue to provide forage and nest sites. Understory vegetation would be available for ground foraging opportunities. Mature and late succession trees would be available for nesting.

Evening Grosbeak: Mixed conifer and spruce-fir forest would be maintained. Forage and nest habitat would be maintained. Spruce budworm and other larvae and seeds would be available. Trees and shrubs used for nesting would be available.

4.2.3 Soils and Site Productivity

If the No Action alternative is selected, there would be no potentially ground disturbing activities, and thus no potential for soil impacts from those actions. However, soil productivity impacts may occur in the event of wildfires whose burn severity or size is outside the historic fire regime. These impacts may include; soil heating to greater depths and/or over greater acreage due to higher than normal fuel loading, higher amounts of duff consumption and exposed soil, more widespread or persistent hydrophobic soil conditions, reduced infiltration, and higher surface runoff and soil erosion (Ice and others, 2004).

4.2.4 Water Quality

If the No Action alternative is selected, there would be no direct, indirect or cumulative impacts since road obliteration and culvert removal would not occur. This alternative may result in an increased sediment delivery risk if road drainage maintenance is not performed, particularly road failure hazards from nonfunctional drainage structures such as culverts. Mass failures of roads could deliver large volumes of sediment. Two sections of road would continue to present an erosion hazard and sediment delivery risk to streams, in addition to twelve other locations where road drainage systems would not be maintained or repaired and present road and slope erosion hazards and sediment delivery risks to streams.

4.2.5 Streams and Riparian Condition

If the No Action alternative is selected, there would be no direct, indirect or cumulative impacts since no road obliteration, culvert removal, or vegetation treatment would occur. This alternative could result in increasing risk of stream and riparian impacts from flow alteration in the event of wildfires whose burn severity or size are outside the historic fire regime. Such fires could alter watershed processes such as infiltration and runoff, erosion, sedimentation, stream channels, water temperature, nutrients, and fish habitat (Ice and others, 2004).

4.2.6 Aquatic Species and Habitat

Under the No Action Alternative, no culverts would be removed. Waterbars and culverts would not be repaired. There would be no vegetation treatments. Four culverts would continue to be barriers to passage and migration of aquatic species such as cutthroat trout.

Aquatic Species
There would be no direct effects to aquatic species because no work would be done in aquatic habitats.

Sediment
Culverts and associated road fill would not be removed from the three streams mentioned above. Without disturbance to streambanks and beds associated, no sediment would be released into the channel.

Habitat Access
This alternative would have no direct or indirect effects as no culverts would be removed. Fish habitat would continue to be fragmented at the current level and westslope cutthroat trout in Pearson, East Fork Chamberlain, and Bear Creeks would continue to be blocked from accessing up to 4.3 miles of potential habitat upstream from the existing culverts.

The amount of habitat that would not be accessible if culverts are not removed represents approximately 15% of total available habitat for westslope cutthroat trout in affected streams. An unknown portion of this total would be unavailable for parts of the year due to intermittent or discontinuous flow. As such, leaving the culverts in place would not likely affect the long-term viability of cutthroat trout in the planning area.

4.2.7 Wales Creek Wilderness Study Area

There would be no direct effects to the qualities of WSA that make it suitable for wilderness designation. Because wildlife habitat contributes to qualities of the WSA, indirect effects would occur because 2,500 acres of wildlife habitat would not be improved (see Section 4.2.2).

4.2.8 Special Status Plants

No projects would be implemented and thus no ground-disturbing activities would occur. The changes in vegetation structure, composition, density described in 4.2.1, as well as fire regime changes, would not affect Howell's gunweed.

4.2.9 Invasive Plants

Weed infestations would continue to be treated under a previous decision (USDI-BLM, 2009). New infestations would be less likely given the absence of the proposed management activities and associated ground disturbance and vehicle traffic.

4.2.10 Cultural Resources

The proposed activities would not occur, and no negative impacts would occur.

4.2.11 Lewis and Clark National Historic Trail

Under the No Action Alternative, projects would not be proposed, so there would be no potential to affect the Lewis and Clark National Historic Trail.

4.2.12 Recreation

Under the No Action Alternative, there would be no direct or indirect impacts to Recreation.

4.3 DIRECT & INDIRECT IMPACTS OF THE PROPOSED ACTION ALTERNATIVE

4.3.1 Forest Vegetation, Fuels & Fire Management

This section analyzes the impacts of the various proposed treatments to forest vegetation, fuels, and fire management in the analysis area. Forest vegetation impact indicators include stand density and structure, species composition, and patch size. The analysis is subdivided into three cover types to facilitate comparison to the content in Sections 2 and 3. Unless stated otherwise, direct and indirect impacts were analyzed at the Chamberlain-Wales analysis area boundary scale.

By restoring vegetation communities to more closely resemble their range of natural variability, the risks associated with undesirable disturbance from insects, disease, and wildfire are expected to be reduced. The BLM expects to:

- reduce undesirable disturbance by maintaining or improving forest health
- improve forest resiliency through movement of vegetation towards a closer resemblance of the natural range of variability (desired condition) for that vegetation type.
- maintain and improve, where needed, spatial heterogeneity of vegetation across the landscape within the analysis area through a matrix of proposed action treatments and untreated areas.

As discussed by Landres and others (1999), a reduction of spatial heterogeneity causes a decline in the biological diversity, increased vegetation susceptibility to insects, disease and other disturbances while lowering the system's resiliency to weather future disturbances.

<u>Lodgepole pine /subalpine fir cover type</u>

Tables 4-1a and 4-1b summarize the shifts that would occur to stand structure, species composition and density between the No Action and Proposed Action in the lodgepole pine/subalpine fir cover type.

Table 4-1a. Lodgepole pine/Subalpine Fir Cover Type: Summary of Anticipated Shifts in Structure/Composition				
	No Action		**Proposed Action**	
Dominant Structure Class (inches DBH)	**Species (order of abundance)**	**Acres (% of total)**	**Species (order of abundance)**	**Acres (% of total)**
Seedling-Sapling (< 5.0)	LP/AF	2,023 (17)	LP/AF	4497 (37)
Pole (5.0-8.9)	LP/ES	6,290 (51)	LP/ES	5,711 (46)
Medium (9.0 -14.9)	LP/ES/DF	3,480 (28)	LP/ES/DF	1585 (13)
Large (15-20.9)	ES/LP/DF	416 (3)	ES/LP/DF	416 (3)
Very Large (21.0 +)	ES	2 (<1)	ES	2 (<1)
Non-stocked/Non-forest	*n/a*	42 (<1)	*n/a*	42 (<1)

LP (lodgepole pine), AF (subalpine fir), ES (Engelmann spruce), DF (Douglas-fir)

Table 4-1b. Lodgepole pine/Subalpine Fir Cover Type: Summary of Anticipated Shifts in Density		
Density/Canopy Coverage Class (% canopy cover)	**Acres and % of Total**	
	No Action	**Prop. Action**
0-14%	382 (3)	2239 (18)
15-39%	1,081 (9)	798 (7)
40-69%	8,262 (67)	6667 (54)
70-100%	2,528 (21)	2549 (21)

Timber Harvest with Prescribed Fire: Lodgepole Pine Stand Replacement
(359 acres in Units HF5, HF6, HF7, HF8 and HF9)

The proposed action treatment units, when combined with the adjacent multi-storied lodgepole pine stands, would create a mosaic of age and size classes across the lodgepole pine/subalpine fir cover type. Creating this mosaic would reduce the acreage highly susceptible to future mountain pine beetle epidemics while reducing fuel loading and continuity over time. (Amman, 1977; Cole, 1978; Graham, 1999; and Safranyik and Wilson, 2006). The proposed action is designed to spatially mimic natural patterns that occurred on the landscape while increasing heterogeneity and resiliency across the lodgepole pine types. The resulting increase in heterogeneity of age class, structure, size and species may help counteract effects of drought and warmer climate which research suggests would increase tree susceptibility beetle attack, allow higher beetle survival (Wells, 2012), and in some locales, allow more generations of beetles to be produced in one season (Mitton and Ferrenberg, 2012).

DENSITY: The stands currently exhibit stem exclusion with 70-100% canopy closure prior to the recent mountain pine beetle outbreak. Due to mortality associated with the current outbreak, canopy coverage averages 30-40%. The proposed harvest and prescribed burning would reduce the density to less than 14% canopy coverage in harvest patches but would reserve areas within the units to maintain wildlife corridors and linkages by retaining existing canopy coverage. As lodgepole pine regenerates following treatment, density would increase and would reach 65 or greater percent canopy coverage within 20 years.

COMPOSITION: Stands are currently dominated by lodgepole pine, and the proposed harvest and prescribed burning would maintain this composition. The lodgepole pine in the affected stands have predominantly serotinous cones which require temperatures between 45° and 60° C (113° to 140° F) to break the resin bond and release the seed (Burns and Honkala, 1990). Lodgepole pine germinates and reproduces most successfully on the proper seedbed of bare mineral soil in full sunlight with low competition from other vegetation (Lotan and others, 1985; USDA-FS, 2013; Burns and Honkala, 1990). The proposed harvest and prescribed burning would create the necessary seedbed for serotinous lodgepole pine regeneration.

Quaking aspen occurs in limited amounts in the analysis area. Current research shows that salvage of some of the mountain pine beetle mortality allows greater aspen regeneration while reducing surface fuels in the long-term (after 20 years) by 2-3 times (Wells, 2012).

Understory plant species diversity would increase with the proposed harvest and prescribed burn due to creation of early successional plant communities. Early successional plant communities within the stand replacement fire regime such as the lodgepole pine/subalpine fir cover type would create biological diversity within the area through the increase of shade-intolerant plants (Arno and Fiedler 2005). Blue huckleberry (*Vaccinium membranaceum*), a good food source for grizzly and black bears (USDA-FS, 2013) occurs within all the proposed treatment units with coverage ranging from 10-30%. Fire exclusion may eventually reduce big huckleberry in most areas. Blue huckleberry can survive the low to moderate severity fires as proposed, and can increase stem numbers and density within 5-7 years after treatment (USDA-FS, 2013; Miller 1977).

STRUCTURE: The stands proposed for harvest and prescribed burning are single-storied, pole to medium-size lodgepole pine stands in the stem exclusion stage. Current crown ratio averages 10-30% on trees generally 60-80 feet tall and ages between 80-125 years. The proposed action would reduce the acreage of older single-storied pole and medium stem exclusion lodgepole pine by 6% while increasing the seedling/sapling acres by 3%. Crown ratios would become 70% or more for 20-30 years as the seedlings/saplings grow to an average 15-20 feet in height. The proposed treatments would allow lodgepole pine to regenerate faster which would create an early seral structure benefitting snowshoe hare and Canada lynx.

The treatment would initiate restoration of a portion of the cover type toward a mosaic of even-aged stands with irregular boundaries like those created by fire historically. These stands would be in an early successional stage, dominated by shade-intolerant lodgepole pine. The sites would also have the graminoids, forbs, shrubs, and aspen (on some sites) that would have occurred following natural fire and were important to wildlife (Arno and Fielder, 2005). The early successional state (i.e. seedling/sapling) would exist for 20-30 years on these sites before canopy closure occurs. Stands in the early successional/stand initiation stage have large numbers of plant species and more diversity than closed canopy stands where trees occupy most of the growing space. Because of the large

amount and variety of food, this period of stand development is utilized by a diverse array of wildlife species (Oliver and Larson, 1996).

*PATCH SIZ*E: Patch sizes are smaller than what historically occurred on the landscape and are predominantly less than 50 acres (USDI-BLM, 2013a). Some of the proposed harvest and prescribed burning treatments would increase patch size toward the historic range (HRV), as well as remove some of the dead lodgepole pine and create fuel breaks. This would create a mosaic of patches which would reduce the risk of stand homogenization and high severity crown fire. The treatments would create early seral forest cover and break up the fuel continuity that otherwise would have occurred over the next 20-30 years from mountain pine beetle outbreak.

The fuels breaks would create a range of age classes, structure, and a spatial pattern outside the WSA that would assist with wildfire management within the WSA. Harvesting gray-stage beetle-killed lodgepole pine stands can decrease the potential and severity of future wildfires by favoring seral, shade-intolerant tree species and reducing course fuel loadings (Collins and others, 2012). Prescribed burning would reduce fuel continuity across the forest floor, lessen fire intensity, slow the rate of fire spread, and decrease the likelihood of fire spread into ladder fuels and tree crowns of adjacent residual stands (Peterson and others, 2005).

Prescribed Fire with Fuel Augmentation

Patch size management in lodgepole pine stands (1,483 acres in Units F6, F9, F10, F13, and HF12)

The proposed action would create a mosaic of age and size classes across the cover type. The continuity of aerial fuels would be fragmented, thereby potentially modifying fire behavior of a large-scale event.

Previous treatments involving mechanical fuel augmentation and prescribed burning conducted in areas adjacent to the analysis area have proven successful in aiding wildfire suppression. The Elevation Mountain Fire of 2012 burned in the Murray-Douglas watershed located south of the Chamberlain-Wales analysis area, and spotted into a fuel augmented/prescribed burn treatment which was conducted in 2011. The spot fire was easily contained. The fuel break was designed and intended to facilitate active fire suppression in event of a wildfire. The 2011 project was also instrumental in the operational planning of the Elevation Mountain wildfire suppression strategy.

COMPOSITION: There would be no change in overstory composition; however understory composition would shift toward a higher percentage of lodgepole pine seedlings and higher abundance of grasses and forbs. Areas of higher fire intensity and moderate severity would likely occur in the prescribed burn treatments which would expose soil and provide a receptive seed bed for serotinous lodgepole pine cones. Competition from other conifers would be lessened during initial regeneration stage, allowing for accelerated lodgepole pine regeneration (Lotan and others, 1985). Lodgepole pine will likely establish as the dominant overstory species because its height growth is faster than Engelmann spruce and subalpine fir (Kaufmann and others, 2008).

The more shade tolerant species would likely decrease in the understory due to increased sunlight hitting the forest floor. Grasses, forbs, and shrubs may flourish in the new openings which may limit or slow tree establishment. Under such conditions, the landscape would likely become more diverse than a pure, single-aged lodgepole pine forest (Kaufmann and others, 2008).

DENSITY/STRUCTURE: Density would be reduced by 50 to 75% initially. In areas of high fire intensity and high severity in the overstory, mineral soil exposure would cause serotinous cones to open and result in denser stands. However, competition from understory vegetation, particularly grass, could decrease stand density even if other factors influencing establishment are favorable (Lotan and others, 1985). Reduction in density would also increase the resiliency of these stands, both in the overstory and understory, to uncharacteristically severe wildfires that can occur in stands with higher stocking or density (Metlen and Fielder, 2006). In areas of moderate fire intensity and low severity, overstory mortality may be minimal or sporadic, creating a widely-spaced stand. In time, it could be expected that two-aged or three-aged stands would develop (Lotan and others, 1985).

In stands with high density, single-storied lodgepole pine, a high severity prescribed fire would remove much of the canopy, essentially resetting the successional process of the stands. Although the stands are decadent and have very little understory growth, a high severity prescribed burn would likely kill or temporarily reduce the abundance of understory shrubs and trees.

PATCH SIZE: Effects of *prescribed fire with fuel augmentation* on vegetation patch size would be the same as those described for the *timber harvest with prescribed fire* treatment on page 84.

Prescribed Fire without Fuel Augmentation: Wales Creek Wilderness Study Area
Wales Creek WSA (2,150 acres in Units WSAF1, WSAF2, WSAF3)

Composition and structure (size, distribution, depth, soundness, age, etc.) of wildland fuels, particularly aerial fuels (the crowns of trees) influence how they burn and how a fire affects the environment (Finney, 2004). In areas of dense, even-aged lodgepole pine and subalpine fir, wildfire intensity and severity are often very high, particularly when there is abundant dead and down woody material. The spatial continuity and density of tree canopies provide in part conditions required for rapidly moving fires that typically consume large forested areas. Patches of vegetation that burn relatively slower, or less severely than surrounding patches, can reduce fire intensity, severity, and spread rate, and may force the fire to move around them by flanking (at a lower intensity), which delays the forward progress of a fire (Finney, 2004). These treatments would serve to break fuel continuity and may serve to slow a wildfire, but would not stop the fire in the absence of additional action.

COMPOSITION: Effects on stand composition would be the same as discussed for *Prescribed Fire with Fuel Augmentation* on page 88. Because the ecosystem has a long history of fire, it is likely that native species and populations have developed mechanisms

for becoming reestablished after fire. Therefore, most of the terrestrial vegetation will likely recover normally.

DENSITY/STRUCTURE: Effects on stand density/structure would be the same as discussed for *Prescribed Fire with Fuel Augmentation* on page 88.

PATCH SIZE: Patch sizes are smaller than what historically occurred on the landscape and are predominantly less than 50 acres (USDI-BLM, 2013a). The proposed prescribed burning treatment would increase patch size toward more historic range (HRV).

Tree Planting: Habitat Improvement and Forest Restoration
Creating multi-storied structure in lodgepole pine stands (579 acres in Units P10 thru P18):

COMPOSITION: Stand composition would shift from pure lodgepole pine to lodgepole pine/Engelmann spruce after planting. With no other disturbance, natural regeneration of subalpine fir would likely occur over the next 50 years (Pfister, 2013). Lodgepole pine regeneration would be limited because of the prevalence of serotinous cones which would not open until a fire or other disturbance creates a suitable mineral soil seedbed and opens the cones. However, some non-serotinous cones occur in these stands and some small amount of lodgepole pine regeneration would be expected. The sites are capable of growing Engelmann spruce and subalpine fir, both of which constitute portions of the climax stands (Pfister, 1977). However, based on the Chamberlain-Wales Ecosystem Assessment (USDI-BLM, 2013a), increasing spruce and subalpine fir on these sites would move the composition outside of HRV. Over decades, these sites would transition to shade-tolerant conifers unless a disturbance such as a wildfire occurs (Fischer and Bradley, 1997). The overstory of lodgepole pine which provides closed canopy or greater than 50% shade is favorable for development of subalpine fir natural regeneration (Burns and Honkala, 1990) as long as a seed source is present.

DENSITY: The proposed planting would increase stand density by 30-50% in the understory within the next 5-10 years. Increasing density on a site may increase competition for nutrients and moisture while potentially increasing stress on the residual overstory trees and decreasing resiliency to disease or insects such as mountain pine beetle (Tappeiner and others, 2007).

Understory forbs, graminoid and shrub diversity and presence generally decreases as conifer density increases (Tappeiner and others, 2007). Seventy-seven percent of the stands proposed for planting contain blue huckleberry with coverage ranges from 5-30%. Blue huckleberry is moderately shade tolerant but would decrease as conifer canopy coverage increases (USDA-FS, 2013; Minore, 1984).

STRUCTURE: Structure on the treatment sites would shift from single-storied lodgepole pine stands to two-storied lodgepole pine/spruce stands. This structure shift would occur within the next 5 years as planting is implemented thereby increasing the two-storied pole and medium structured stands by approximately 29% within this cover type. The change in structure would improve habitat for snowshoe hare and Canada lynx while not disturbing the overstory conifer cover. This change in structure (with shade-tolerant

conifers in the lower layer) would increase ladder fuels and reduce canopy base height which can alter fire behavior and increase the potential for higher intensity crown fire under appropriate future conditions (Peterson and others, 2005).

PATCH SIZE: No immediate impacts to patch size would occur with the proposed planting treatment. As the planted stands develop and the understory becomes fully-stocked over the next few decades, patch size may increase as the area becomes more homogenous since surrounding stands would have similar structure (two and multi-storied) and composition (lodgepole pine, Engelmann spruce and subalpine fir).

Cone Collection

COMPOSITION: Cones would be collected from Engelmann spruce primarily, and would be climbed instead of felled. No tree loss or change of composition would occur.

DENSITY/STRUCTURE: No impacts to density or structure would occur since the trees would be left alive and standing. Trees would be dominant and co-dominant individuals and would be well-dispersed across the area containing the cone crop.

PATCH SIZE: No impacts to patch size would occur. Individual trees would be climbed to obtain cones. The proposed collection does not affect a large enough area to impact or alter patch size.

Western larch/mixed conifer cover type

Tables 4-2a and 4-2b summarize the shifts that would occur to stand structure, species composition and density between the No Action and Proposed Action in the western larch/mixed conifer cover type.

Timber Harvest with Prescribed Fire: Western Larch – Mixed Conifer Stand Restoration *(314 acres in Units HF1, HF2, HF3 and HF4)*

COMPOSITION: Western larch and quaking aspen need to regenerate in order to improve resiliency while managing within HRV. Neither species is regenerating due to lack of disturbance. Both species occurred historically on these sites. Resiliency and site productivity of most ecosystems within the Northern Rockies are dependent on disturbances that create openings to allow seral species to reseed instead of letting shade-tolerant, climax species dominate sites where historic disturbance intervals and patterns did not generally allow those shade-tolerant species to dominate (Harvey and Morgan, 2001).

The proposed treatment would shift composition to a higher percentage of western larch and quaking aspen (where present) in the group selection patches. Composition outside the patches would not change from existing (western larch, Douglas-fir, lodgepole pine and subalpine fir) since these areas would not be treated. Overall, the sites would exhibit a minor increase in western larch and to a lesser degree an increase in quaking aspen, where possible, as the harvested and/or burned patches regenerate.

Table 4-2a. Western Larch/Mixed Conifer Cover Type: Summary of Anticipated Shifts in Structure/Composition				
	No Action		**Proposed Action**	
Dominant Structure Class (inches DBH)	**Species (order of abundance)**	**Acres (% of total)**	**Species (order of abundance)**	**Acres (% of total)**
Seedling-Sapling (< 5.0)	LP/DF/WL	1,715 (7)	LP/DF/WL	2,038 (9)
Pole (5.0-8.9)	LP/DF/WL	4,696 (20)	LP/DF/WL	4,535 (19)
Medium (9.0 -14.9)	DF/LP/WL	11,097 (47)	DF/WL/LP	10,935 (47)
Large (15-20.9)	DF/LP/WL	5,015 (21)	DF/WL/LP/PP/ES	5,015 (21)
Very Large (21.0 +)	DF/WL	811 (4)	DF/WL	811 (3)
Non-stocked/Non-forest	*n/a*	126 (1)	*n/a*	126 (1)

LP (lodgepole pine), WL (western larch), DF (Douglas-fir), PP (ponderosa pine), ES (Engelmann spruce)

Table 4-2b. Western Larch/Mixed Conifer Cover Type: Summary of Anticipated Shifts in Density		
Density/Canopy Coverage Class (% canopy cover)	**Acres and % of Total**	
	No Action	**Prop. Action**
0-14%	227 (1)	309 (1)
15-39%	1,716 (7)	1,945 (8)
40-69%	10,850 (46)	10,721 (46)
70-100%	10,667 (46)	10,485 (45)

Western larch is the most shade-intolerant of the western conifers and therefore requires disturbance to regenerate (Arno and Fiedler, 2005, USDA-FS, 2013). Quaking aspen is also shade intolerant and requires removal of apical dominance to regenerate (USDA-FS, 2013). The proposed harvest group selection patches and subsequent jackpot prescribed fire treatments would create canopy gaps and mineral soil exposure for western larch regeneration and quaking aspen, where present.

Historically, natural fires within these types thinned stands and reduced fuels, stimulating undergrowth and promoting mixed conifers by preparing seedbeds which regenerated predominantly seral species, primarily western larch, in small pockets (Burns and Honkala, 1990). The group selection harvest with jackpot burning is designed to mimic this process.

The mixed severity fire regime of this cover type produces high shrub diversity, including willow (Arno and others, 2000; Brown and Smith, 2000; Arno and Fiedler, 2005). Shrub and understory diversity would increase on the harvest and jackpot burning patches

Blue huckleberry (*Vaccinium membranaceum*), a good food source for grizzly and black bears (USDA-FS, 2013) currently occurs on 78% of the proposed treatment area with coverage ranging from 20-60%. Continued fire exclusion can reduce blue huckleberry (USDA-FS, 2013). It also decreases in abundance as conifer canopy coverage increases and the stands move toward climax, particularly where canopy closure occurs. The proposed treatment would stimulate the blue huckleberry within portions of the treatment area via reduction in overstory canopy shading and pruning of shrubs by low intensity

jackpot burning. Low to moderately severe fires, such as prescribed in the proposed action, are survivable by blue huckleberry and can increase stem numbers and density within 5-7 years post treatment (USDA-FS, 2013).

DENSITY: Density would be reduced on 20-30% of the 314 proposed treatment acres. Group selection harvests would occur as 2-5 acre patches. The reduced density would create favorable seedbeds for western larch regeneration, as well as stimulate understory shrubs, forbs, and graminoids. The remaining portion of the proposed treatment areas would not be treated and density (currently 40-75%) would not change.

STRUCTURE: The group selection patches would change stand structure on 20-30% of the 314 acre treatment area. The single-storied pole/medium size class dominated by lodgepole pine and Douglas-fir would first change to an herbaceous layer followed by seedling regeneration (mostly western larch) in succeeding years. The remainder of the proposed treatment areas would not be treated, and the overall multi-storied nature of the stands would not be changed by the proposed action. Old stand structure would be maintained due to retention of the larger diameter size classes, including snags, and structural complexity would be increased as early succession communities in harvested/burned patches develop. Creation of early successional communities (stand initiation stage) in the patches would improve vegetation diversity and availability of herbaceous vegetation and browse (Smith and others, 1997).

PATCH SIZE: The proposed treatment would not impact or change overall current patch sizes in this cover type. Historically, many of the patches were greater than 150 acres, whereas currently most of this cover type has patches less than 50 acres (USDI-BLM, 2013a). The proposed treatment units (group selection patches and reserve areas; see Figure 2-1) of HF2, HF3, and HF4, due to their spatial arrangement, would create some patches between 100 and 150 acres. This would be an initial step toward shifting the cover type toward HRV and the condition that existed prior to historic logging and fire suppression. HF1 would not alter patch size from its current sizes.

Forest Stand and Wildlife Habitat Improvement in Sapling/Pole-Sized Stands
Lynx/Snowshoe Hare Study site (37 acres in Units T9, T10 and T11):

COMPOSITION: The proposed action would utilize variable-density thinning around western larch while leaving all other areas untreated. This would result in a slight increase in western larch composition. The treatment would allow shade intolerant western larch to persist. Variable-density thinning increases spatial heterogeneity and enhances habitat characteristics (Peterson and others, 2005). Western larch composition is currently lower than what occurred historically.

DENSITY: The density reduction would be minor since the thinning would occur immediately around western larch stems and there would be untreated control plots in the units. The variable-density thinning (as proposed) would reduce crown fire risk by reducing the continuity of the canopy fuels and increasing spatial heterogeneity in the canopy structure (Peterson and others, 2005). Reducing density would lower competition for moisture and nutrients around western larch enhancing its growth and ability to persist on the site.

STRUCTURE: No change in structure would occur immediately. Since western larch diameter growth is sensitive to density (Burns and Honkala, 1990), the proposed thinning treatment would promote increased diameter and height growth in western larch thereby accelerating development of old stand characteristics such as larger diameter trees. Old stand structure (large and very large single, two-storied and multi-storied) is currently lacking.

PATCH SIZE: Due to type of treatment and small scale (100 acres or less), no impact to patch size would result.

Douglas-fir would be the predominant species removed during variable-density thinning. With regard to fire hazard, Douglas-fir thinning slash loses half of its original fuel loading and depth within two years of cutting, and the effect of fine fuels is minimal after two to four years (Christiansen and Pickford, 1991). The immediate increase in fire hazard from slash is partially mitigated through the requirement of slash to be lopped and scattered to a maximum of 18 inches per the Montana State Slash Law. In the long term, risk of crown fire is reduced due to a reduction in canopy bulk density and crown continuity canopy spacing between the pine (Peterson and others, 2005).

Forest Stand and Wildlife Habitat Improvement in Sapling/Pole-Sized Stands
Mixed Conifer Thinning/Restoration (86 acres in Units T14, T15, and T16):

COMPOSITION: Species composition would not exhibit a major overall shift. Where possible, seral species such as ponderosa pine, western larch and lodgepole pine would be increased. The stands are currently dominated by Douglas-fir with western larch and lodgepole pine present.

Due to the mixed severity fire regime which occurs in this cover type, shrub diversity can be high (Arno and others, 2000; Brown and Smith, 2000; Arno and Fiedler, 2005). When thinning treatments are applied before a dense understory forms, establishment of understory shrubs, herbs and overstory trees are all enhanced due to increases in light, air, available nutrients and moisture (Tappeiner and others, 2007). The proposed thinning and reduction in canopy shading would maintain an open stand longer, enabling shrub species to persist longer. These shrubs may have been shaded out without treatment (Tappeiner and others, 2007). Availability of browse may be improved through thinning by increasing the abundance of shrubs and other understory forbs and graminoids present on the sites (Tappeiner and others, 2007; Dodson and others, 2008).

DENSITY: Density would be reduced by 5-15%. Reduction in density through pre-commercial thinning would, over time: lower the risk of pine beetle damage, root disease and defoliation by reducing competition and stress; develop stand structures not conducive to outbreaks; and favor non-host species and resistant individuals in the highest vigor classes (Amman and others, 1997; Carlson, 1989; Cole, 1978; Safranyik and Wilson, 2006). Thinning would increase stand photosynthetic efficiency and net primary productivity by as much as 20%, functioning to increase crown vigor and production of secondary compounds that protect the tree from defoliator and bark beetles (Smith and others, 1997).

STRUCTURE: No change in structure would occur immediately since the proposed treatment is targeting the sapling size class and is designed to improve tree vigor through reducing competition and therefore stress to the tree. Residual overstory structure would be left on the sites. Besides improving vigor, thinning would stimulate trees to increase crown growth with crowns extending lower on the trees. The larger and lower crowns can provide improved hiding cover for elk and other large ungulates (Tappeiner and others 2007). Over time, reducing competition for nutrients and moisture through thinning can accelerate old stand development through advancement of the growth of larger trees (Tappeiner and others 2007). Currently this portion of the cover type is exhibiting fewer large-diameter trees than occurred historically.

PATCH SIZE: No changes to patch size would occur since the proposed stands to be thinned are not adjacent to any patches of similar size classes, species composition mix or disturbance.

Douglas-fir would be the predominant species removed during thinning. In relation to potential fire hazard, Douglas-fir thinning slash loses half of its original fuel loading and depth within two years of cutting, with fine fuels effects on fire hazard minimal after two to four years (Christiansen and Pickford, 1991). The immediate increase in fire hazard from slash is partially mitigated through requirement of slash to be lopped and scattered to a maximum height of 18 inches by Montana State Slash Law. In the long term, risk of crown fire is reduced due to a reduction in canopy bulk density and crown continuity canopy spacing between the pine (Peterson and others, 2005).

Prescribed Fire with Fuel Augmentation

Restoration of remnant western larch stands (323 acres in Units F2, F3, F7, F8)

Prescribed burning would create a mosaic pattern of openings where western larch trees can regenerate and promote forested areas of different ages, densities, and size classes. Prescribed fire would also reduce areas with high concentrations of ground fuels and low- and mid-level shade tolerant trees that act as ladder fuels thus lowering intensity and severity of future unplanned wildfires. Treated areas would function as effective fuel treatment zones to increase the likelihood of successful fire suppression efforts and limit fire growth.

COMPOSITION: Composition would shift to a greater percentage of western larch in the understory and decrease the amount of Douglas fir and lodgepole pine. Western larch seedlings are more fire tolerant than lodgepole pine and Douglas-fir and mature western larch trees would survive all but the most severe fires (USDA-FS, 2013). Surviving western larch would quickly reseed burned-over areas and areas where mineral soil is exposed. Seedlings would develop rapidly and outgrow competitors (USDA-FS, 2013). In addition to the effects from the prescribed fire, areas of more dense Douglas-fir and lodgepole pine regeneration would be targeted with mechanical fuel augmentation, increasing the abundance of western larch. The disturbance of fire in these stands would result in greater amounts of grouse whortleberry, false huckleberry, and beargrass.

DENSITY/ STRUCTURE: Overstory and understory density would be reduced. Sapling and pole-sized lodgepole pine and Douglas-fir would be mechanically treated and burned, thus reducing density in the understory. Medium and larger sized Douglas-fir and lodgepole pine would also be reduced in a mixed severity prescribed burn.

The interaction of prescribed fire with western larch and other conifers would produce a variety of age-class structures. Fuel augmented vegetation and prescribed burning would decrease seedling and pole-sized lodgepole pine and Douglas-fir and increase dominance of very large overstory western larch (Arno and others, 1997). Western larch usually develops in mixed-species stands, gains an early height advantage, and continues to outgrow its competition for a century or more, unless weakened by insects or disease (Burns and Honkala, 1990; Green and others, 1992).

Manipulation of forest structure has been shown to reduce the severity and intensity of wildland fire events (Agee, 1996). Decreased fire intensities from effective reduction of surface and aerial fuels would enable suppression forces to have a much better chance of controlling fires (Agee and others, 2000). This would be the expected result with the fuel augmentation and prescribed burning proposed for this project.

In terms of resilience to fire, forest structure is directly related to wildland fuels and potential fire behavior. Recent emphasis on fuels management has led to studies focusing on the effects of manipulating forest vegetation and fire hazard and behavior. It has been found that reduced stand densities, retaining larger diameter fire-resistant species, managing surface fuels, and increasing height to live crowns has had positive effects on tree and stand survivability, decreased crown fire activity, decreased surface fire potential, and decreased fire severity (Omi and Martinson, 2002; Agee and Skinner, 2005).

Eventually the effects to forest structure from all treatments would diminish. Because trees grow over time, stand densities would increase, tree crowns would expand, advanced regeneration would become established and continue to grow taller, fuels would accumulate, and crowns would become stratified through stand dynamics. While large amounts of dead and down woody material would be reduced with prescribed fire, shrubs and forbs would re-sprout and standing dead material would eventually fall, both adding to increased surface fire behavior. To fully achieve the desired fire behavior conditions and to lengthen the effects of prescribed fire, two or possibly three maintenance burns may be required in the future.

PATCH SIZE: The proposed treatment would not impact or change overall current patch sizes within this cover type. Historically many patches were greater than 150 acres in size, and currently most of this cover type has patches less than 50 acres (USDI-BLM, 2013a). The proposed treatment units, due to their spatial arrangement, would create some patches from 100 to almost 150 acres. This is an initial step toward shifting the landscape within this cover type to more of the range that occurred under natural disturbance, prior to historic logging and fire suppression. Initiation of action toward the HRV patch size and spatial arrangement would increase and maintain vegetation structural and species diversity while improving resiliency of the mixed conifer type on the landscape (USDI-BLM, 2013a).

Tree Planting: Habitat Improvement and Forest Restoration
Mixed conifer stand forest resiliency and conifer diversity (699 acres in Units P2 thru P9; P19 thru P22)

COMPOSITION: Composition shifts would vary depending on the site. Generally the current composition on these sites is lower in the seral species such as ponderosa pine, western larch quaking aspen. Predominantly, planting would shift composition to higher percentages of seral species. However, some sites would be planted with Douglas-fir or Engelmann spruce. Shifting composition would create greater species diversity and allow for those sites to have a greater resiliency to a variety of natural disturbances such as insects, disease and wildfire.

DENSITY: Historically the sites proposed to be planted were forested. Since the sites proposed to be planted are understocked, density would be increased over time as seedlings develop. Sites range between 15-60% canopy coverage currently. The increase in density is site-dependent, but an increase of 10-30% above the existing canopy coverage is expected. Within P19 and P22, up to 216 acres of planting would occur if the sites do not naturally regenerate to western larch following the prescribed fire treatment.

STRUCTURE: Since the proposed planting is interplanting between existing conifers on the sites, the dominant structure of the stands (predominantly medium and pole size classes) would not change. However, depending on the amount of interplanting on each site, up to 46% of the proposed treatment area could become multi-storied with the remaining 54% either maintaining or evolving to a two-storied structure. The structural changes created from the proposed action would shift these areas to stand structures that occurred historically. These sites typically exhibited multi-layered structure with mixed-species represented by small patches missed during earlier fire events (Losensky, 1997).

PATCH SIZE: Since planting within this cover type is proposed to increase conifer density and maintain/improve species diversity on sites already exhibiting some stocking, the proposed action would not alter patch size.

Cone Collection

COMPOSITION: No impacts are anticipated due to the small scale of the proposed action with individual trees being climbed or felled over a large area (i.e. the western larch/mixed conifer cover type covers 23,460 acres in the analysis area). No compositional shift would occur within this cover type. Ponderosa pine, Douglas-fir, and Engelmann spruce would be climbed and therefore would continue to exist on the landscape so no alteration of species composition would occur. Western larch would be climbed or pruned if possible, or if these methods are deemed unsafe, western larch would be felled, with no greater than 50 trees felled over a 10-year period. If western larch would need to be felled, overall species composition of this cover type would not shift due to the small proposed treatment area.

DENSITY: No density reduction is anticipated since the majority of trees would be climbed and left standing, and the quantity of trees felled would be small and scattered over a large area (23,460 acres). The trees proposed to be felled would occur over a dispersed area, and over a 10 year time period if a productive cone crop occurs therefore changes in density would be negligible.

STRUCTURE: Due to the small scale and type of proposed action, climbing for cone collection or minimal felling of trees if necessary, no impacts to the overall structure of the stands within this cover type is anticipated. Cone collection would target the medium to large size classes (<21" DBH) which constitutes 69% of the dominant structure within this cover type. It is not anticipated western larch over 21 inches and/or greater would need to be felled, particularly since seed viability declines in western larch as they age.

PATCH SIZE: No impacts to patch size would occur. Individual trees would be climbed or felled for cones. This proposed action occurs on too small a scale to impact or alter patch size.

Ponderosa pine/Douglas-fir cover type

Tables 4-3a and 4-3b summarize the shifts that would occur to stand structure, species composition and density under the Proposed Action in the ponderosa pine/Douglas-fir cover type.

Table 4-3a. Ponderosa Pine/Douglas-fir Conifer Cover Type: Summary of Anticipated Shifts in Structure/Composition

Dominant Structure Class (inches DBH)	No Action		Proposed Action	
	Species (order of abundance)	Acres (% of total)	Species (order of abundance)	Acres (% of total)
Seedling-Sapling (< 5.0)	DF/PP	480 (3)	PP/DF	533 (3)
Pole (5.0-8.9)	DF/PP	709 (4)	DF/PP	692 (3)
Medium (9.0 -14.9)	DF/PP	8,701 (43)	DF/PP	8,556 (43)
Large (15-20.9)	PP/DF	7,526 (38)	PP/DF	7,688 (39)
Very Large (21.0 +)	PP/DF	2,357 (12)	PP/DF	2,357 (12)
Non-stocked/Non-forest	*n/a*	195 (<1)	PP	142 (<1)

PP (ponderosa pine), DF (Douglas-fir)

Table 4-3b. Ponderosa Pine/Douglas-fir Conifer Cover Type: Summary of Anticipated Shifts in Density

Density/Canopy Coverage Class (% canopy cover)	Acres and % of Total	
	No Action	Prop. Action
0-14%	414 (2)	664 (3)
15-39%	3,910 (19.5)	4,214 (21)
40-69%	11,744 (59)	11,206 (57)
70-100%	3,900 (19.5)	3,884 (19)

Forest Stand and Wildlife Habitat Improvement in Sapling/Pole-Sized Stands
Ponderosa pine restoration (546 acres in Units T1, T2, T3, T4, T5, T6, T7, T8, T12, T13)

COMPOSITION: Species composition would shift toward a higher percentage of seral species such as ponderosa pine and western larch while reducing shade tolerant species such as Douglas-fir. This shift would also move these stands closer to the HRV and desired condition (USDI-BLM, 2013a). The proposed would maintain existing overstory species composition. The proposed pre-commercial thinning would increase understory species (forbs, graminoids, shrubs) diversity, but may cause an increase in invasive or exotic species. However, Fiedler and others (2006) demonstrated that thinning would favor native species over non-natives.

DENSITY/ STRUCTURE: Density would be reduced 20-25%. Understory species diversity would increase in response to increased light and reduced competition for moisture and nutrients, primarily nitrogen (Metlen and Fiedler, 2005; Fiedler and others, 2006). Pre-commercial thinning would reduce density, competition, and stress, as well as decrease future pine beetle risk, root disease, and defoliator damage by favoring non-host species and resistant individuals in higher vigor classes (Amman and others, 1997; Carlson, 1989; Cole, 1978; Safranyik and Wilson, 2006). Thinning would increase stand photosynthetic efficiency and net primary productivity by as much as 20%, which increases crown vigor and production of secondary compounds that protect trees from defoliators and bark beetles (Smith and others, 1997).

Reduced density would increase overstory and understory resiliency to uncharacteristically severe wildfires (Metlen and Fielder, 2005).

Initial forest structure would not be altered. Over time, forest stand improvement combined with future intermediate treatments would accelerate development of older stand structures (Smith and others, 1997; Peterson and others, 2005; Fiedler and Arno, 2005) currently lacking in the proposed treatment areas.

PATCH SIZE: The proposed action would maintain the patch size range of 150-200 acres that historically existed over a larger percentage (10-25%) of this cover type. Currently 3-4% of this cover type is in this patch size range (USDI-BLM, 2013a).

Slash created through pre-commercial thinning would increase fire hazard for up to 5 years in ponderosa pine stands (Fahnestock, 1968). Fire hazard would decrease after 5 years because of needle loss and snow compression coupled with on-going slash decomposition.

Douglas-fir would be the predominant species removed during thinning. In relation to potential fire hazard, Douglas-fir thinning slash loses half of its original fuel loading and depth within two years of cutting, with fine fuels effects on fire hazard minimal after two to four years (Christiansen and Pickford, 1991). The immediate increase in fire hazard from slash is partially mitigated through requirement of slash to be lopped and scattered to a maximum height of 18 inches by Montana State Slash Law. In the long term, risk of crown fire is reduced due to a reduction in canopy bulk density and crown continuity canopy spacing between the pine (Peterson and others, 2005).

Prescribed Fire with Fuel Augmentation
Restoration of lower elevation ponderosa pine and Douglas-fir savannah types (605 acres in Units F1, F4, F5, F12)

COMPOSITION: Composition would shift toward a higher percentage of ponderosa pine in the understory. Currently Douglas-fir is the dominant species in 51% of the cover type. The desired future composition of this cover type is 4-10% Douglas-fir, 85-90% ponderosa pine on drier portions of the cover type, and 60-70% ponderosa pine on more mesic sites. Prescribed burning would enhance coverage and diversity of understory vegetation and could improve forage production for elk and deer by 200-2000 percent (Hillis and others, 2001).

DENSITY: Overall density would be reduced through prescribed burning. The density reduction would occur primarily in the Douglas-fir seedlings, saplings and pole size classes. Density would likely be maintained near current levels with the majority of llarge and very large size classes at 40-69% canopy coverage. Understory species diversity would increase in response to more light and lower competition for moisture and nutrients, primarily nitrogen (Metlen and Fiedler, 2005; Fiedler and others, 2006).

Reduction in conifer density would reduce stress on existing trees, particularly the large and very large size classes, and lower their susceptibility to drought, insects, and disease (Arno, 1996; Hilles and others, 2001). Reduced density would aid in restoring a low intensity, high frequency fire regime and provide greater survival and resiliency from wildfires (Fielder and others, 1998; Arno and Fielder, 2005; Brown and Smith, 2000).

STRUCTURE: Existing multi-storied structures (where occurring) would be maintained. Prescribed burning would create suitable seedbeds and promote ponderosa pine regeneration. A new pine seedling layer would shift stand structure from single and two-storied stands toward multi-storied stands. Additionally, prescribed burning can enhance, maintain and promote any old stand characteristics occurring in this cover type (Brown and Smith, 2000). Large and very large trees, particularly ponderosa pine, would persist. Recruitment of medium size class (currently 41% of the cover type) into the large size class would be enhanced through accelerated growth after prescribed burning (Arno and Fiedler, 2005).

PATCH SIZE: Prescribed burning in Units F1, F4 and F5 would not alter patch size and would be generally within the HRV for mid-elevation sites. Prescribed burning in Unit F12 would increase patch size to greater than 400 acres. F12 is located at a lower elevation where HRV patch size averaged between 250 to greater than 500 acres (USDI-BLM, 2013a).

Tree Planting: Habitat Improvement and Forest Restoration
Ponderosa pine site restoration (53 acres in Unit P1)

COMPOSITION: Unit P1 is a grass, forb, and shrub site dominated by noxious weeds such as spotted knapweed (*Centaurea stoebe*) and cheatgrass (*Bromus tectorum*) with occasional Douglas-fir natural regeneration (less than 1% cover). The proposed planting

would change stand composition toward an open-canopied ponderosa pine and Douglas-fir overstory and a mixed grass, forb, and shrub understory.

DENSITY: Density would increase to approximately 200-300 trees per acre (15-39% canopy coverage). This would be an increase of 14-38% over the current canopy coverage. The site is presently under-stocked as a result of the 1991 Game Range Fire. Increasing density and canopy coverage would provide greater shade and create site conditions less favorable for invasive weeds such as spotted knapweed (Ferguson and others, 2007; Forcella and Harvey, 1983; Watson and Renney, 1974) and cheatgrass (USDA-FS, 2013) which currently occupy 35-40% of the site. With a reduction of invasive species, there would be improved site conditions for native forbs, graminoids and shrubs and the possibility of increased vegetation diversity.

STRUCTURE: Structure would progress from a grass/forb/shrub state where the site has existed for the previous 22 years toward a predominantly single-storied seedling/sapling stage from the time of planting through the next 15-20 years until the site developed into the pole size class.

PATCH SIZE: No impacts to patch size would occur because the scale is too small.

Cone Collection

COMPOSITION: No impacts to species composition would occur. Ponderosa pine and/or Douglas-fir would be climbed (as opposed to felled) to collect cones and would therefore continue to exist on the landscape.

DENSITY/STRUCTURE: No impacts to density or structure would occur. Cone collection would occur at a small scale, and the selected dominant and co-dominant trees would be well-dispersed across the area containing the ponderosa pine and/or Douglas-fir cone crop.

PATCH SIZE: No impacts to patch size would occur. Cone collection would occur on too small of a scale to impact or alter patch size.

Effects of Treatments on Conifer Seed Production

The recent mountain pine beetle epidemic has created mortality within the lodgepole pine/subalpine fir cover types. Mortality in the lodgepole pine would reduce the cone production within this cover type. In regard to the lodgepole pine mortality and cone production, scientific literature cites that for best germination of this seral species full sunlight and bare mineral soil or at a minimum disturbed duff with no competing vegetation (Burns and Honkala, 1990; Lotan and others 1985, Davis and other 1980, USDA FS 2013) is needed for regeneration. Disturbance, generally fire, that creates bare mineral soil and reduces vegetative competition will promote regeneration of these stands and in many cases will reduce the time needed to establish another stand of lodgepole capable of producing cones and seed.

Lodgepole pine, particularly serotinous, evolved to have the heat of stand-replacing fire release the canopy seed (USDA 2013; Burns and Honkala, 1990; Teste and others 2011; Lotan and others 1985). Lodgepole pine is a prolific seed producer and capable of producing viable seed at early ages such as 5-10 years. Cone production in individuals of this species in the dominant and codominant positions can vary from a few hundred to a few thousand per tree with annual seed production of 40,000 to 90,000/acre (Burns and Honkala, 1990).

If disturbance does not occur that assists the cones in releasing seed, stand development and future cone production will be delayed. Scientific literature states that cones, particularly serotinous, will exist in standing dead lodgepole pine for up to 15 years before seed viability becomes a major factor in reduced seed available for germination (Teste and others 2011). However, during that time, seeds in serotinous cones will be "trapped" in the high resin cones and not able to germinate until a disturbance creates enough heat to open the resinous surface and allows seed dispersal (Teste and others 2011, USDA FS 2013). Seed banks in the ground do exist with lodgepole pine but when they occur in predominantly serotinous stands of lodgepole, will again require heat of some type to open the resinous cones. Without disturbance and serotinous cones on standing dead lodgepole, regeneration of lodgepole on those sites could be delayed by 10-15 years until the standing dead trees fall to the ground (Teste and others 2011) and have an appropriate disturbance to open the cones.

Of the 12,253 acres within the lodgepole pine cover type in the analysis area, 10,141 are managed by the BLM. Field inventories during planning for this project indicate that the majority of these stands have serotinous cones. The proposed action is recommending prescribed burning on 2,219 acres representing 18% of the cover type within the analysis area with the burning. The proposed burning represents 22% of the lodgepole cover type on BLM lands. The burning is proposed to be conducted in phases taking up to 10 years. One portion of the burning (i.e. a block) must be completed prior to another. The areas burned will start regenerating as other blocks are being treated. The burns are planned as a mosaic burn and 100% mortality is not anticipated thereby increasing the amount of residual lodgepole pine not under treatment still existing in the analysis area above the 18%.

The proposed action is recommending harvest of a maximum of 359 acres within this type. This accounts for 3% of the cover type and represents 3.5% of the lodgepole cover type on BLM lands. Harvesting timber would not remove cones from the site. The preponderance of the tops of the trees are left with cones attached within each unit thereby providing seed for regeneration of the forest, as well as, a food source for birds. The proposed post-harvest burning is designed to aid in release of lodgepole pine seeds. The proposed harvest areas are predominately dead trees already so the treatments (including prescribed fire) would not reduce cone production on trees already killed by the mountain pine beetle but can accelerate recolonization by lodgepole pine on those sites.

4.3.2 Wildlife and Wildlife Habitat

Impacts of the proposed action are described in the context of the issues presented in section 1.8. Timing and acres of treatments are evaluated. Wildlife and wildlife habitat would be impacted to varying degrees by proposed vegetation treatments and the proposed use and construction of roads. Impacts with timing of road use, acres of habitat impacted by road use, and acres of habitat disturbed by temporary road construction are evaluated.

Unless otherwise noted (Canada lynx, elk, mountain lions), the geographic scope of effects is limited to BLM lands within the Chamberlain-Wales analysis area boundary. Short and long-term effects are analyzed below for affected species. The objective of the proposed action alternative is to enhance habitat conditions for Chamberlain wildlife.

Special Status Species: (Threatened, Endangered, Candidate)

Grizzly Bear (threatened): Cone collection, culvert removal and helispot development are benign treatments and would not measurably affect grizzly bears. Road drainage maintenance, improvement, and obliteration would displace bears in the vicinity of work sites for the duration of the project. Road obliteration would lower total road density by one mile. Road travel management designation would lower total road density, as well as total open road density. Road density would decrease from 3 mi/mi^2 to 1 mi/mi^2. Open road density would decrease from 0.29 mi/mi^2 to 0.26 mi/mi^2. Grizzly bear habitat security would increase with management of Class 3 roads. Class 2 roads would improve habitat security when no longer needed and allowed to close with downed trees and vegetation growth.

Road travel management designation of Class 1, 2, and 3 roads would lower total road density and total open road density improving grizzly bear habitat security (Figure 2-2). These roads are primarily closed during spring, summer, and fall. Class 1 roads (46 miles) are system roads and would receive periodic maintenance to keep them trafficable for administrative access. Class 2 roads (26 miles) would receive maintenance to access proposed treatments until no longer needed and allowed to close with downfall and vegetation growth (shrubs and trees). Class 3 roads (26 miles) are not needed for the proposed action treatments and are allowed to close naturally with downfall and vegetation growth; these roads would not be used for ordinary administrative use, but may be used for fire suppression or future vegetation management. Of the 98 miles of total roads on BLM lands, 52 miles are Class 2 and 3 roads representing a 53% reduction in administrative drivable roads post proposed action treatments relative to total BLM road mileage. See Table 4-4 for road information.

Security core area has not been designated for Chamberlain, but will follow the draft Northern Continental Divide Ecosystem Conservation Strategy when it is finalized. The draft strategy define grizzly bear secure core habitat as those areas more than 500 m (0.3 miles) from open or gated wheeled motorized access routes and high-use non-motorized trails, and at least 2,500 acres in size. The Wale's Creek Wilderness Study Area, which is 11,580 acres, was identified in the draft as a potential grizzly bear secure core area.

Table 4-4. Road Density and Class 1, 2, and 3 Roads Used For Administrative Use			
Road Density and Road Class	Pre-Treatment	During Treatment	Post-Treatment
Total Road Density Total Open Road Density	2.80 mi/mi² 0.29 mi/mi²	2.80 mi/mi² Variable, See Table 6	2.80 mi/mi² 0.29 mi/mi²
Class 1 Roads Class 2 Roads Class 3 Roads	46 miles 26 miles 26 miles	46 miles 26 miles 0 miles	46 miles 0 miles 0 miles
Total:	98 miles	72 miles	46 miles

Vegetation treatments would result in reduction of 4,978 acres (24% of BLM lands in treatment blocks 1,2,3, and 4) of grizzly bear cover over an estimated 10-year period. Grizzly bear summer/fall habitat above 5,000 feet elevation (4,857acres; 98%), and spring habitat below 5,000 feet (121 acres; 2%) would be affected. Road use for administrative purposes and vegetation treatments during spring, summer, and fall would potentially displace grizzly bears during these activities. Open motorized road use behind otherwise year-round closed roads would increase. An open road is defined as any road where motorized vehicles are allowed (Rowland et al. 2005). Open motorized road density is currently managed at <1mi/mi^2 throughout the Chamberlain and Wales Creek area. In an attempt to maintain low open motorized road density, multiple treatment blocks would be established to stage and localize activities into different portions of the analysis area at different times.

Project work would be implemented on one or two treatment blocks and accomplished in one to three years before implementing work on other treatment blocks. Treatment block work would be planned over a 10-year period. Montana Fish, Wildlife, and Parks recommends open road density in grizzly bear habitat at <1 mi/mi^2 (Dood and others, 2006). In the Swan Mountains, Mace and others (1996) found that most grizzly bears exhibited a neutral or positive selection for 0.5 km buffers surrounding closed roads and roads receiving <10 vehicles/day, but avoided buffers surrounding roads having >10 vehicles/day. Treatment block design features, managed in time and space would minimize the effects of motorized vehicle access by providing habitat security in non-active treatment blocks.

Once projects are implemented, reduction of forest cover (4,978 total acres; 24% of BLM lands) would last approximately 15-20 years. In the short-term (2-5 years) conditions would improve for grizzlies by enhancing huckleberry, serviceberry, grass, and forb summer/fall forage habitat. This is especially beneficial in prescribed burn units that would increase forage by 4,309 acres (21%) during the next 20-30 years. Road use by contractors would cease post treatment, allowing grizzlies to adjust to lower open motorized road densities. Administrative use of roads would continue, but would decrease to an estimated one vehicle/day from spring to fall. Grizzly bear displacement would decrease, but would be a function of administrative road use: the greater administrative use the greater displacement. Open motorized use behind managed year-

round closed roads would be <1 mi/mi^2. Wales Creek WSA would function as grizzly bear habitat security area once vegetation treatments cease.

Canada Lynx (threatened): The direct and indirect effects analysis area is the Chamberlain and McElwain Complex Lynx Analysis Units (LAUs), and for critical habitat, Unit 3, Northern Rockies Critical Habitat. Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management designation effects would be similar to those for the grizzly bear. Approximately 546 acres of dense sapling/small pole stands within the ponderosa pine/Douglas-fir cover type are proposed for pre-commercial thinning, are not located in Canada lynx/snowshoe hare habitat, and would have no effect on these two species. Vegetation treatments would impact lynx habitat: lodgepole pine stand replacement with timber harvest and prescribed burns (359 acres), western larch-mixed conifer stand restoration with timber harvest and prescribed burn (314 acres), western larch restoration with prescribed fire and fuel augmentation outside Wales Creek WSA (323 acres), lodgepole pine prescribed fire and fuel augmentation outside the Wales Creek WSA (555 acres), lodgepole pine prescribed fire without fuel augmentation inside the Wales Creek WSA (2150 acres; up to 50% burned), snowshoe hare research study variable density thinning (37 acres), and 2.5 miles of temporary road construction creating 10 acres of vegetation disturbance. Timber harvest would not occur in multistory habitat. Pre-commercial thinning in 86 acres of dry Douglas-fir habitat types would occur in lynx matrix habitat not providing snowshoe hare habitat. Tree planting would potentially enhance 579 acres of hare and lynx habitat. Roads and road use are not an issue for hares or lynx.

Treatments total 3,714 acres of direct and indirect effects to the Chamberlain Complex LAU (1,297 acres); and McElwain Complex LAU (2,595 acres). The Chamberlain LAU has 23,330 acres of lynx habitat. Chamberlain existing condition is 1,333 acres or 6% unsuitable condition (early stand initiation; spring, summer, fall forage habitat). Existing conditions combined with proposed action treatment of 1,297 acres (6%) in potential unsuitable condition would produce 2,630 acres (12%) unsuitable lynx habitat within the total LAU.

The McElwain LAU has 48,571 acres of lynx habitat. McElwain existing condition is 2,658 acres (5%) unsuitable. Existing conditions combined with proposed treatment of 2,417 acres (5%) in potential unsuitable condition would produce 5,253 acres (11%) unsuitable lynx habitat within the total LAU.

The RMP standard for Canada lynx is that no more than 30% of lynx habitat in an LAU can be in an unsuitable condition and management actions shall not change more than 15% of lynx habitat in an LAU to an unsuitable condition within a 10-year period (USDI and USDA, 2013). Vegetation treatment in both LAUs would be in RMP compliance. Tree planting with Engelmann spruce in 579 acres of stem exclusion lodgepole pine (units P10 thru P18) is intended to benefit snowshoe hares and Canada lynx by producing early stand initiation, stand initiation, and multistory structure. Den habitat is estimated at greater than 50%.

Prescribed burning and timber harvest with prescribed burns are intended to produce early stand initiation, stand initiation, and multistory structure providing forage for snowshoe hares, and forage and den habitat for Canada lynx. In the short-term, 5,990 acres (12%) of early stand initiation structure in the Chamberlain and McElwain Complex LAUs would be in an unsuitable condition. At this time, 88% of lynx habitat in these LAUs would be in suitable condition providing stand initiation, multistory forage, den, and corridor habitat. Within 10 years, 6% of currently unsuitable habitat would become suitable habitat (stand initiation). Unsuitable and suitable habitat would then be 6% and 94%, respectively. If otherwise undisturbed, within 15 to 20 years the remaining 6% of unsuitable habitat produced from the proposed action would provide stand initiation. Unsuitable and suitable habitat would be at 0% and 100%, respectively. Timber harvest and prescribed fire in western larch (314 acres) stands would occur in mature forest lynx habitat, attaining multistory structure would take an additional 100 years (Pfister, 2013; USDA-FS, 2013). Tree planting would take 15-20 years to provide year-round forage habitat and >100 years to attain multistory structure. Temporary road recovery would take 20-30 years to provide stand initiation year-round forage habitat.

The term "fragmentation" describes the human-caused alterations of natural landscape patterns that reduce the total area of habitat, increase the isolation of habitat patches, and impair the ability of wildlife to effectively move between those patches of habitat. Fragmentation of habitat accentuates the viability risk inherent in a small population and increases its vulnerability to local extirpation. The combination of human-caused and natural disturbances may exacerbate fragmentation effects. Lynx habitat in the contiguous United States is inherently patchier than in the northern boreal forest with its extensive forests, gentle topography, and relatively consistent winter snow conditions. The pronounced topographic relief in the mountains of the western United States restricts lynx habitat to a relatively narrow elevation band. Within their home ranges, lynx strongly select for habitat patches that enhance their foraging opportunities. Analysis of winter movements of lynx in Montana indicated that lynx selected homogeneous spruce-fir patches that supported snowshoe hares and avoided recent clearcuts or other open patches. Lynx avoid large openings, especially during winter. (USDI and USDA, 2013).

The proposed action implements conservation measures to minimize habitat fragmentation outlined in the LCAS 3rd edition, such as: emphasizing land uses promoting or retaining conservation of contiguous blocks of lynx habitat; maintaining a mosaic of vegetation and features such as riparian areas, forest stringers, unburned inclusions and forested ridges to provide habitat connectivity within and between LAUs; Identify linkage areas to maintain connectivity of lynx populations and habitat; considering topographic and vegetation features important to lynx movement patterns; retaining lynx habitat and linkage areas in public ownership to maintain or facilitate lynx movement. Vegetation treatments are designed to provide lynx movement around harvest and prescribed fire units.

Unit 3 of Northern Rockies Critical Habitat encompasses 10,102 mi^2 or 6.5 million acres. Lynx habitat in Chamberlain Complex LAU contains 36 mi^2 or 23,330 acres, which represents .004% of the Northern Rockies Critical Habitat. Lynx habitat in McElwain Complex LAU contains 76 mi^2 or 48,571 acres, which represents .007% of the Northern

Rockies Critical Habitat Area. Chamberlain LAU existing unsuitable lynx habitat and proposed action unsuitable lynx habitat represents .0002% and .0002%, respectively, totaling .0004% of Northern Rockies Critical Habitat. McElwain LAU existing unsuitable lynx habitat and proposed action unsuitable lynx habitat represents .0004% and .0005% respectively, totaling .0009% of Northern Rockies Critical Habitat.

Pre-commercial thinning would occur on 86 acres of matrix habitat composed of dry Douglas-fir habitat types. These mixed conifer forests do not provide habitat for snowshoe hares. Variable density thinning would occur on 37 acres of snowshoe hare habitat located in the 1994 East Chamberlain Burn. Thinning is part of the University of Montana snowshoe hare research project, which would study how snowshoe hares respond to light thinning techniques in young (19 year old) western larch stands. The research project is an attempt to restore western larch while retaining stand initiation structure for snowshoe hares. Stem exclusion timber harvest with prescribed fire on 359 acres of lodgepole pine are proposed to create stand initiation structure forage habitat in the long-term (15–20 years). Proposed action objectives are to produce snowshoe hare and Canada lynx habitat through vegetation treatments.

Prescribed fire, with and without timber harvest, is not proposed in multistory lynx habitat. Proposed vegetation treatments are in stands not exhibiting multiple age classes, vegetation layers, or high horizontal cover with lower live limbs reaching the snow. Large woody debris and canopy gaps are not generally present. In the western larch timber harvest with prescribed fire, portions of stands have large woody debris and canopy gaps with sapling regeneration; these areas would be deferred from treatment. Treatment stands are in stem exclusion and matrix habitat. Stem exclusion habitat are single-story structure without horizontal cover or live limbs reaching the snow at ground level. Matrix habitat is located in dry Douglas-fir habitat types not supporting snowshoe hares.

Wolverine (candidate): Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management designation effects would be similar to the grizzly bear. According to the 12-month finding and distinct population segment, land management activities do not create a threat to wolverines (USDI-FWS, 2010; USDI-FWS, 2013d). Climate change and trapping may be the major risk factors for wolverine population viability. Reduction in wolverine habitat may result from 4,978 acres of proposed vegetation treatments. However, the wolverine is a generalist/opportunist in its foraging habits and utilizes a variety of vegetation types. It is likely wolverines utilizing the area would be displaced during vegetation treatments.

The risk of trapping mortality would not increase with the proposed action; the public would continue to access the area under existing travel management direction. Habitat quality would diminish in the short-term, but recover in 3-5 years post treatment. Wolverines forage on insects, birds, and small mammals; carrion is a main food source during winter. Food sources would be available pre and post-treatment.

Special Status Species: (Sensitive)

Forest Bats: The proposed action would not affect caves, mine openings, or old buildings. Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management designation would not impact forest bats. Vegetation treatments, such as timber harvest, would remove lodgepole snags, which are potentially used by bats for roosting. Taylor (2006) suggests that vegetation management creates openings and edges for foraging habitat. Suitable forage and roosting habitat results from group selection harvest, snag retention, prescribed fire, thinning, and other mechanical treatments.

Stand replacement harvest and prescribed burning in lodgepole pine cover types (359 acres, 2% of BLM lands) and timber harvest and prescribed fire in western larch cover types (314 acres, 2% of BLM lands) would impact 673 acres (4% of BLM lands) roosting habitat, but enhance forage habitat. A total of 4,978 acres (24%) of BLM lands) of forest habitat would undergo some type of disturbance (timber harvest, thinning, and/or prescribed fire), however 98% of vegetation treatments would retain roosting and enhance forage habitat. Timber harvest has short-term impacts while treatments are occurring. Prescribed fire has initial short term impacts associated with displacement from roosting sites. Long-term prescribed fire impacts would be positive since thousands of snags for potential roosting and foraging sites would be created. Snags would not be harvested. Roosting habitat for long-eared and long-legged myotis would be enhanced through prescribed fire. Late succession forest and riparian habitat would not be impacted, which retains primary forage sites for insects. Temporary roads would remove 10 acres of coniferous trees resulting in a loss of potential roosting trees.

Bat foraging habitat would not be impacted. Townsend's big-eared bats and fringed myotis roost in caves and mine adits/shafts and would not be impacted by current or planned actions. Roosting habitat for long-eared and long-legged myotis would be maintained. Riparian habitat, late succession structure, snags, and live tree habitat would continue to develop through natural ecological processes. Natural disturbance processes (fire, insects, and disease) would continue, enhancing foraging and roosting habitat, especially for long-eared and long-legged myotis. As per the Northern Region Snag Management Protocol, snags occur in pulses of high density, persisting for short periods (5-25 years) then are gone until the next fire event or other disturbance. This is the ecology of these vegetative response units (USDA-FS, 2000).

Vegetation treatments, such as timber harvest, would incidentally remove lodgepole snags, which are potentially used by bats for roosting. Taylor (2006) suggests that vegetation management creates openings and edges for foraging habitat. Suitable forage and roosting habitat results from group selection harvest, snag retention, prescribed fire, thinning, and other mechanical treatments.

Fisher: Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management designation effects would be similar to the grizzly bear. Roads would be open to contractors and administrative use, but closed to the public, other than winter snowmobile use. Low trapping access would be maintained and minimize trapping mortality. Closed

roads currently with <1mi/mi^2 of open road would be managed with treatment blocks to mitigate effects: > 1 mi/mi^2 in active treatment blocks; < 1 mi/mi^2 in inactive treatment blocks. The fisher favors riparian habitat and these areas would not be impacted by the proposed action, since all treatments would comply with INFISH and Riparian Habitat Conservation Area (RHCA) direction. Mature western larch/mixed conifer forests (314 acres) would be harvested with group selection treatment and jackpot burned to develop historic late succession uneven age/multistory stand structure. Treatment patches would be 2-5 acres.

Gray Wolf: Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management designation effects would be similar to the grizzly bear. Proposed vegetation treatments may occur in potential den habitat; den locations for both packs residing in the project area are unknown. If an active den or rendezvous site is located vegetation treatments within a one mile radius would be deferred until July 15. Habitat conditions for ungulate prey would be maintained. A combination of timber harvest and prescribed burning would promote 5,070 acres of early stand initiation structure. Grass, forb, and shrub habitat would increase, which would increase ungulate forage. The proposed action would reduce cover by 4,978 acres in the short-term, but cover would increase in 15-20 years.

Habitat security for wolves and their prey, especially elk, would diminish with constant road use during spring, fall, and winter. Elk may be displaced up to ½ mile on either side of an active road (Burcham and others, 1998). To mitigate potential impacts, temporary and existing roads would be managed with treatment blocks, to maintain habitat security. Treatment blocks that are managed in time and space would be established to minimize effects of vehicle traffic. Each block would be treated one at a time providing untreated blocks with high levels of habitat security. Habitat security impacts would diminish once treatment blocks are completed and road use ceases, which may last 1-3 years. Class C roads would be allowed to close, which would enhance wolf and ungulate habitat security. Wolf hunting and trapping may occur, but the area would not be open to public vehicle access during spring, summer, and fall. Snowmobile use during winter would provide public access to wolf hunting and trapping.

Bald and Golden Eagles: Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management designation effects would be similar to the grizzly bear. What appears to be an eagle nest is located ½ mile south of a pre-commercial thinning area (T8). The nest was reported in 2011, but has never been active. There are no known bald or golden eagle territories in Chamberlain or Wales Creek. If an active nest is discovered the nest would be protected by implementing the Montana Bald Eagle Management Guidelines (2010) and the Bald and Golden Eagle Protection Act (1940 as amended). The proposed action would not affect bald and golden eagles. Large trees for potential nest sites would not be impacted by the proposed action. Large trees suitable for nest sites would be retained in all timber harvest and prescribed burns located in uplands above riparian areas. The Montana SMZ law, INFISH, and RHCA direction would protect stream channels and maintained untreated riparian habitat for bald eagles. Cliff sites where golden eagles often nest are uncommon and those present would not be impacted by the proposed action.

Northern Goshawk: Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, road obliteration, and road travel management designation would not affect goshawks. Current nesting activity is unknown, but BLM lands in the project area may contain 5-10 nest territories (McGrath and others, 2003; Smith and Keinath, 2004; Sampson, 2006). Late successional forests would be impacted from timber harvest with prescribed fire proposed in western larch stands (HF1, HF2, HF3, HF4; 314 acres) and prescribed fire with fuel augmentation in western larch (F2, F3, F7, F8; 323 acres). The impact would occur by removal of active and potential nest trees, structure changes in nest and forage habitat, and by disruption of breeding activity during implementation. Prescription objectives are to retain late succession forest by maintaining and restoring western larch, yet some habitat would be impacted by timber harvest, fire, fuel augmentation, and implementation activity.

Vegetation treatments with uneven age management in ponderosa pine and Douglas-fir would produce forage habitat. Prescribed burns would enhance goshawk forage habitat while retaining potential nest habitat. Food items are comprised of red squirrels, chipmunks, snowshoe hares, ground squirrels, and various forest birds, including robins, flickers, and woodpeckers (McGrath and others, 2003; Smith and Keinath, 2004; Sampson, 2006). Snowshoe hare habitat is not proposed for treatment. Increased road use from contractors and administrators may potentially disturb goshawk nests located within ¼ mile of a road. Ground disturbing activities would not occur from June 1 to July 15 to protect potential nest habitat. If an active nest is located, 40 acres around the nest would be deferred from any ground disturbing activities from March 1-September 30. The area would be evaluated to determine if treatment modification should be considered, such as excluding the 40 acre buffer zone around the nest from treatment.

Great Gray and Flammulated Owls: Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, road obliteration, and road travel management designation effects would not impact great gray and flammulated owls. Late successional forests used for great gray owl nest sites may be potentially impacted from timber harvest with prescribed fire in western larch (HF1, HF2, HF3, HF4; 314 acres) and prescribed fire with fuel augmentation (F2, F3, F7, F8; 323 acres). The impact would occur through the inadvertent removal of active or potential nest trees and disturbing nest territories during implementation. Wildlife design features would protect potential nest sites. All prescribed burning projects, with and without timber harvest and fuel augmentation (4,978 acres) would enhance forage habitat for the great gray owl. Timber harvest and prescribed burn treatments would recover in the short-term (2-5 years) and continue to function as forage and nest habitat for the long-term (30-50 years).

Timber harvest and prescribed burns in ponderosa pine and mixed ponderosa pine and Douglas-fir late successional forests would benefit flammulated owls. Understory vegetation would be disturbed producing foraging habitat. Large snags would be retained for potential nest trees. Large trees, open savannah conditions, and patches of dense vegetation would maintain roosting habitat. Short and long-term recovery would be similar to the great gray owl. Ground disturbing activities would not occur from June 1 to July 15 to protect potential nesting owls. If an active great gray or flammulated owl nest

is located 40 acres around the nest would be deferred from any ground disturbing activities from April 15-August 15. The area would be evaluated to determine if treatment modification should be considered, such as excluding the 40 acre buffer zone around the nest from treatment.

Black-Backed and American Three-Toed Woodpeckers: Cone collection, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, road obliteration, and road travel management designation would not affect black-backed and three-toed woodpeckers. All treatments with timber harvest and prescribed burning (4,978 acres) would enhance black-backed and three-toed woodpecker forage and nest habitat. The 2012 Elevation Mountain Fire, located a few miles south of the proposed action area, has black-backed and three-toed woodpecker activity (J. Sparks, personal observation). Prescribed burns would retain all burned trees (no salvaging) for post-treatment foraging and nesting. Late succession mature stands would be enhanced to produce old growth characteristics such as retaining old trees, snags, logs and creating canopy patches. Some old trees, snags, and logs may be damaged during harvest and burning operations, but this would be incidental to the objectives. Firewood cutting may occur in Person Creek, however the Chamberlain area is closed to vehicle access and Wales Creek WSA has public access, but the road is rough and firewood cutting activity is likely insignificant.

Big Game Species

Elk: The direct and indirect effects analysis area for elk is the Chamberlain and Lindbergh herd home ranges. Effects of the proposed action on elk would be similar to grizzly bear. Cone collection, culvert removal and helispot development are benign treatments not measurably affecting elk. Road drainage maintenance and improvement would displace elk in the vicinity of work sites during the time taken to begin and complete projects. Road obliteration would displace elk in the vicinity of projects from beginning to completion, but would lower total road density by one mile and would benefit elk habitat security. Road travel management designation would lower total road density and open road density behind locked gates for administrative use. Habitat security would increase with modification and abandonment of existing Class 3 (25 miles) and Class 2 (26 miles) roads when these roads are no longer needed for resource projects and allowed to close themselves with downed trees and conifer and shrub growth. New construction of permanent roads is not proposed.

Ten miles (0.38 mi./mi.^{2}) of the total 98 linear miles of roads are located in Pearson and Wales Creek and are open to motorized public assess during the hunting season with road densities of 0.38 miles/mi^2. With 35 mi^2 of BLM lands, total open road density during the hunting season would be 0.29 mi/mi^2. Public motorized access is not permitted behind locked gates at any time of year, including pre-treatment, during-treatment, or post-treatment. With a ½ to 1-mile road buffer, approximately 17,000 acres of elk habitat security would be available. No public motorized access is permitted during the hunting season or any other time of year. Road management has been this way for more than 30 years. Therefore elk vulnerability during the hunting season in the project area would be zero. Hiding cover current condition is approximately 90,000 acres of the Chamberlain

and McElwain area. Approximately 84,000 acres of hiding cover would be available post-treatment.

Road use during administrative use and vegetation treatment during summer and fall would displace elk from the treatment areas. Rowland et al. (2005) define open roads as any road where motorized vehicles are allowed. Open motorized road use behind otherwise year-round closed roads would increase. Treatment blocks would be established to mitigate effects to habitat security and effectiveness. Montana Fish, Wildlife, and Parks recommends open road density in elk habitat at <1 mi/mi^2. Habitat effectiveness is a measure of success in meeting elk needs on summer range and is defined as the percentage of available habitat usable by elk outside the hunting season (Christensen et al. 1993). Habitat effectiveness is calculated by determining the number of miles/square mile of open roads. To benefit elk summer range and to retain high use, habitat effectiveness should be >70%. Where elk are one of the primary resource considerations habitat effectiveness should be >50% (Christensen and others, 1993). Minor contributions to elk management goals are habitat effectiveness values <50%. Proposed action open road density would result in a habitat effectiveness value >50% in active treatment blocks and >70% in inactive treatment blocks. Treatment block design features, managed in time and space, would minimize the effects of open road density on elk.

Vegetation treatments would result in a reduction of 4,978 acres (24%) of elk cover over an estimated 10-year period. The Chamberlain and Lindbergh elk herds primarily use the Chamberlain area during summer and fall. Montana FWP conducts surveys for elk during spring and counts very few elk in April. Elk tend to migrate to Chamberlain after calving in early June (Jay Kolbe, personal communication). Hiding and thermal cover are not considered as essential in summer, but during the fall hunting season hiding cover is more essential and thermal cover becomes less essential.

Canopy structure would diminish with group selection treatments which would reduce hiding and thermal cover. Prescribed burning would provide forage in the short-term (2-5 years) and cover in the long-term (15-20 years). Prescribed burning without timber harvest in western larch would maintain elk cover. Prescribed burning in single-story lodgepole pine would produce a mosaic of unburned, mixed severity burns, and stand replacement burns producing a diverse habitat for elk providing cover and forage. Prescribed burns with and without timber harvest would create and retain large irregularly shaped patches of forest structure providing travel corridors within summer range, as well as between summer and winter ranges.

Vegetation treatments, resulting in a loss of cover, would last for 15-20 years. Treatment areas would recover and provide forest cover. In the short-term (2-5 years), forage conditions would improve for elk by enhancing grass, forbs, and shrubs in summer/fall habitat. This is especially beneficial in prescribed burn units and would potentially improve forage conditions on 4,978 acres or 24% of BLM lands for 20-30 years. Road use would cease post-treatment. Administrative use of roads would continue but with fewer trips per day. Elk habitat effectiveness would increase to >70%. Class 2 and 3 roads would naturally close reducing total road density. Wales Creek WSA would function as a large patch (11,580 acres) of elk habitat security once vegetation treatments

cease. Vegetation treatments would not occur in the project area from June 1 to July 15 to protect big game calving and fawning, and the nesting season for Bird Species of Concern. Lodgepole pine replacement burns are an exception and may occur during the first two weeks of June to reduce risk of escaped fire.

Moose: Effects of the proposed action on moose would be similar to elk. Cone collection, culvert removal, and helispot development would not measurably affect moose. Road drainage maintenance and improvement would displace moose during the time taken to complete projects. Road obliteration would displace moose until completed. Road obliteration would lower total road density by one mile and would benefit habitat security, although roads are not as much an issue with moose as with elk (Burcham et al. 2000). Road travel management designation would lower total road density and open road density behind locked gates for administrative use. Habitat security would improve with modification/abandonment of Class 3 roads (25 miles) and Class 2 roads (26 miles) when these roads are no longer needed for resource projects and allowed to close themselves with downed trees and conifer and shrub growth. Habitat effectiveness models have not been developed for moose, however motorized access during the hunting season is not permitted in Chamberlain which reduces moose vulnerability.

Vegetation treatments would result in reduction of 4,373 acres (24%) of moose cover over a 10-year period. This figure excludes ponderosa pine treatments, since moose do not inhabit these cover types. Burcham and others (2000) found that moose in the Garnet Range prefer landscapes 25-75% forested and use areas that are more than 75% forested less than expected by availability. The proposed vegetation treatments would result in 25%-75% forested cover for the analysis area. Burcham and others (2000) also found that over 30% of moose locations were within 300 feet of creeks and streams. Burcham (20005) states that the relatively narrow riparian shrub communities found throughout the Garnet Range, especially areas with willow and dogwood, provide the most stable habitat for moose through time. Riparian areas would not be impacted by the proposed action, since all treatments would comply with INFISH and RHCA direction, and wildlife design features.

Lodgepole pine timber harvest with and without prescribed fire would enhance moose habitat. Burcham et al. (2000) states that clearcuts with prescribed burns that are 15-40 years old, with dense regeneration and deciduous shrubs provide highly desirable moose habitat. He also states that cutting units in the Garnets providing the best moose habitat in later seral stages tended to be at higher elevation on north aspects. Greater than 50% of proposed vegetation treatments would facilitate development of winter habitat for moose. Existing winter habitat would not be treated. Winter habitat would be enhanced in the long-term (15 years). Moose utilize multistory habitat during winter, which is also deferred from treatment. Wildlife design features mitigating direct effects would be implemented. Vegetation treatments would not occur from June 1 to July 15 to protect big game calving and fawning, and the nesting season for Bird Species of Concern. Lodgepole pine replacement burns are an exception and may occur during the first two weeks of June to reduce risk of escaped fire.

Mule Deer and White-Tailed Deer: Effects of the proposed action on deer would be similar to effects on elk. Cone collection, culvert removal and helispot development are

benign treatments not measurably affecting deer. Road drainage maintenance and improvement would displace deer in the vicinity of work sites during the time taken to begin and complete projects. Road obliteration would displace deer in the vicinity of projects from beginning to completion. Road obliteration would lower total road density by one mile and would benefit deer habitat security. Road travel management designation would lower total road density and open road density behind locked gates for administrative use. Habitat security would improve with modification/abandonment of Class 3 (25 miles) and Class 2 (26 miles) roads when these roads are no longer needed for resource projects and allowed to close themselves with downed trees and conifer and shrub growth. Road use during administrative use and vegetation treatment during summer and fall would displace deer. Open road density models have not been developed for deer; deer may not be as sensitive to disturbance as elk. Treatment blocks, managed in time and space, would be established to minimize the effects of vehicle traffic.

Vegetation treatments would result in reduction of 4,373 acres (24%) of mule deer cover over an estimated 10-year period. The mule deer population in the analysis area and elsewhere in the Garnet Range is lower than historic levels; the cause is uncertain (Jay Kolbe, FWP biologist, personal communication). White-tailed deer have a greater association with riparian habitat, which is protected with INFISH, RHCA, and SMZ direction. Vegetation treatments, resulting in a loss of 28% forest cover, would last for 15-20 years. Treatment areas would recover and provide cover for deer. In the short-term (2-5 years), forage conditions would improve by enhancing shrub habitat. Both species are present during winter and shrub enhancement would be beneficial. Wildlife design features mitigating direct effects would be implemented. Vegetation treatments would not occur from June 1 to July 15 to protect big game calving and fawning, and the nesting season for Bird Species of Concern. Lodgepole pine replacement burns are an exception and may occur during the first two weeks of June to reduce risk of escaped fire.

Mountain Lion: The direct and indirect effects analysis area for elk is the Chamberlain and Lindbergh herd home ranges. Lions have a close affinity for their prey, especially elk. Effects of the proposed action on lions would be similar to elk. Cone collection, culvert removal and helispot development are benign treatments not measurably affecting lions. Road drainage maintenance and improvement would displace lions in the vicinity of work sites during the time taken to begin and complete projects. Road obliteration would displace lions in the vicinity of projects from beginning to completion. Road obliteration would lower total road density by one mile and would benefit elk habitat security and therefore benefit lions. Road travel management designation would lower total road density and open road density behind locked gates for administrative use. Habitat security would improve with modification/abandonment of Class 3 (25 miles) and Class 2 (26 miles) roads when these roads are no longer needed for resource projects and allowed to close themselves with downed trees and conifer and shrub growth. Road management effects on lions would be similar to elk, since lions follow elk from summer to winter range.

Vegetation treatments would result in reduction of 4,373 acres (24%) of elk cover over an estimated 10-year period. Lions would have greater difficulty stalking and ambushing prey since cover would diminish with vegetation treatments. Prescribed burning would provide forage in the short-term (2-5 years) and cover in the long-term (15-20 years).

Prescribed burning without timber harvest would produce a mosaic of unburned, mixed severity burns, and stand replacement burns producing a diverse habitat of cover and forage. Prescribed burns with and without timber harvest would create and retain large irregularly shaped patches of forest providing connectivity for travel and stalking and ambush habitat. Vegetation treatments, resulting in a loss of 28% forest cover, would last for 15-20 years. After that time treatment areas would recover and once again provide forest cover for elk and lions.

Black Bears: Road management and vegetation treatment effects would be similar to those for grizzly bear. Cone collection, culvert removal and helispot development are benign treatments not measurably affecting black bears. Road drainage maintenance and improvement would displace bears in the vicinity of work sites during the time taken to begin and complete projects. Road obliteration would displace bears in the vicinity of projects from beginning to completion. Road obliteration would lower total road density by one mile and would benefit black bears. Road travel management designation would lower total road density and open road density behind locked gates for administrative use.

Habitat security would improve with modification/abandonment of Class 3 (25 miles) and Class 2 (26 miles) roads when these roads are no longer needed for resource projects and allowed to close themselves with downed trees and conifer and shrub growth. Road administrative use and vegetation treatment during spring, summer, and fall would displace bears. Open motorized road use behind otherwise year-round closed roads would increase during project implementation. An open road is defined as any road where motorized vehicles are allowed (Rowland and others, 2005). Treatment block design features, managed in time and space would be established to minimize the effects of vehicle traffic and open motorized road density.

Vegetation treatments would result in reduction of 4,373 acres (24%) of cover over an estimated 10-year period. Effects from vegetation treatments would last for 15-20 years, gradually recovering to provide forest cover. In the short-term (2-5 years), forage conditions would improve for black bears by enhancing huckleberry, serviceberry, grass, and forb summer/fall habitat. This is especially beneficial in prescribed burn units and would potentially increase forage availability on 4,309 acres (22%) for 20-30 years.

Montana Bird Species of Concern

Cone collection, tree planting, culvert removal, helispot development, road drainage maintenance and improvement, road obliteration, and road travel management would not affect these species.

Lewis's Woodpecker: Timber harvest with prescribed fire and prescribed fire with and without fuel augmentation in lodgepole pine and western larch forests would have no impact on Lewis's woodpecker. Vegetation treatments enhancing Lewis's woodpecker habitat include: 1) Ponderosa pine prescribed fire (605 acres) and 2) thinning treatments (200 acres). Prescribed fire would produce forage and nest habitat; pre-commercial thinning would enhance forage habitat. Large snags would be retained for potential nest habitat. Wildlife design features mitigating direct effects would be implemented.

Pileated Woodpecker: Timber harvest with prescribed fire and prescribed fire with and without fuel augmentation may temporarily impact 4,309 acres of pileated woodpecker habitat. Sampson (2006) showed that nest site habitat for pileated woodpeckers is abundant and well distributed across the Northern Region Forest Service, and that well distributed habitat for this species was not an issue. Large snags and large down woody debris would be retained for potential nest and forage habitat. Wildlife design features mitigating direct effects would be implemented. Pileated woodpeckers are non-migratory, establish year-round nest territories, and nest from March - July.

Clark's Nutcracker: Timber harvest with prescribed fire and prescribed fire with and without fuel augmentation in lodgepole pine and western larch forests may temporarily displace nutcrackers from forage habitat. Nutcrackers are gregarious and inhabit broad landscapes with available cones for foraging. Nest sites would not be directly affected since the breeding season occurs during late winter (February, March, and April). Nutcrackers may store seed in prescribed burn areas and forage on other food items available in post burn areas.

Brown Creeper: Timber harvest with prescribed fire and prescribed fire with and without fuel augmentation in lodgepole pine and western larch mixed Douglas-fir forests would temporarily displace creepers during project implementation. Burn areas with <50% disturbance would enhance forage and nest habitat within 1-5 years post treatment. Wildlife design features mitigating direct effects would be implemented: Vegetation treatments would not occur from June 1-July 15 to protect nesting birds.

Cassin's Finch: Impacts during treatment implementation would not occur to active nests since wildlife design features mitigating direct effects would be implemented. Vegetation treatments would not occur from June 1-July 15 to protect nesting birds. Timber harvest with prescribed fire and prescribed fire with and without fuel augmentation in lodgepole pine and western larch forests may impact Cassin's finch by reducing potential forage and nest habitat. Active nests are unlikely to be located within or outside the June 1-July 15 and buffer zones around nests are not practical.

Evening Grosbeak: Impacts during treatment implementation would not occur to active nests since wildlife design features mitigating direct effects would be implemented. Vegetation treatments would not occur from June 1-July 15 to protect nesting birds. Timber harvest with prescribed fire and prescribed fire with and without fuel augmentation in lodgepole pine and western larch forests may impact evening grosbeaks by reducing potential forage and nest habitat. Active nests are unlikely to be located within or outside the June 1-July 15 timeframe and buffer zones around nests are not practical.

4.3.3 Soils and Site Productivity

Harvest treatments and prescribed burning would incorporate design features which contain BMPs to minimize soil impacts and maintain soil productivity as per BLM policy (USDI-BLM, 2008b). Soil impacts are measured in terms of acres of impacted soils on an activity area. Impacted soils are those that are detrimentally disturbed via compaction, displacement, or erosion. Soil impacts would be minimized through the implementation

of the design features stated in Section 2.3. Prescribed burning design features have provisions for avoiding excessive soil heating, hydrophobic soil, and increased erosion hazard. The construction and rehabilitation of 2.6 miles of temporary roads would impact an estimated 9.5 acres of soils (assuming an average disturbance width of 30 feet). Soil productivity would be affected for a period of 10 to 15 years depending on soil type and habitat type. Foltz and others (2007) concluded that four years was not sufficient for obliterated roads to return to pre-road conditions. Although some aspects of reduced soil productivity may persist (such as a lack of soil horizons as compared to an undisturbed site), for the purpose of this EA site productivity would be considered restored once productive native vegetation cover and a surface organic layer is established. Road obliteration and culvert removal would restore long-term productivity (5 to 10 years) on 0.95 miles of roads equating to about 3.9 acres. Prescribed fire treatments would reduce wildfire hazard and retain the lower duff material that protects mineral soil and conserves nutrients to sustain site productivity (Elliot and others, 1999) and is useful for returning sites to a more natural condition.

4.3.4 Water Quality

The Water Erosion Prediction Project (WEPP) model (Elliot and Hall, 2010) was used to estimate sediment delivery for the six treatment units that are adjacent to or inside RHCAs. In all cases, a "low-severity fire" simulation resulted in zero "sediment leaving profile" for the annual 10-year average. For a 10-year storm event in the first year of treatment scenario (10% probability), the percent increase in first year sediment was 1.2 percent for Chamberlain Creek, zero for Wales Creek, and 4.5 percent for Frazier Creek. Sediment delivery from prescribed burning and harvest clearing is therefore interpreted as a 10% probability of occurrence of a 0 to 4.5% increase in sediment delivery for the six treatment units that have the highest potential for sediment delivery to streams.

Sediment delivery from road drainage maintenance would likely occur during the first season after maintenance of inboard ditches that route flow to eight stream crossings. This sediment would most likely be very fine particles that contribute to water turbidity for a period of less than 1 day. Maintenance would be performed in dry conditions when the majority of such ditches are not flowing any water. The loosened soil particles would then only be transported during a high intensity summer thunderstorm event, or fall or winter extended wet period. Since many of these roadside ditches have grass and forb cover, as well as alder brush in many cases, it is likely that grasses and forbs would reestablish in the ditch in the same growing season greatly reducing the chance of sediment delivery and turbidity.

Sediment delivery from culvert removal is discussed in Section 4.3.6.

Sediment delivery from road obliteration is not expected to occur outside of the culvert removal areas. During obliteration the road bed would be decompacted and road prism recontoured and covered with forest debris and native seed. The side-slopes are moderate (10 to 40%) and there would be forest and understory cover between obliterated sections and the stream (Pearson Creek). The proposed obliteration segment in Section 19 is not near any streams and no sediment delivery would occur.

4.3.5 Streams and Riparian Condition

Hydrologic impacts are evaluated for six subdrainage polygons that have higher amounts of past harvest activity and potential hydrologic modification as compared to other portions of the analysis area. No stream/riparian morphologic changes were observable in five of the six subdrainages, suggesting that any flow alteration that may have occurred did not cause a channel response or noticeable impact while observing indicators of channel erosion or bedload movement. One subdrainage polygon (East Fork Chamberlain) had evidence of past flow alterations and channel impacts likely resulting from the 1994 wildfire.

Table 4-5 lists past and proposed actions along with comparative percentages of the affected subdrainage polygons. Past treatment areas are largely revegetated with advanced sapling (and in many places, small pole-sized) regeneration. Harvest clearings and prescribed fire are assumed to generally increase water yield from a site and gradually decreasing as regrowth occurs. Precommercial thinning is assumed to reduce canopy by 50% and gradually increase over time. Planting is assumed to gradually increase canopy and reduce water yield over time. Anticipated effects on streamflows and channels are described by subdrainage polygon.

Table 4-5. Subdrainage polygons evaluated for indirect effects of proposed harvest, fire, thinning on streams.

Polygon	Acres	Past Harvest or Fire Acres	Percent of subdrainage	Proposed Action acres	Percent of subdrainage
Lost Horse (Chamberlain)	1148	342 harvest	30	78 RX fire 212 planting	7 18
Sec. 29 (Chamberlain)	321	152 harvest	47	8 thinning 49 harvest&fire	2 15
Sec. 33 (Chamberlain)	728	307 harvest 147 wildfire	42 20	27 RX fire 27 planting	4 4
East Fork Chamberlain	984	555 harvest 708 wildfire	56 72	169 thinning	28
East Fork Pearson	1113	198 harvest	18	166 RX fire 99 planting	15 9
Upper Frazier	1216	143 harvest	12	40 harvest&fire 378 RX fire	3 31

Lost Horse: Given that no instream effects are evident from past clearings (30% of the basin) and water yield changes, it is unlikely that the comparatively low acreage of the proposed burning (7% of the basin) combined with proposed planting (18% of the basin) would cause stream/riparian impacts from water yield change.

Section 29: Given that no instream effects are evident from past clearings (47% of the basin) and water yield changes, it is unlikely that the comparatively low acreage of the proposed harvest, prescribed fire, and thinning (17% of the basin) would cause stream/riparian impacts from water yield.

Section 33: Given that no instream effects are evident from past clearings (42% of the basin) and water yield changes, it is unlikely that the comparatively low acreage of the

proposed prescribed fire (4% of the basin) combined with planting (4% of the basin) would cause stream/riparian impacts from water yield. The proposed treatment F7 is a formerly treated partial cut and would not constitute a new clearing.

East Fork Chamberlain: Some instream effects are evident from the 1994 wildfire (72% of the basin). These effects are not separable however from the pre and post-fire harvests which occurred over 56% of the basin. The proposed action would perform thinning on 28% of the subdrainage regenerating stands. This action would not likely cause any stream impacts from water yield change, particularly over the long-term as the thinned stands increase growth.

East Fork Pearson: Given that no instream effects are evident from past clearings (18% of the basin) and water yield changes, it is unlikely that the lower acreage of the proposed prescribed fire (15% of the basin) combined with planting (9% of the basin) would cause stream/riparian impacts from water yield.

Upper Frazier: Given that no instream effects are evident from past clearings (12% of the basin) and water yield changes, it is unlikely that the comparatively low acreage of the proposed harvest (3% of the basin) would cause stream/riparian impacts from water yield. The prescribed fire represents 34% of the basin but the patchy nature of the proposed burning would not produce a full removal of tree canopy, nor would it burn the entire unit. The dead lodgepole pine was not a contributor to evapotranspiration during the high runoff year of 2011 when instream channel conditions (PFC) were being observed. Any water yield change from the treatments would not likely impact the stream or riparian area.

The proposed treatments are designed are to bring the vegetation into the HRV. Since basin hydrology and streamflows are influenced by basin vegetation (Grant and others, 2008), it is assumed that hydrologic HRV would parallel vegetation HRV, minus any influence of hydrologic modifications such as road drainage interception or compacted soils.

The removal of four culverts would restore long-term riparian and natural stream channel conditions toward meeting PFC on 200 feet of stream and 0.1 acres of riparian habitat. These values assume the stream crossing restoration sites average approximately 50 x 25 feet.

4.3.6 Aquatic Species and Habitat

Disturbance to Aquatic Species

Direct and indirect effects to aquatic species were evaluated at the local or site scale because this is the largest scale at which those impacts could be measured. Aquatic organisms and their habitat outside of this area would not be affected.

There would be no direct effects to aquatic species from road repair and drainage improvements or vegetation management projects because no work would be done directly in aquatic habitats.

Culvert removals would directly affect fish because the work would be performed in fishbearing streams. Culverts proposed for removal are located in the headwaters of Pearson, East Fork Chamberlain, and Bear Creeks. In these headwater areas, the only fish species present is westslope cutthroat trout. Amphibians would not be affected because the locations proposed for culvert removals do not provide suitable habitat. Additionally, freshwater mussels are not found in streams proposed for culvert removals.

No direct adverse effects to fish eggs or embryos are expected from the work because the project would not commence until late summer, after alevins of spring-spawning westslope cutthroat have emerged from redds. Eggs and embryos of fall-spawning fish (e.g., bull trout) would not be affected because repeated sampling has not located fall spawning fish species in the vicinity of the proposed culvert removals.

The most likely direct effects to cutthroat are disturbance due to construction and increases in turbidity. Disturbance related to construction would likely haze fish from the project area, but they are expected to return to the area shortly after completion of project activities. Releases of sediment and increases in turbidity are more likely to directly affect fishes in the project area.

Amphibians would not be directly affected by culvert removals because the work would not occur in occupied habitats such as lentic areas or wetlands with boreal toads or spotted frogs.

Sediment

Direct and indirect effects to aquatic species were evaluated at the local or site scale because this is the largest scale at which those impacts could be measured. Aquatic organisms and their habitat outside of this area would not be affected.

Vegetation treatments would not contribute sediment to stream channels because design and implementation of the work would incorporate protective PIBO/INFISH Riparian Habitat Conservation Areas (RHCAs). There would no ground disturbance within RHCAs, such as new road construction, mechanical treatment, or construction of log landings or other facilities. A substantial body of scientific literature supports the capacity of the PIBO/INFISH RHCAs to effectively prevent sediment introductions. A detailed summary of the literature and conclusions is available in the project file.

Low-severity prescribed fire treatment is proposed for some RHCAs, but this would not contribute sediment to adjacent stream channels because the width of the RHCAs where prescribed fire is proposed is equivalent to two site-potential tree heights, or approximately 220 feet on each side of the stream channel. The burning would only occur in the outer portion of the RHCA, leaving the interior portion intact to act as a vegetative filter strip. Furthermore, the fires proposed are designed to be low-intensity burns that would be allowed to “creep” into the outer portion of the RHCA, and it is unlikely that consumption would be sufficient to remove all duff or alter water infiltration.

Most of the scientific literature reviewing forestry-related stream sedimentation indicates that roads and log hauling are the predominant source of sediment in streams, not yarding or log landings (Megahan, 1972; Furniss and others, 1991; Schnackenburg and McDonald, 1998; Luce and Black, 2001a, 2001b; Jordan, 2006). The potential for timber management-related transportation to contribute sediment to streams is a factor of the proximity of the haul road to stream channels, the condition of the road during hauling, and the quantity and density of vegetated filter strips between the road and the stream channel.

Hauling routes under the proposed action would occur almost entirely on ridgetop or midslope roads. Hauling from two units would occur on a road adjacent to Chamberlain Creek and hauling from three units would cross Bear Creek. The use of these roads for log hauling is unlikely to contribute sediment because the great majority of the road is outside of the RHCA. Where the road crosses both streams, existing dense vegetation would be sufficient to intercept dust or incidental sediment. Finally, project design features require the use of BMPs (e.g., hauling only during dry conditions; pre-project road surfacing improvements) that greatly limit the likelihood that sediment would be transported from the road to the stream.

Culvert removal

Culvert removal is the only element of the proposed action that involves in-channel or streamside construction that could contribute sediment and increase turbidity in aquatic habitats. Amphibians would not likely be affected by these activities because the work would not be performed in or adjacent to habitats suitable for boreal toads or spotted frogs; however, work is proposed for headwaters of Bear, East Fork Chamberlain, and Pearson Creeks that area occupied by westslope cutthroat trout.

The length of stream potentially affected by increases in turbidity and sediment deposition as well as the duration of impact depends on flow conditions, gradient, application of BMPs, and other factors. The headwaters of Bear and East Fork Chamberlain Creeks are characterized by late-season intermittent and discontinuous surface flow, greatly limiting the capacity for downstream transport and deposition of sediment.

However, the reach of upper Pearson Creek proposed for culvert removals contains perennial surface flow, even in later summer months, and the proposed work would likely generate a sediment plume during excavation and removal of old culverts. The length of stream affected and duration of effects would be fairly minimal due to the timing of the work (e.g., late summer when there is only minimal flow) and the application of relevant BMPs, including the placement of sediment fence and straw bales in the channel. Past monitoring of culvert removal conducted by the Missoula Field Office as well as the results of extensive studies of the sediment effects of culvert removals (Table 4-6) indicate that the main plume generated by the work could extend to a maximum of 50 meters downstream and last for up to 3 hours, with very minor amounts extending up to 24 hours from the start of the project. During this time, fish directly affected by sediment increases would be expected to move downstream and would likely recolonize the area after turbidity has returned to background levels. Downstream increases in turbidity due

to construction-related sediment releases may cause downstream fish to alter their behavior or swim downstream. Construction-related sediment that is deposited on downstream substrates would likely be flushed out during high flows the following spring; therefore, impacts to spawning gravels for spring-spawning fishes downstream of the culverts are expected to be negligible or undetectable.

Long-term sediment releases following the project are not expected because project design features would stabilize bare soil (e.g., fascines, coir fabric, and seeding) would stabilize bare soil.

Table 4-6. Summary of studies evaluating sediment effects of culvert removal.
Note: many studies evaluated the effects of construction activity substantially greater in size and intensity than is currently proposed in this EA.

Source	Project	Effects: Stream Length & Dissipation Period
Foltz *et al.* 2012	Culvert replacements on Salmon R. tributaries	BMPs effective in preventing exceedence of Idaho turbidity requirements of 50 NTUs during and after projects (reference: 50 NTU is considered point at which salmonids show active avoidance of turbid conditions; Sigler *et al.* (1984)).
Foltz *et al.* 2008	Three culvert removals on Clearwater N.F.	Straw bales placed in the stream caused a significant reduction in sediment yield from a average of 67 kg. with no bales to an average of 1.6 kg. and were sufficient to substantially reduce the peak sediment concentrations and turbidity as well as their duration.
Yenko 2007	Culvert removal, Boise N.F.	Turbidity fell from 249.5 NTU immediately 50 M downstream of the site and fell to 23.6 NTU within 1 hour. Within 2 hours NTU fell to 11.1 and it continued to fall substantially that day.
Missoula Field Office BLM 2006	Culvert removal on lower Bear Creek	Nearly all visible sediment trapped by in-channel straw bales. Small plume extends ~ 25 meters downstream. No visible sediment after 2 hours.
Foltz and Yanosek 2004	Culvert removal on the Nez Perce N.F.	Construction in unstable geology (Idaho Batholith).Sediment concentrations rapidly declined once disturbance ceased, decreasing by a factor of ten within two hours after culvert removal at a monitoring site 20 meters downstream
Jakober 2002	Culvert replacement on the Bitterroot N.F.	Culvert replaced with larger one, requiring more excavation than simple removal. Sediment concentrations decreased to near pre-culvert removal levels within ~24 hours after work ceased.
Bakke *et al.* 2002	Culvert removals near Olympia, WA	Visible plume did not last for more than 1 hour.
Casselli *et al.* 2000	Three culvert removal projects, Lolo N.F.	Ninety-five percent of the sediment was introduced into the stream during the first two hours of removal, and suspended sediment concentrations returned to pre-work levels within 26 hours from start of the removal.

Access to Aquatic Habitat

Direct and indirect effects were determined on a stream-by-stream basis since the projects are located in hydrologically separate drainages. Within each drainage, effects were analyzed at the reach scale, corresponding to sections of stream made newly accessible to resident cutthroat trout. This scale was chosen because this corresponds to the likely

range of movement for headwater-resident westslope cutthroat trout, the primary species potentially affected by the action. These fish tend to spawn, rear, and live through adulthood in the same relatively short segment of stream (Behnke, 1992; Sheperd and others, 1984; Brown and Mackay, 1995; Zurstadt and Stephan, 2004). The migratory range of fluvial fish was not considered because the projects would occur only in the headwaters, beyond the likely range of fluvial fish. Additionally, access for fluvial fish in the planning area is blocked in many instances (see Section 3.3.6) by anthropogenic or natural barriers downstream from the project area.

Restriction or blockage of fish passage at culverts results in the direct loss of spawning and rearing habitat upstream, thus reducing overall population productivity (Fausch and others, 2002). This is especially relevant for westslope cutthroat trout that typically migrate upstream and spawn in small tributaries and headwaters (Liknes, 1984; Behnke, 1992). The Proposed Action would restore upstream passage for westslope cutthroat trout in three tributaries by eliminating four culvert barriers that currently block or impede access to up to 4.3 miles of potential spawning and rearing habitat, representing an increase of 27 to 38% (by stream) of potential habitat in the Chamberlain-Wales planning area.

Restoring fish passage into these headwater habitats would not result in the introduction of hybridized westslope cutthroat trout into areas occupied by genetically pure trout. The presence of fish above the culvert proposed for removal in Bear Creek has not been verified; however, genetic testing of cutthroat trout below the culvert indicate the population is 100% pure (data retrieved from MFISH 1/13/2012). Upper East Fork Chamberlain was determined to be non-fishbearing above the culvert proposed for removal based on repeatedly observed lack of surface flow upstream from the culvert.

Genetic testing of fishes in Pearson Creek indicate westslope cutthroat trout in the system are slightly introgressed with rainbow trout (data retrieved from MFISH 1/13/2012); however, the culverts proposed for removal are not complete upstream passage barriers, so it is considered likely that the genetic composition of cutthroat trout upstream from culverts proposed for removal is similar to that of downstream fishes.

4.3.7 Wales Creek Wilderness Study Area

The design features would create natural-looking prescribed burn units. No new roads would be created and Minimum Impact Suppression Tactics would be used. Visitors would not be able to recognize whether or not the burn units were from natural fire or prescribed fire. Thus, visitors' experiences of solitude and opportunities for outstanding recreation would not be affected. In addition, the prescribed burn treatments would provide short and long-term benefit to big game habitat in the WSA which may improve big game hunting opportunities. The proposed action would not impair the suitability of the WSA and would have a beneficial effect to the qualities of the WSA that make it suitable for wilderness designation.

4.3.8 Special Status Plants

No impacts are expected to Howell's gumweed due to the design feature that requires a pre-project field inventory for sensitive plants and if plants are found to occur, the area would be flagged off and removed from the project area which would eliminate potential impacts to the plant.

4.3.9 Invasive Plants

New infestations are most likely to occur along roads, landings, and prescribed burn areas associated with the proposed action. Mortensen and others (2009) found that roads played an important role in facilitating the movement of invasive plants through forests.

Design features stated in the BLM Integrated Weed Management Environmental Assessment (USDI-BLM, 2009) would mitigate the possible introduction of new infestations as well as reduce the spread of existing infestations.

Ongoing weed management (inventory, monitoring, and treatment) would continue for 3 to 5 years after implementation of all proposed activities.

The combined harvest and prescribed burn treatments ("HF" units) have a high potential for weed introduction because of potential ground disturbance, harvest equipment traffic, and prescribed burning operations. Downy brome (*Bromus tectorum)* and spotted knapweed (*Centaurea stoebe*) have the highest infestation hazard for these activities.

Prescribed burning alone (without harvest treatment) also has a high potential for weed introduction, although the potential is lower than treatments that combine harvest and burning due to the absence of ground-based harvest operations and equipment traffic. Prescribed burning in the WSA has a lower, yet moderate potential for weed introduction because motorized equipment would not be used within the WSA.

Construction and rehabilitation of temporary roads, as well as road obliteration, can have a high potential for weed introduction and spread into currently weed-free areas because of bare disturbed soils and the use of heavy equipment.

The proposed thinning and planting treatments have a low potential for weed introduction because the work involves little or no ground disturbance, and no off-road equipment use.

Culvert removal and road maintenance work have the lowest potential for weed introduction because of the small extent of ground disturbance, relatively short period of exposed soil, and the areas are still accessible to ongoing roadside weed treatment.

An inventory of invasive plants prior to the implementation of the higher risk proposed activities would be completed to assess the hazard and identify any opportunities to treat weeds prior to implementing proposed activities.

Table 4-7. Summary of the potential impacts (affected acres) from invasive plants.			
Proposed Activity	Potential for weed introduction	Pre-implementation inventory	Potentially Affected Acreage and Percent of Total Treatment Acreage
Harvest Rx Burn	High	Yes	891 14.0%
Temp road construction	High	Yes	13 0.02%
Rx Burn	Moderate	Site Specific	1757 27.0%
WSA Rx Burn	Low	No	2500 38.5%*
Thinning / Planting	Low	No	1331 20.5%
**about half of these acres will actually be burned.*			

4.3.10 Cultural Resources

With implementation of the design features, no negative impacts are likely to occur. A pre-project field inventory would be completed. If cultural resources were found to occur, the site would be removed from the treatment area, or otherwise protected, which would eliminate potential impacts to the site.

4.3.11 Lewis and Clark National Historic Trail

BLM Manual 6280 outlines the management of the National Scenic and Historic Trails. According to the manual, proposed actions which may adversely impact designated National Trails need to be analyzed. In the Sperry Grade area, two forest vegetation related treatments are proposed – pre-commercial thinning and planting. Because the purpose of both treatments is to restore the habitat to historic conditions and because both projects are not ground disturbing, there is very little, if any, potential for them to adversely impact the LCNHT. Because the LCNHT follows part of Highway 200 through the Sperry Grade area and because of the terrain in that segment, the main recreational opportunity on BLM administered lands for those seeking the Lewis and Clark National Historic Trail experience would be an auto tour (motor trail). People following the auto tour would not notice a change in the vegetation from thinning. In addition, they would not be able to notice the planting. As such, the proposed activities do not have the potential to adversely impact the trail and the LCNHT would not be directly or indirectly affected.

4.3.12 Recreation

Proposed projects located in the Blackfoot Block Management Area have the potential to affect hunters. Short term impacts would occur with increased traffic in the BMA, however design features as described in Section 2.3 would be implemented to lessen the impacts. See the Wildlife and Wildlife Habitat Section 4.3.2 for a discussion of the effects of proposed projects on big game animals.

4.4 CUMULATIVE IMPACTS ANALYSIS

As defined in 40 CFR 1508.7 (Council on Environmental Quality [CEQ] regulations for implementing the NEPA), a cumulative impact is an impact on the environment that results from the incremental impact of the action when added to other past, present, and

reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such other actions.

Both the geographic extent and timeframes (temporal boundary) of cumulative impacts varies by the type of resource and impact. The cumulative impact analysis areas (CIAAs) are identified by the resource issues analyzed in Section 3.3 and are listed in Table 4-8.

Table 4-8 outlines the CIAAs and temporal boundaries for each issue/resource. Table 4-9 outlines the past, present, and reasonably foreseeable future actions (RFFA's) by CIAA and issue/resource. "Project Area" in the tables refers to the Chamberlain-Wales Ecosystem Assessment area boundary.

Table 4-8. Cumulative Impact Analysis Areas by Resource/Issue

Resource Issue Area	CIAA and Rationale	Indicator Units (acres,miles,etc)	Temporal Boundary and Rationale
Treatment Impacts on the composition, structure, density and patch size within the 3 cover types of: (1) lodgepole pine/ subalpine fir cover type (2) western larch/ mixed-conifer cover type (3) ponderosa pine/ Douglas-fir cover type	*Scale:* Chamberlain Ecosystem Analysis area, Elk Creek Assessment Area, Murray-Douglas Assessment Area *Rationale:* Continuous vegetation across the three adjoining assessment areas.	Acres	*Scale:* From early 1900's to 30 years from the current date. *Rationale:* Fire suppression and land use practices, primarily logging, started to occur within the area in the early 1900's and have contributed to the current conditions. The Chamberlain-Wales Ecosystem Assessment analyzed and recommended vegetation treatments through 30 years.
Elk, lion	Chamberlain-Wales area and Murray-Douglas area (Chamberlain and Lindbergh elk herd home range	120,000 ac	15-20 yrs. Disturbance plus recovery period.
Bears, birds, bats, wolf, wolverine, fisher, deer, moose.	Chamberlain-Wales Analysis Area. All projects contained within boundary	62,000 ac	See discussion Sec. 4.4.2
Canada lynx	Three LAU's (Chamberlain, McElwain, Elk Creek). Mapped habitat for the proposed action and adjacent to other LAUs.	91,442 ac	15-20 yrs Period for development of stand-initiation structure.
Water quality (sediment), stream/riparian condition (direct)	Adjacent/receiving stream reach. Impacts most detectable at reach scale.	6 reaches associated with RHCA treatments.	1 season
Soils & Site Productivity	Activity Area. Impacts do not extend beyond affected site.	Impacted acres	10 to 15 years
Stream/Riparian condition (indirect)	Stream reaches within affected subdrainages. Impacts most detectable at reach scale.	6 reaches and subdrainages	10 to 15 years
Aquatic Species Disturbance	Project Site (This is the largest scale at which impacts to individual fish could be	Project site : width of road and existing culvert and up to 20 ft.	4-6 hours -for turbidity and channel disturbance

Table 4-8. Cumulative Impact Analysis Areas by Resource/Issue			
Resource Issue Area	**CIAA and Rationale**	**Indicator Units (acres,miles,etc)**	**Temporal Boundary and Rationale**
	measured).	up- and downstream	
Sediment and Aquatic Habitat	Project Area **(**This is the largest extent at which the indicator could be measured.)	Project site + 50 meters downstream	24 hours -for turbidity and channel disturbance
Habitat Access	Reach of stream made accessible in each individual drainage Cumulative effects to migration are considered on a stream-by-stream basis since the projects are located in separate drainages with little likelihood of fish migration within drainages.	Miles of habitat made accessible in each drainage	Indefinitely after project completion
Invasive Plants	Project Area Extent of potential disturbance/ occurrence	20570 acres BLM	10 years -extent of project implementation
Special Status Plants	Project Area Extent of potential disturbance/ occurrence	20570 acres BLM	10 years -extent of project implementation
WSA	WSA boundary Requirements limited to boundary	11580 acres BLM	Indefinite timeline for fire suppression activities.
Cultural Resources	Project Area Extent of potential disturbance/ occurrence.	20570 acres BLM	10 years -extent of project implementation

Table 4-9. Past, Present, and RFFA's by Resource Issue.			
CIAA and Resource Issue Area	**Past and Present Actions**	**RFFAs**	**Total**
Lodgepole pine/ subalpine fir cover type	4,110 acres*	None	4,110 acres
Western larch/ mixed-conifer cover type	3,710 acres*	150 acres Timber harvest	3,860 acres
Ponderosa pine/ Douglas-fir cover type	4,604 acres*	1,577 acres timber harvest 500 acres thinning	6,681 acres
Chamberlain, McElwain, Elk Creek LAU's (Canada lynx)	See discussion by species Sec. 4.4.2	See discussion by species Sec. 4.4.2	See discussion by species Sec. 4.4.2
Chamberlain and Lindbergh elk herd home range. (Elk, mountain lion)	See discussion by species Sec. 4.4.2	See discussion by species Sec. 4.4.2	See discussion by species Sec. 4.4.2
Chamberlain-Wales Analysis Area. (Bears, birds, bats, wolf, wolverine, fisher.)	See discussion by species Sec. 4.4.2	See discussion by species Sec. 4.4.2	See discussion by species Sec. 4.4.2
Water quality (sediment), stream/riparian condition (direct/indirect) Stream Reach scale.	Timber harvest and roading 1970's-present. Water Quality Listings (4.4 miles Frazier Creek, 1.9 miles Wales Creek)	None in CIAA	No net increase in affected miles.
Soils & Site Productivity at the site scale (Activity Area)	Timber harvest 1970's-present (see above).	None in CIAA	No net increase in affected acres.

Table 4-9. Past, Present, and RFFA's by Resource Issue.			
CIAA and Resource Issue Area	**Past and Present Actions**	**RFFAs**	**Total**
Aquatic Species Disturbance	No known activities in spatial or temporal boundary would disturb or harm aquatic species	No known activities in spatial or temporal boundary would disturb or harm aquatic species	No cumulative impact
Sediment	No known activities in spatial or temporal boundary would contribute sediment	No known activities in spatial or temporal boundary would contribute sediment	No cumulative impact
Aquatic Habitat Access	PAST: Barrier removal in Bear Creek (2006 and 2010) and Pearson Ck (2013). PRESENT: no other ongoing barrier removal projects known.	No known proposals to install or remove culverts or other passage barriers	No cumulative impact
Invasive Plants in the Project Area	Roads, Logging, Recreation, Admin Traffic Weed Treatment (Infestation acreage would decrease)	Recreation, Administrative traffic, Weed Treatment (Infestation acreage would decrease	Infestation acreage would decrease.
Special Status Plants in Project Area	None	None	None
WSA	Fire Suppression	Fire Suppression	No change in affected acres.
Cultural Resources in Project Area	Railroad, logging activities	None	No change in affected acres

* The acreages for vegetation management on BLM managed lands are derived from treatment records dating from 1957. Present vegetation treatment acres for non-BLM managed lands are derived from the best available knowledge of current activities within the analysis area and discussions with local landowners. The analysis recognizes that previous treatments occurred on non-BLM managed lands prior to 2009, but available data only dates from 2009 to present.

4.4.1 Forest Vegetation, Fuels & Fire Management

Due to the continuity of vegetation cover types and geography, the cumulative impacts analysis area (CIAA) also includes the Elk Creek and Murray-Douglas analysis areas (areas delineated and analyzed in ecosystem assessments completed in 1998 and 2002, respectively). The Elk Creek and Murray-Douglas areas share adjoining boundaries along the southwest, south and southeast border of the Chamberlain analysis area. The cumulative impacts analysis area totals 119,432 acres. Canopy coverage is used as a surrogate for density in this analysis since we have contiguous canopy coverage data for all lands within the CIAA.

Impacts of past and present actions: Past land use practices, primarily timber harvest, have occurred within the area since the early 1900's through the present day. According to historic aerial photos (circa 1938 and 1953), written archives, oral history and age boring of existing trees, logging started within the analysis area in the late 1800's-early1900's within the ponderosa pine/Douglas-fir cover type, around the 1950's for the western larch/mixed conifer cover type and the late 1970's for most of the lodgepole

pine/subalpine fir cover type. The last harvests on BLM managed lands, except for the recently acquired lands, within the Chamberlain watershed occurred in 1996 and 1997.

Organized fire suppression started in the CIAA with the formation of the BFPA in 1921. From 1982-2010, in the CIAA there were 231 fires suppressed with 81% of them ignited by lightning and 19% human caused. In the ponderosa pine/Douglas-fir cover type there were 93 fires of which 96% were 10 acres or less. In the western larch/mixed conifer cover type there were 53 fires of which 98% were 10 acres or less in size, and in the lodgepole pine/subalpine fire cover type there were 85 fires of which 97% were kept at 10 acres or less. The few exceptions of fires that have escaped initial attack and have impacted vegetation in the CIAA include the 1929 Elk Creek Fire, the 1961 Elk Creek Fire, the 1994 East Fork Chamberlain Fire, the 1991 Game Range Fire, and the 2012 Elevation Mountain Fire. The Elk Creek Fire of 1929 started in Elk Creek, and burned into the Chamberlain and Murray Douglas analysis areas. The 1961 Elk Creek Fire burned mostly in Elk Creek and in Chamberlain Meadows, but did spread over into the head of Wales Creek in the Chamberlain analysis area, while the East Fork Chamberlain Fire and the 1991 Game Range Fire were solely in the Chamberlain analysis area. The Elevation Mountain Fire was ignited by lightning and burned in the Murray Douglas analysis area. See section 3.3.1 for more details about historic fire suppression.
Over time, past land use practices (all ownerships) and incremental impacts of fire suppression have changed composition, structure, density, and patch size. Some of the changes have assisted with the progression of portions of the cover types to move outside the HRV. Managing forests within the HRV or range of natural variation can improve resiliency of the vegetation to weather a major disturbance while maintaining appropriate biodiversity across the landscape (Holling and Meffe, 1996; Morgan and others, 1994).

On the land managed by the BLM within the Elk Creek and Murray-Douglas portions of the cumulative impacts analysis area, similar treatments with the same restoration goals (i.e. increasing vegetation diversity, particularly the understory species, improving forest resiliency and assisting with forest health) as mentioned in this proposed action were implemented on the forested landscape within the last 15 years. From the late 1970's through the late 1990's, the BLM managed land in the Chamberlain drainage also had vegetation management, harvest, thinning, planting) conducted on portions of the lands.

Impacts of RFFAs: The following Reasonable Foreseeable Future Actions (RFFAs) are those that would cumulatively affect the same resources in the cumulative impact area as the proposed action and alternatives. The primary RFFAs would be continued fire suppression and continued forest management activities (harvest, thinning and planting) within the analysis area (See Table 4-9).

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: The cumulative impacts of No Action are summarized in Table 4-10. Ninety-five percent of the wildland fires in the CIAA would expected to be suppressed at less than 10 acres in size. Vegetation management has and will change vegetation communities by the percentages in Table 4-10, and most wildland fires, due to size, will have no effect on vegetation.

Table 4-10: Combined past, present, and RFFA's as a percentage of the CIAA for Forest Vegetation			
CIAA	**Combined Past, Present, and RFFAs (acres)**	**Cover type in CIAA (acres)**	**Percentage of Cover Type With Vegetation Management**
Lodgepole pine/ subalpine fir	4,110	44,774	9%
Western larch/ mixed-conifer	3,860	34,405	11%
Ponderosa pine/ Douglas-fir	6,681	40,253	17%
Combined Cover Types	14,651	119,432	12%

Lodgepole pine /subalpine fir cover type

The lodgepole pine/subalpine fir cover type in the CIAA consists of 44,774 acres with 24% in the pole size single-storied structure class and 22% in the medium single-storied structure class. Lodgepole pine exhibits dominance in 53% of this cover type. Douglas-fir, primarily in the Murray-Douglas area, is the dominant conifer species in another 39% of the lodgepole pine/subalpine fir cover type. For a summary of current conditions in the CIAA see Table 4-11. Under the No Action alternative 359 acres would not be harvested, 2,259 acres would not be prescribed burned, and 579 acres would not be planted. This would result in older, continuous stands of dead lodgepole. As we have seen in the past, it is possible that a wildland fire would escape initial attack and burn a large area due to the continuity of the fuels. This type of fire may result in a larger patch size and higher severity to both vegetation and soils than historically seen in the CIAA (Arno and Fiedler, 2005).

Western larch/mixed conifer cover type

The western larch/mixed conifer cover type in the CIAA consists of 34,405 acres with 41% in the medium and large multi-storied structures with Douglas- fir, lodgepole pine, and western larch (in order of decreasing dominance) creating the most prevalent species. For a summary of current conditions in the CIAA see Table 4-12. Under the No Action alternative 314 acres would not be harvested, 323 acres would not be prescribed burned, 699 acres will not be planted, and 186 acres would not be thinned including the snowshoe hare study areas. We can expect to see a decrease in western larch over time and increase in the other conifer species, due to lack of disturbance through wildland fire, prescribed fire, or timber harvest. The tree density, particularly shade tolerate understory conifers would increase and produce more ladder fuels which can shift the historic mixed fire regime to a higher percentage of crown fire instead of ground fire (Arno and Fielder, 2005).

Table 4-11: Lodgepole Pine/Subalpine Fir Cover Type: Summary of Current Structure/Composition/Density within the CIAA Area			
Dominate Stand Structure (size class and inches DBH)	**Percent of Total Acreage**	**Acres**	**Dominant Species by order of abundance**
Seedling-Sapling (< 5.0)	9	3,816	LP/DF
Pole (5.0-8.9)	29	12,862	LP
Medium (9.0 -14.9)	42	18,986	DF/LP
Large (15-20.9)	15	6,603	DF/LP
Very Large (21.0 +)	5	2,391	DF/LP
Non-stocked/Non-forest	<1	116	LP/DF
Total acres in cover type		44,774	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	19	8,620
15-39%	5	2,207
40-69%	35	15,708
70-100%	41	18,239
Total acres in cover type		44,774

Table 4-12: Western Larch/Mixed Conifer Cover Type:Summary of Current Structure/Composition/Density within the CIAA Area			
Dominate Stand Structure (size class and inches DBH)	**Percent of Total Acreage**	**Acres**	**Dominant Species by order of abundance**
Seedling-Sapling (< 5.0)	11	3,682	WL/DF/LP
Pole (5.0-8.9)	14	4,891	LP/WL/DF
Medium (9.0 -14.9)	31	10,617	DF/WL/LP
Large (15-20.9)	30	10,244	DF/WL/PP/LP
Very Large (21.0 +)	14	4,963	DF/WL/PP
Non-stocked/Non-forest	<1	8	
Total acres in cover type		34,405	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	29	9,889
15-39%	6	1,981
40-69%	33	11,340
70-100%	32	11,195
Total acres in cover type		34,405

Ponderosa pine/Douglas-fir cover type

Within the CIAA, the ponderosa pine/Douglas-fir cover type is comprised of 40,253 acres with 43% of this cover type in the medium size class and almost evenly divided between single-storied, two-storied and multi-storied structure. Ponderosa pine and Douglas-fir each dominate 50% of the composition of that cover type. For a summary of current conditions in the CIAA see Table 4-13. Under the No Action alternative 605 acres would not be prescribed burned, 53 acres would not be planted, and 546 acres would not be thinned. There would be a gradual shift to more Douglas-fire than

ponderosa pine and an increase in density, again producing ladder fuels adding to the potential spread of wildland fire, and a change of fire regimes from a historically low intensity low severity fire regime to a mixed to high intensity and severity fire regime (Arno and Fielder, 2005).

Table 4-13: Ponderosa Pine/Douglas-fir Cover Type: Summary of Current Structure/Composition/Density within the CIAA Area

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	8	3,174	PP/DF
Pole (5.0-8.9)	3	1,097	PP/DF
Medium (9.0 -14.9)	43	17,343	DF/PP
Large (15-20.9)	35	14,010	DF/PP
Very Large (21.0 +)	11	4,409	DF/PP
Non-stocked/Non-forest	<1	220	
Total acres in cover type		40,253	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	9	3,438
15-39%	13	5,394
40-69%	56	22,500
70-100%	22	8,921
Total acres in cover type		40,253

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: The cumulative impacts of the Proposed Action are summarized in Tables 4-14 and 4-15.

Table 4-14: Summary of Past, Present, and Reasonable Foreseeable Future Actions combined with the Proposed Action for Forest Vegetation

CIAA and Resource Issue Area	Past and Present Actions (acres)	RFFAs (acres)				Proposed Action (acres)			
CIAA = Chamberlain/Murray-Douglas/Elk Creek	Vegetation Management (Harvest, Thin, Plant) from 1957 to 2013*	Harvest	Thin	Plant	Rx Burn	Harvest/Rx Burn	Thin	Plant	Rx Burn
Lodgepole pine/ subalpine fir	4,110					359	0	579	1458
Western larch/ mixed-conifer	3,710	150				314	186	699	323
Ponderosa pine/ Douglas-fir	4,604	1,577	500				546	53	605
	TOTAL 12,424	TOTAL			2,227	TOTAL			5122
		TOTAL (past, present, RFFA, proposed action) 19,773							

* Under Past and Present Actions, acres for vegetation management on BLM managed lands are derived from historical vegetation treatment records dating from 1957. Present vegetation treatment acres for non-BLM managed land are derived from the best available knowledge of current activities within the analysis area and discussions with local

landowners. The analysis recognizes that previous treatments occurred on non-managed BLM prior to 2009 but the data available to the BLM was from 2009 to the present.

Table 4-15: Percentage of the total CIAA of the combined Past, Present, Reasonable Foreseeable Future and Proposed Actions for Forest Vegetation

CIAA	Combined Past, Present, RFFA and Proposed Action (acres)	Cover type in CIAA (acres)	Percentage of Cover Type With Vegetation Management
Lodgepole pine/ subalpine fir	6,546	44,774	15%
Western larch/ mixed-conifer	5,382	34,405	16%
Ponderosa pine/ Douglas-fir	7,885	40,253	20%
Combined Cover Types	20,574	119,432	17%

Lodgepole pine /subalpine fir cover type

The proposed action shift in vegetation is summarized below in Table 4-16. The treatments would break up the continuity of the closed canopy, single storied lodgepole pine stands, and initiate early seral structure. Future wildland fire managers would be able to use the treatment areas to help manage fires toward the HRV for resource benefits.

Table 4-16: Lodgepole Pine/Subalpine Fir Cover Type: Summary of Anticipated Shifts in Structure/Composition/Density from Proposed Action (all treatments proposed for Cover Type) within the CIAA Area

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	14	6290	LP/DF
Pole (5.0-8.9)	27	12,283	LP
Medium (9.0 -14.9)	38	17091	DF/LP
Large (15-20.9)	15	6,603	DF/LP
Very Large (21.0 +)	5	2,391	DF/LP
Non-stocked/Non-forest	<1	116	
Total acres in cover type		44,774	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	23	10477
15-39%	4	1924
40-69%	32	14113
70-100%	41	18260
Total acres in cover type		44,774

Western larch/mixed conifer cover type

The proposed action shift in vegetation is summarized below in Table 4-17. The proposed action would aid in the regeneration and continuation of western larch across the watershed thereby retaining species diversity and maintain composition within the HRV. The density would decrease in treatments areas, improving tree vigor and forest health, reducing ladder fuels, and improving forest resiliency to undesirable disturbance levels from wildfire, insects, and disease.

Table 4-17: Western Larch/Mixed Conifer Cover Type: Summary of Anticipated Shifts in Structure/Composition/Density from Proposed Action (all treatments proposed for Cover Type) within the CIAA Area

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	12	4,005	WL/DF/LP
Pole (5.0-8.9)	14	4,730	WL/LP/DF
Medium (9.0 -14.9)	30	10,455	DF/WL/LP
Large (15-20.9)	30	10,244	DF/WL/PP/LP
Very Large (21.0 +)	14	4,963	DF/WL/PP
Non-stocked/Non-forest	<1	8	
Total acres in cover type		34,405	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	29	9,971
15-39%	6	2,210
40-69%	33	11,211
70-100%	32	11,013
Total acres in cover type		34,405

Ponderosa pine/Douglas-fir cover type

The proposed action shift in vegetation is summarized below in Table 4-18. The proposed action would help maintain and restore the ponderosa pine in areas it historically existed. The treatments would result in lower density and less ladder fuels, maintaining the historic fire regime, while improving tree vigor and forest health, and resiliency to future disturbance such as fire, insects, and disease.

Table 4-18: Ponderosa Pine/Douglas-fir Cover Type: Summary of Anticipated Shifts in Structure/Composition/Density from Proposed Action (all treatments proposed for Cover Type) within the CIAA Area

Dominate Stand Structure (size class and inches DBH)	Percent of Total Acreage	Acres	Dominant Species by order of abundance
Seedling-Sapling (< 5.0)	8	3,227	PP/DF
Pole (5.0-8.9)	3	1,080	PP/DF
Medium (9.0 -14.9)	43	17,198	DF/PP
Large (15-20.9)	35	14,172	PP/DF
Very Large (21.0 +)	11	4,409	PP/DF
Non-stocked/Non-forest	<1	167	
Total acres in cover type		40,253	

Density Class/Canopy Coverage	Percent of Total Acreage	Acres
0-14%	11	3,688
15-39%	14	5,698
40-69%	54	21,962
70-100%	21	8,905
Total acres in cover type		40,253

4.4.2 Wildlife and Wildlife Habitat

Cumulative impacts are described in the context of the issues presented in section 1.8. Wildlife and wildlife habitat would be impacted to varying degrees by proposed vegetation treatments. Timing and acres of treatments are evaluated. Wildlife and wildlife habitat would be impacted to varying degrees by proposed use of and construction of roads. Impacts with timing of season of road use, acres of habitat impacted by road use, and acres of habitat disturbed by temporary road construction are evaluated.

Except for Canada lynx, elk, and mountain lion, the cumulative effects analysis area is the approximately 62,000-acre Chamberlain-Wales analysis area boundary. This spatial scale comprises the proposed activities area within the larger context of the Chamberlain-Wales analysis area.

Special Status Species: (Threatened and Endangered)

Grizzly Bear (threatened): United States Fish and Wildlife Service (FWS) Section 7 consultation requirements apply to 130,500 acres of BLM Missoula Field Office (MiFO) lands located north of Interstate 90. Chamberlain Creek Watershed is part of this area. The FWS updated the MiFO Backlog Consultation Biological Opinion for grizzly bears in 2012 (USDI-BLM, 2012). The temporal scale is 15-20 years, which is the length of time for timber harvest, prescribed burning, planting, and pre-commercial thinning to provide cover.

Direct and indirect effects would occur. The proposed action is intended to benefit grizzly bears by enhancing grass, forbs, and berries for summer forage. The proposed action would reduce cover on 4,978 acres (24% of BLM lands), but would have short-term effects and long-term benefits. Western larch treatments may have the most impacts to grizzlies since they occur in late successional forests. The effects of road use during the proposed action would temporarily displace bears and reduce habitat security for the duration of treatment activities (up to 3 years per treatment block). In an attempt to maintain low open motorized road density multiple treatment blocks would be established to mitigate potential effects. Please see the grizzly bear direct and indirect effects section for further details.

Past timber harvest reduced hiding and thermal cover by an estimated 51,103 acres; all but 3,000 acres has fully recovered and is currently providing hiding and thermal cover. Present timber harvest on all lands within the watershed is reducing cover by 1,048 acres.

Reasonably foreseeable future timber harvest and thinning would reduce cover by an additional 2,427 acres. The proposed action combined with past, present, and reasonably foreseeable actions would result in 11,767 acres of reduced grizzly bear cover. The total represents 19% of the watershed. Cover would be maintained at an estimated 80%, which is diversified and excellent habitat for grizzlies.

Timber harvest impacted the lower parts of Chamberlain in the early 1900s. More recent past timber harvest occurred in the upper portions of Chamberlain in the 1970s. The last time the BLM had a timber sale in the drainage was in the 1990s. The most recent past timber harvest occurred in the early 2000s when Plum Creek Timber completed timber sales and exchanged their lands during the Blackfoot River Legacy Program. The DNRC and LEF have had recent past timber harvest. Forested areas throughout the watershed have regenerated and exhibit various stages of composition, structure, and function. The range of conditions runs from early stand initiation to mature forest. From a grizzly bear perspective the watershed has excellent year-round habitat. Grizzly bear reports prior to 2000 were uncommon, but during the last decade individual bears and sows with cubs have been annually reported.

Road construction, associated with timber harvest, has modified grizzly bear habitat security in the action area. Total linear miles of motorized roads in the watershed equals 158 miles. With 96 mi^2 of land under all ownerships, total motorized road density equals 1.62 mi/mi^2. Total linear miles of motorized roads on BLM lands equals 98 miles. With 35 mi^2 of BLM lands, total motorized road density equals 2.80 mi/mi^2. The majority of BLM roads (88 miles) in the watershed are managed as closed roads (spring, summer, fall gate closures) and open to administrative use only (no motorized public access). Ten miles of BLM roads are open year-round creating a total open motorized road density of 0.29 mi/mi^2. Many of the roads behind gate closures are closed due to downfall and shrub and tree growth. Montana Department of Fish, Wildlife, and Parks recommends open road density in grizzly bear habitat at <1mi/mi^2 (Dood and others, 2006).

The majority of BLM roads in the watershed are currently managed as closed roads, with an open motorized road density of <1 mi/mi^2 and opened to administrative use only (no motorized public access). The proposed administrative controlled use of the road system which has seen very little administrative traffic for 10 years would impact the grizzly and habitat security. To avoid adverse effects of increasing open motorized road density from < 1 mi/mi^2 to 4 mi/mi^2, multiple treatment blocks would be established as described in the grizzly bear direct and indirect effects of the proposed action. Treatment block design features, managed in space and time would minimize the effects of motorized vehicle access.

To avoid the adverse effects of increasing open motorized road density, four treatment blocks would be established and managed in space and time to retain grizzly bear habitat security at <4.00 mi/mi^2 for treated blocks and < 1 mi/mi^2 for untreated blocks. Only one treatment block would be active at a time, for up to approximately three years, while the remaining three treatment blocks would be inactive (no vehicle use). Treatment Block 1 (East Chamberlain) would be the first treatment block open for three years. During this time, Treatment Block 1 would have an open road density of 2.94 mi/mi^2, Treatment Block 2 (Pearson, inactive) would have an open road density of 0.38 mi/mi^2, Treatment

Block 3 (Main Chamberlain, inactive) would have an open road density of 0.00 mi/mi^2, and Treatment Block 4 (Kennedy; inactive) would have an open road density of 0.80 mi/mi^2. See Table 4-19 for road information.

Treatment Block 2 would be the second treatment block open for three years. During that time, Treatment Block 2 would have an open road density of 3.00 mi/mi^2, Treatment Block 1 (inactive) would have an open road density of 0.00 mi/mi^2, Treatment Block 3 (inactive) would have an open road density of 0.00 mi/mi^2, and Treatment Block 4 (inactive) would have an open road density of 0.80 mi/mi^2. Treatment Block 3 would be the third treatment block open for three years. During that time, Treatment Block 3 would have an open road density of 3.60 mi/mi^2, Treatment Block 1 (inactive) would be 0.00 mi/mi^2, Treatment Block 2 (inactive) would be 0.38 mi/mi^2, and Treatment Block 4 (inactive) would be 0.80 mi/mi^2. Treatment Block 4 would be the fourth treatment block open for three years. During that time, Treatment Block 4 would have an open road density of 1.20 mi/mi^2, Treatment Block 1 (inactive) would be 0.00 mi/mi^2, Treatment Block 2 (inactive) would be 0.38 mi/mi^2, and Treatment Block 3 (inactive) would be 0.00 mi/mi^2. See Table 4-19 for road information.

Table 4-19. Road Miles and Density by Treatment Block; 3-Year Rotation.

Treatment Blocks	Pre-Treatment	During Treatment (approximately 3 years)	Post-Treatment
Block 1, active (50 road miles; 17 mi^2)	0.00 mi/mi^2	2.94 mi/mi^2	0.00 mi/mi^2
Block 2, inactive	0.38 mi/mi^2	0.38 mi/mi^2	0.38 mi/mi^2
Block 3, inactive	0.00 mi/mi^2	0.00 mi/mi^2	0.00 mi/mi^2
Block 4, inactive	0.80mi/mi^2	0.80 mi/mi^2	0.80 mi/mi^2
Block 2, active (24 road miles; 8 mi^2)	0.38 mi/mi^2	3.00 mi/mi^2	0.38 mi/mi^2
Block 1, inactive	0.00 mi/mi^2	0.00 mi/mi^2	0.00 mi/mi^2
Block 3, inactive	0.00 mi/mi^2	0.00 mi/mi^2	0.00 mi/mi^2
Block 4, inactive	0.80 mi/mi^2	0.80 mi/mi^2	0.80 mi/mi^2
Block 3, active (18 road miles; 5 mi^2)	0.00 mi/mi^2	3.60 mi/mi^2	0.00 mi/mi^2
Block 1, inactive	0.00 mi/mi^2	0.00 mi/mi^2	0.00 mi/mi^2
Block 2, inactive	0.38 mi/mi^2	0.38 mi/mi^2	0.38 mi/mi^2
Block 4, inactive	0.80 mi/mi^2	0.80 mi/mi^2	0.80 mi/mi^2
Block 4, active (6 road miles; 5 mi^2)	0.80 mi/mi^2	1.20 mi/mi^2	0.80 mi/mi^2
Block 1, inactive	0.00 mi/mi^2	0.00 mi/mi^2	0.00 mi/mi^2
Block 2, inactive	0.38 mi/mi^2	0.38 mi/mi^2	0.38 mi/mi^2
Block 3, inactive	0.00 mi/mi^2	0.00 mi/mi^2	0.00 mi/mi^2

Wildfire has contributed to forest structure and has had a positive effect on grizzly bear summer habitat. Huckleberries, serviceberries, and other berries are plentiful as a result of past wildfires. The1994 East Chamberlain fire is the most recent large fire in the watershed and provides grizzly bear cover and forage. Lodgepole pine mountain pine beetle mortality occurring in the past decade has increased huckleberry production, which

has had a beneficial effect on grizzly bear summer forage. Pine beetle mortality functions similarly to wildfires by opening the overstory to sunlight and increasing water availability for understory vegetation utilized by bears. Increased large woody debris from snags falling over provides cover and a variety of insects for bears to feed on.

Reasonably foreseeable actions on LEF, DNRC, and TNC lands related to open motorized road density would have similar effects as activities on BLM lands since the majority of these areas are behind road gates that are year-round closures. Roads used may be permanent or temporary. Reasonably foreseeable future actions involving vegetation management may affect the grizzly bear. Timber harvest on LEF and DNRC, and BLM lands would compromise grizzly bear habitat security, but subside once projects have ended. Projects would affect how grizzlies use the area. Increased vegetation management, associated road building, and use of existing roads would diminish grizzly bear habitat security. Short and long-term impacts would result.

Potential den habitat may be impacted due to augmented road use and vegetation treatments. Denning is thought to occur in the planning area, but locations have not been recorded. All contractors involved in proposed activities would be required to comply with grizzly bear food/attractant guidelines to mitigate potential grizzly bear/human conflicts. The food/attractant guidelines require storage and handling of attractants such as human food and garbage and livestock feed. In the reasonably foreseeable future recreation activity, such as hunting, would continue. Recreationists are encouraged to follow grizzly bear food/attractant guidelines, but these guidelines are voluntary.

Missoula Field Office partners with the Montana Department of Fish, Wildlife, and Parks to correct problem situations and to educate hunters and others how to safely recreate in grizzly bear habitat. Short-term vegetation treatments and road use impacts are anticipated and mitigated to reduce potential effects. Long-term benefits would enhance den and forage habitat, maintain open motorized road density to <1mi/mi^2, and maintain grizzly bear habitat security. The effects of the proposed action, when combined with the past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Approximately 11,767 acres of grizzly bear habitat would be disturbed over the next 10 years in the assessment area. In the context of ESA Section 7 consultation, the proposed action, with consideration of cumulative effects, has been determined to "may affect, not likely to adversely affect" the grizzly bear and its habitat.

Canada Lynx: The cumulative effects analysis spatial scale is the 91,442 acres of Canada lynx habitat in the Chamberlain (23,330 acres), McElwain (48,571 acres), and Elk Creek (19,541acres) Lynx Analysis Units (LAUs) and Unit 3, Northern Rockies Critical Habitat. The spatial scale was selected since this is the mapped lynx habitat for the proposed action and because Elk Creek LAU is adjacent to the Chamberlain-Wales analysis area. The temporal scale for lynx habitat within the LAUs and Critical Habitat is 15-20 years, which is the length of time for timber harvest, prescribed burning, and planting to develop stand initiation structure providing year-round forage habitat for snowshoe hares and Canada lynx. By reviewing previously harvested and burned sites in Chamberlain an estimated 15-20 years of growth is required to develop stand initiation structure. Trees growing in the 1994 Chamberlain burn (19 years of growth) are 20 to 30

feet tall with densities >1,000 trees per acre and have reached stand initiation structure. Clearcuts occurring in the mid to late 1990s also exhibit stand initiation structure.

Direct and indirect effects would occur. Vegetation treatments affecting lynx total up to 3,892 acres and include timber harvest with prescribed burning and prescribed burning with and without fuel augmentation. This represents 5% of the lynx habitat in the three LAUs. Prescribed burning and timber harvest with prescribed burning are intended to produce stand initiation and multistory structure to provide forage for snowshoe hares and forage and den habitat for Canada lynx. These vegetation treatments would provide early stand initiation forage habitat (spring, summer, and fall) for hares and lynx in 5-15 years, stand initiation forage habitat in 15-20 years, and multistory forage and den habitat in 100 years. There would be no winter forage habitat in the short-term (20 years), but hare and lynx winter forage habitat would be established in the long-term at around 20 years. Winter forage habitat is the most limiting factor. Please see Canada lynx direct and indirect effects section for further details.

Vegetation management treatments have been implemented by BLM, DNRC, Lubrecht Experimental Forest (LEF), and industrial timber companies such as Anaconda Forest Products Company, Champion Timber Company, and the Plum Creek Timber Company. Merchantable forests harvested in the past included mature and older multistory habitat. Wildlife habitat for species like Canada lynx was not considered during past timber harvest design. Prior to the 1970s that was true for all ownerships. It wasn't until 2000 that Canada lynx forage and den habitat considerations were developed by federal and state agencies. Before Plum Creek Timber sold their lands in the Chamberlain Creek drainage, they harvested much of their holdings in some cases creating 640-acre clearcuts. Lower elevation forests were harvested before the middle and upper elevation forests. Past wildfires and insect tree mortality produced early stand initiation, stand initiation, multistory, and stem exclusion habitat. Forest roads are not an issue for lynx.

Timber harvest that has occurred in the past in Chamberlain, McElwain, and Elk Creek LAUs are in various structural stages. Lower elevation forests are currently mature. Middle and upper elevation forests are presently a mixture of seedling/sapling, post/pole, and mature structure (single and multistory). Vegetation condition currently account for 6,922 acres of early stand initiation forage habitat, which does not provide winter habitat for lynx and hares; Chamberlain (1,333 acres), McElwain (2,658 acres), and Elk Creek (2,931 acres). This represents an unsuitable or early stand initiation value for the three LAUs of 9% (Chamberlain (6%), McElwain (5%), and Elk Creek (15%). The RMP standard (as amended by the LCAS) is there to be no more than 30% unsuitable lynx habitat in each LAU. Stand initiation stage ranges from 3,500 acres in McElwain LAU to 4,886 acres in Chamberlain LAU, and to 3,908 acres in Elk Creek LAU, which provides year-round habitat, including winter habitat, for lynx and hares. Stem exclusion habitat presently accounts for 43,827 acres in the three LAUs. Multistory habitat presently accounts for 28,399 acres in the three LAUs, which provides year-round habitat, including winter habitat, for lynx and hares and is not proposed for vegetation management treatments. Mature multistory habitat current condition has not had previous vegetation management. Timber harvest occurring on LEF would impact 320 acres (1%) of stem exclusion lynx habitat in the Chamberlain LAU. Den habitat in the Garnet Mountains is not limiting for lynx (John Squires, personal communication); the 10%

standard is exceeded in all LAUs. Overall, the proposed action would be consistent with the Garnet RMP as amended with the LCAS by virtue of all LAUs in the analysis are maintaining far more than 70% suitable lynx habitat.

Reasonably foreseeable future actions occurring in Chamberlain may affect lynx. Approximately 3,155 acres of timber harvest and pre-commercial thinning is planned in the reasonably foreseeable future in Elk Creek and Chamberlain LAUs. Of this amount, 150 acres will occur in lynx habitat; the remainder is in lower elevation ponderosa pine. The 150 acres represents <1% of lynx habitat in the Elk Creek LAU. Short-term impacts may result in a loss of stem exclusion habitat. Long-term impacts (>15 year) would result in enhanced forage habitat of early stand initiation, stand initiation, and multistory stand structure. There are no known RFFAs that would occur in the McElwain LAU. The effects of the proposed action, combined with the past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. In the context of ESA Section 7 consultation, the proposed action, with consideration of cumulative effects, has been determined to "May affect, not likely to adversely affect" the Canada lynx and its habitat. The U.S. Fish and Wildlife

Critical habitat encompasses 91,442 acres (143 mi^2) within the cumulative effects boundary. Direct and indirect effects, and past, present, and reasonably foreseeable future actions are discussed above. The present condition is a diverse landscape for Canada lynx, snowshoe hares, and other prey species, such as red squirrel. Past timber harvest and road building, wildfire, and insects/disease are the main disturbances shaping the composition, structure, and function of critical habitat. Multistory forests were impacted by the above influences. Forests have recovered and provide various quantity and quality of snowshoe hare and Canada lynx habitat. Multistory habitat presently accounts for 28,399 acres in the three LAUs.

Snowshoe hares and Canada lynx are present throughout the Chamberlain, McElwain, and Elk Creek LAUs. Early stand initiation, stand initiation, and multistory forest habitat are well represented and distributed throughout these LAUs. Early stand initiation habitat will develop into year-round stand initiation habitat within five years; these stands have high densities of conifer saplings and deciduous shrubs. Stand initiation habitat provides high densities of saplings for cover and with lower live branches for browse during winter; cover and forage will be available for decades. Late successional multistory conifer forests, with live conifer branches at snow level are available for snowshoe hare browsing. Multistory den habitat with abundant coarse woody debris is available for lynx. Matrix habitat is also present on low energy aspects with dry Douglas-fir habitat types. Snow typically persists through May at upper elevations.

Timber harvest in lynx habitat is described above and is occurring on LEF lands. The 320 acres of sanitation/salvage harvest is in mountain pine beetle mortality lodgepole pine forests, which exhibit stem exclusion structure. Pre-commercial thinning is not prescribed in lynx/hare habitat. Reasonably foreseeable future actions are also described above. Timber harvest is planned in 150 acres of stem exclusion habitat in lodgepole pine and mixed conifer stands. Treatments would result in early stand initiation structure, developing into stand initiation structure. Effects of the proposed action, combined with past, present, and reasonably foreseeable future actions, would not result in adverse

cumulative effects to critical habitat. Approximately 4,042 acres of lynx habitat would be disturbed during the next 10 years. In the context of ESA Section 7 consultation, the proposed action, with consideration of cumulative effects, has been determined to "may affect, not likely to adversely affect" Canada lynx critical habitat.

Wolverine (candidate): The temporal scale is 15-20 years, which is the length of time for timber harvest, prescribed burning, planting, and pre-commercial thinning to provide cover. Direct and Indirect effects would occur related to vegetation management; no affects are anticipated with road use. Land management activities would not create a threat to the wolverine; climate change and trapping may be the major risk factor for wolverine population viability (USDI-FWS, 2010; USDI-FWS, 2013d).

Past, present, and reasonably foreseeable future actions are similar to the vegetation analysis for grizzly bear and Canada lynx. Past wildfire and timber harvest have resulted in short-term effects, but in the long-term have been positive. Proposed vegetation management within the watershed would reduce cover by an estimated 3,000 acres, but vegetation would recover in 3-5 years. Present timber harvest on all lands within the watershed is reducing cover by 1,048 acres. Reasonably foreseeable future timber harvest and thinning would reduce cover by an additional 2,427 acres. The proposed action combined with past, present, and reasonably foreseeable actions would result in 11,767 acres of reduced cover. The total represents 20% of the watershed. Cover would be maintained at an estimated 80%. Den habitat is not present. Approximately 8,663 acres of wolverine habitat would be disturbed during the next 10 years. Under the ESA, the BLM is required to ensure and determine that its actions are not likely to jeopardize the continued existence of "candidate" species such as wolverine. The effects of this proposed action, in addition to pre-existing cumulative effects, would not likely jeopardize the continued existence of the wolverine.

Special Status Species (Sensitive)

Past timber harvest reduced altered an estimated 51,103 acres, of which all but 3,000 acres has fully recovered and providing various structural conditions. Present timber harvest on all lands within the watershed is altering 1,048 acres of wildlife habitat. Reasonably foreseeable future vegetation treatments would alter wildlife habitat by an additional 2,427 acres. The proposed action combined with past, present, and reasonably foreseeable actions would result in 11,767 acres of wildlife habitat alteration. The total represents 20% of the watershed, which would still provide habitat for sensitive species. An estimated 80% of the watershed provides diversified habitat for sensitive wildlife species.

Forest Bats: The temporal scale is 15-20 years, which is the length of time for timber harvest, prescribed burning, planting, and pre-commercial thinning to provide forage habitat. Direct and Indirect effects related to vegetation management would occur; no affects are anticipated with road use. Vegetation management would reduce roosting habitat and road management may reduce snags along roadsides. On a watershed level, roosting and foraging habitat would be retained and would buffer potential effects.

Past, present, and reasonably foreseeable future actions may impact forage habitat for all bat species and roosting habitat for the long-eared and long-legged myotis. Townsend's big-eared bats and fringed myotis roost in caves and mine adits/shafts and would not be impacted by current or planned actions. Short-term impacts would result in diminished forage and roosting habitat. Long-term impacts may result in loss of roosting habitat. Approximately 8,673 acres of bat habitat would be disturbed over the next 10 years. The proposed action, in addition to cumulative effects may impact forest bats, but would not result in loss of species viability or lead toward listing under the Endangered Species Act.

Fisher: The cumulative effects analysis spatial and temporal scale, and rationale for selection is the same as for the wolverine. Direct and Indirect effects related to vegetation management would occur. No effects are anticipated with road use. Past, present, and reasonably foreseeable future actions are similar to the vegetation analysis for wolverine. Past wildfire and timber harvest have resulted in adverse effects. Past timber harvest and road building along stream channels has reduced late successional habitat for fisher, which may take hundreds of years to recover.

Effects of current and planned vegetation management may impact/reduce fisher den and forage habitat. Short-term impacts may result from temporary displacement while timber harvest is occurring. Long-term impacts may result from loss of forage and den habitat. Large wildfires would continue to occur. Fire suppression by the DNRC would limit the size of wildfires within 500-1,500 acres. Small wildfires, or the absence of wildfires, would maintain forage and den habitat. Approximately 8,673 acres of fisher habitat would be disturbed during the next decade. The effects of this proposed action, in addition to pre-existing cumulative effects may impact fisher, but would not result in loss of species viability or lead toward listing under the Endangered Species Act.

Gray Wolf: The cumulative effects analysis spatial scale is the Chamberlain Creek Watershed (62,000 acre). The spatial scale was selected since it comprises the Chamberlain and Lindbergh elk herds, which the gray wolf follows. The Chamberlain Wolf Pack uses the watershed exclusively. The temporal scale is 15-20 years, which is the length of time for vegetation treatments to provide cover for elk and other ungulates. Direct and indirect effects would occur related to vegetation management and road use. Road use would diminish substantially at the end of the 10-year treatment period providing year-round closure (other than winter when elk are typically not present) and enhanced habitat security for elk and other prey species. For more detail on ungulate prey, please see below under big game species.

The effects of past, present and reasonably foreseeable future actions (wildfire, vegetation management, and associated roads) have impacted the wolf. This is basically the reflection of impacts on ungulate prey. Forage and potential den habitat may be impacted by timber harvest and thinning. Short-term impacts may result from temporary displacement of prey and den sites. Short-term impacts may result in enhanced forage conditions for elk and deer. Long-term impacts may result in enhanced forage conditions for prey species. Treatment blocks, with spatial and temporal restrictions would result in maintaining habitat security for ungulates and wolves. Approximately 8,673 acres of wolf habitat would be disturbed during the next decade, but would continue providing habitat for wolves. The effects of this proposed action, in addition to pre-existing cumulative

effects, may impact gray wolves, but would not result in loss of species viability or lead toward listing under the Endangered Species Act.

Bald and Golden Eagle: The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects would not occur. Large trees for potential nest sites located along streams would not be impacted. The watershed presently has three known bald eagle nest territories located along the Blackfoot River, which are not located in the project treatment area. Golden eagle nest territories are not known for the watershed. An eagle nest is located ½ mile from thinning unit T8, but the nest was not active in 2012 or 2013, and the species has not been verified. Proposed activities are not planned within ½ mile of the nest site.

The effects of past actions may have impacted bald and golden eagles. Large tree removal in the past which occurred through timber harvest or wildfires may have impacted eagles. Present and reasonably foreseeable future actions may temporarily displace eagles, but are not anticipated to have long-term effects on potential bald or golden eagle nest territories. Large tree removal is not prescribed in these foreseeable future actions. Eagles nest from February through August and if occupied nests are found during this time period potential impacts would be evaluated. The proposed action, in addition to cumulative effects would not impact eagles.

Northern Goshawk: The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects would occur. Temporary disturbance may occur, but ground disturbing activities would not occur from June 1–July 15. If active nests are found, treatments would be deferred and evaluated. Late successional forests would be impacted by timber harvest and prescribed burning, but the best structure would be deferred from treatment and 2-5 acre blocks of lesser habitat would be treated.

The effects of past actions may have impacted goshawk forage and nest habitat. Large tree removal in the past which occurred through timber harvest or wildfires may have had negative effects. Present and reasonably foreseeable future actions may temporarily displace goshawks, but are not anticipated to have long-term effects on nest territories. Large tree removal is not prescribed in these foreseeable actions. Goshawks nest in early spring. The seasonal restriction period of June 1–July 15 would prevent adverse impacts on goshawks. As stated above if nests are found treatments would be evaluated and modified. Approximately 8,673 acres of goshawk habitat would be disturbed during the next decade. The effects of this proposed action, in addition to pre-existing cumulative effects, may impact goshawks, but impacts are considered insignificant.

Great Gray and Flammulated Owl: The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects would occur. Wildlife design features would be enforced to protect active owl nests.

Lower elevation ponderosa pine harvest presently occurring and/or planned to occur in the reasonably foreseeable future may impact flammulated owls. Short-term impacts may result in owls abandoning nest sites, which may lead to nestling mortality. Long-term impacts may result in loss of suitable nest trees, such as snags and large older trees for

flammulated owls and great gray owls, respectively. Approximately 2,300 acres of ponderosa pine is currently occurring or planned for timber harvest and thinning. Vegetation treatments have the potential to benefit flammulated owls if large ponderosa pine are retained and understory vegetation reduced. Timing is critical to not disturb nesting flammulated owls. Mid to high-elevation timber harvest currently occurring or planned to occur in and adjacent to Chamberlain may affect the great gray owl. Late succession forest habitat may be potentially impacted. These attributes would be retained with the No Action alternative related to the Chamberlain Proposed Action. Approximately 8,673 acres of great gray owl and 3,610 acres of flammulated owl habitat would be disturbed in the next 10 years. The effects of this proposed action, in addition to pre-existing cumulative effects, may impact owls, but impacts are considered insignificant.

Black-Backed and American Three-Toed Woodpecker: The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects would occur. Temporary disturbance may occur, but potential nests sites would be protected from June 1–July 15. If active nests are found outside of this time period vegetation treatments would be deferred and evaluated. Woodpeckers would benefit from prescribed burning since no salvage of burned timber would be permitted.

Past, present, and reasonably foreseeable future actions planned for salvage sales of mountain pine beetle killed trees may have impacts on black-backs and three-toed woodpeckers forage and nesting habitat. Short-term impacts may result in loss of forage habitat, adult displacement, and nest abandonment coinciding with harvest activities. This could lead to nestling mortality. Prescribed fire in lodgepole pine would benefit both woodpeckers, especially the black-backed. Approximately 4,239 acres of woodpecker habitat would be disturbed during the next decade. The proposed action, in addition to cumulative effects may impact woodpeckers, but impacts are considered insignificant.

Big Game Species

Elk: The cumulative effects analysis for elk parallels those for the gray wolf. The spatial scale is the Chamberlain Creek and Murray/Douglas Watershed (120,000 acre). The spatial scale was selected since it comprises the Chamberlain and Lindbergh elk herd distribution. The temporal scale is 15-20 years, which is the length of time for vegetation treatments to provide hiding and thermal cover for elk. Direct and indirect effects would occur. Vegetation treatments would provide forage in the short-run, but lack of hiding and thermal cover. Forage and cover would be maintained in the long-run. Treatment blocks would lower the effects of open motorized road use by temporally and spatially mitigating effects to habitat security. Road use would be tied to projects and would diminish substantially once treatments end and the area once again provides year-round closure (other than winter when elk are typically not present) and enhanced habitat security for elk. Projects would also be implemented in blocks so that the affected area would be minimized and would geographically shift over time.

The effects of past, present and reasonably foreseeable future actions have impacted elk. During the Elk Logging Study in Chamberlain (Burcham et al. 1998), elk essentially moved to private land refuge areas. The study also found that importance of closed

canopy (>30% crown closure) coniferous forest on summer range appeared to have declined by almost half as elk selected increasingly fragmented habitats. Present and reasonably foreseeable future actions may have displaced elk from forage habitat, caused behavioral modification for avoidance of roads, and reduced habitat security. Present and reasonably foreseeable future actions on 3,475 acres of elk summer range would pose impacts during and after harvest and thinning treatments. These actions may provide forage within two years post treatment and hiding and thermal cover within 15 years. Temporary displacement may occur while harvest operations and road travel are occurring. Approximately 8,673 acres of elk habitat would be disturbed during the next 10 years. Approximately 7,883 acres of treatment would result in early stand initiation structure. The proposed action would have additive cumulative effects in that hiding and thermal cover would be reduced, and elk use patterns would be altered.

Moose: The spatial scale was selected since up to 20 moose may inhabit the watershed throughout the year; the upper Chamberlain/Wales area may be the best moose habitat in the Garnet Range (Jay Kolbe, personal communication). The temporal scale is 15-20 years, which is the length of time for vegetation treatments to provide hiding cover. Direct and indirect effects would occur. Vegetation treatments would impact moose cover in the short-term, but provide forage and cover in the long-term. Treatment blocks would lower the effects of open motorized road use by temporally and spatially mitigating effects to habitat security.

The effects of past, present and reasonably foreseeable future actions have impacted moose. Moose have declined in the Chamberlain Watershed in the last 10-15 years, but the cause is undetermined (Jay Kolbe, personal communication). Mixed forest riparian areas are primary use areas, but lodgepole pine uplands may be used for forage areas (especially if deciduous shrubs are present) and travel corridors. Ponderosa pine lowlands are not frequented by moose. Present and reasonably foreseeable future actions are in uplands and lowlands rather than mixed forest riparian areas. Long-term benefits (>15 years) would result from vegetation treatments by providing shrubs and young conifers (subalpine fire) for winter browse. Road use would displace moose and reduce habitat security for the duration of project implementation. Moose benefit from prescribed fire. Moose are impacted by fire in the short-term, but benefit in the long-term as stand initiation structure advances providing deciduous and coniferous forage. This is particularly important for moose winter range. Approximately 4,239 acres of moose habitat would be disturbed during the next 10 years. Moose showed strong selection for clearcuts and burned areas during the Chamberlain Moose Study and that moose use large blocks of forest cover for habitat security, which is available in the mid to upper elevation of the project area, especially in the Wales Creek WSA (Bercham et al. 2000). The proposed action would have additive cumulative effects in that hiding and thermal cover would be reduced for a period 15 to 20 years while forage conditions for moose would improve in that timeframe.

Mule Deer and White-Tailed Deer: The spatial scale was selected since both mule and white-tailed deer may be present year-round. The temporal scale is 15-20 years, which is the length of time for vegetation treatments to provide hiding and thermal cover. Direct and indirect effects would occur. Vegetation treatments would provide forage in the long-term. Treatment blocks would lower the effects of open motorized road use by temporally

and spatially mitigating effects to habitat security. Road use would diminish substantially once treatments end and the area once again provides year-round closure and enhanced habitat security.

The effects of past, present and reasonably foreseeable future actions (wildfire, vegetation management, and associated roads) have impacted deer. Present and reasonably foreseeable future actions of vegetation management and road construction/use in and adjacent to Chamberlain would impact deer. Mule deer utilize uplands and lowlands with mixed conifer forest and deciduous shrubs, with low water availability; 2,775 acres of this habitat would be impacted. White-tailed deer prefer riparian mixed conifer habitat, which is not impacted by current or planned actions. Short-term impacts resulting in temporary displacement would be associated with concurrent harvesting and road use. Long-term impacts (>15 years) would be associated with stand recovery providing forage, hiding, and thermal cover. Approximately 8,673 acres of deer habitat would be disturbed during the next decade. The proposed action would have additive cumulative effects in that hiding and thermal cover would be reduced.

Mountain Lion: The cumulative effects analysis for mountain lion parallels that for elk. The spatial scale is the Chamberlain Creek and Murray/Douglas Watershed (120,000 acre). The spatial scale was selected since it comprises the Chamberlain and Lindbergh elk herd distribution and elk are a primary prey species of mountain lion. The temporal scale is 20 years, which is the maximum length of time for vegetation treatments to provide hiding cover. Direct and indirect effects would occur, based on effects to prey species (elk and deer). Vegetation treatments would provide forage for prey species such as elk and deer in the short-run, but lack of hiding and thermal cover for elk and other ungulates. Forage and hiding and thermal cover would be available in the long-run (>20 years) when lions are able to ambush prey. As with elk, treatment blocks would lower the effects of open motorized road use by temporally and spatially mitigating effects to habitat security. Road use would diminish substantially once treatments end and the area once again provides year-round closure (other than winter when elk are typically not present) and enhanced habitat security for elk.

The effects of past, present and reasonably foreseeable future actions have impacted elk and lions. During the Chamberlain Mountain Lion Study (Robinson and DeSimone 2011) showed that hunting harvest has a dramatic effect on mountain lion survival and population growth. Present and reasonably foreseeable future actions, such as vegetation treatments, would displace lions similar to the displacement of elk and deer. This would occur over the 2,714 acres of lodgepole pine and ponderosa pine vegetation treatment areas. In the short-term, elk and deer would be harder to ambush and stalk during early stand initiation stages. In the long-term, hiding cover would return (>20 years) aiding in ambushing and stalking habitat. Thinning units would reduce hiding cover for lions making conditions less suitable for ambushing and stalking prey. The proposed action and present and reasonably foreseeable future actions would disturb approximately 8,673 acres of lion habitat during the next decade. The proposed action would have additive cumulative effects in that hiding and thermal cover for big game would be reduced.

Black Bear: The temporal scale of the cumulative effects analysis area is 15-20 years, which is the maximum length of time for timber harvest, prescribed burning, planting, and pre-commercial thinning to provide hiding and thermal cover. Direct and Indirect effects would occur. The proposed action is intended to benefit bears by producing early seral habitat, especially huckleberries. The proposed action would reduce cover by 4,978 acres, but would have short-term effects and long-term benefits. The effects of road use during the proposed action would displace bears and reduce habitat security. In an attempt to maintain low open motorized road density multiple treatment blocks would be established to mitigate potential effects.

Present, past, and reasonably foreseeable future actions have had mixed effects on black bears. Past effects have moderated and provide forage, den, and cover habitat. Present and reasonably foreseeable future actions involving timber harvest and thinning would improve forage conditions in the short-turn. In the long-term, potential den and cover habitat may be impacted. Black bears often den under coarse woody debris, which would diminish during timber harvest activities. Cover would diminish related to large patch-sizes on DNRC and LEF lands. In the long-term, timber harvest resulting in large patch-size may make black bears more vulnerable to hunting by increasing habitat vulnerability. Road use and vegetation treatments would reduce habitat security and reduce hiding and thermal cover. Approximately 8,673 acres of black bear habitat would be impacted in the next 10 years. The proposed action would have additive cumulative effects in that hiding and thermal cover would be reduced.

Montana Bird Species of Concern

Mature ponderosa pine trees are retained, and deferred from treatment in all harvest and thinning units. Ponderosa pine restoration prescription would be for pre-commercial thinning. Therefore, cones and seeds would be available for nutcrackers, Cassin's finches, and evening grosbeaks. Treatments within ponderosa pine cover-types would provide sustained habitat for birds dependent on seeds. Nutcrackers, finches, and grosbeaks also forage on other conifer and non-conifer seeds. Composites would be an example.

Past timber harvest reduced altered an estimated 51,103 acres, of which all but 3,000 acres has fully recovered and providing various structural conditions. Present timber harvest on all lands within the watershed is altering 1,048 acres of wildlife habitat. Reasonably foreseeable future vegetation treatments would alter wildlife habitat by an additional 2,427 acres. The proposed action combined with past, present, and reasonably foreseeable actions would result in 11,767 acres of wildlife habitat alteration. The total represents 19% of the analysis area, which would still provide habitat for bird species of concern. An estimated 80% of the watershed provides diversified habitat for wildlife.

BLM typically retains snags on their lands, while private timber lands do not. Currently 40-80% mortality in LP from pine beetles and mortality in Douglas-fir in the past ten years from bark beetles has created potential cavity nesting sites for primary and secondary cavity nesting birds and mammals.

Lewis's Woodpecker: The spatial scale was selected since it comprises ponderosa pine forests in the project area within the larger context of Chamberlain-Wales analysis area. The temporal scale is 10 years, which is the length of time for proposed action treatments to recover. Direct and indirect effects may occur. Temporary disturbance would occur, but potential nests sites would be protected from June 1–July 15. If active nests are found outside of this time period vegetation treatments would be evaluated and potentially deferred. Woodpeckers would benefit from prescribed burning on BLM lands, since no salvage of burned timber would be permitted.

Past, present, and reasonably foreseeable future actions in ponderosa pine cover types may have a positive long-term effect on Lewis's woodpeckers, especially if large ponderosa pine trees are retained and understories reduced. Timber harvest is prescribed on DNRC and TNC land. Short-term impacts may result if timber harvest occurs during the nesting season from mid-May to mid-July. Large ponderosa pines are retained on BLM Bear Creek Flats lands. Large dead and living ponderosa pine are used by Lewis's woodpeckers for cavity nesting. Reduced understories may enhance forage opportunities for Lewis's woodpecker. Prescribed fire in ponderosa pine cover types would benefit Lewis's woodpecker. More abundant forage and potential nest sites would be created through prescribed fire. Approximately 3,610 acres of Lewis's woodpecker habitat would be disturbed during the next decade. The proposed action would have additive cumulative effects in that forage and nest habitat would be reduced.

Pileated Woodpecker: The spatial scale was selected since the entire area may comprise pileated woodpecker habitat. The temporal scale is 10 years, which is the length of time for timber harvest and prescribed burning accomplishments. Temporary disturbance would occur, but potential nests sites would be protected from June 1–July 15. If active nests are found outside of this time period vegetation treatments would be evaluated and potentially deferred.

Past, present, and reasonably foreseeable future actions in ponderosa pine, Douglas-fir, western larch, and mixed conifer stands with lodgepole pine cover types may have a positive effect on pileated woodpeckers. Retaining large live and dead trees provide forage and cavity nesting habitat. Young and mature forests would progress through succession towards late succession structure. Ecological processes, such as insects and disease, would continue and develop snags and woody debris. Short-term impacts may result if logging occurs during the nesting season on TNC, LEF, and DNRC lands. BLM wildlife design features would disallow ground disturbing activities during nesting season. Long-term impacts may result if large snags and live replacement snags are harvested. Additional actions resulting from vegetation and road management projects of the proposed action would not occur. Proposed action vegetation treatments in ponderosa pine, Douglas-fir, western larch, and lodgepole are intended to benefit species such as the pileated woodpecker. Recent wildfire trends in these cover types indicate that wildfires would continue into the future. Approximately 8,673 acres of pileated woodpecker habitat would be disturbed during the next 10 years. The proposed action would have additive cumulative effects in that forage and nest habitat would be reduced.

Clark's Nutcracker: The spatial scale was selected since the entire area may be nutcracker habitat. The temporal scale is 10 years, which is the length of time for

proposed action completion. Direct and indirect effects may occur. Temporary disturbance would occur as nutcrackers are displaced from foraging areas and nest sites disturbed during winter logging.

Past, present, and reasonably foreseeable future actions are not occurring in whitebark pine. Short-term impacts may result if logging occurs during the nesting season (February–April), but this is unlikely. Short and long-term impacts to nutcrackers may result from the removal of Douglas-fir and subalpine fir, which provide cones food sources. LEF is conducting timber harvest in high elevation lodgepole pine and subalpine fir habitat, which would be a potential source of food for nutcrackers. Many of the advanced early succession forests harvested over 20 years ago currently provide subalpine fir and Douglas-fir cones nutcrackers depend on for food. Approximately 4,042 acres of Clark nutcracker habitat would be disturbed during the next 10 years. This represents 26% of BLM lands and 8% of total lands in the analysis area. The proposed action would have additive cumulative effects in that forage and nest habitat would be reduced.

Brown Creeper: The spatial scale was selected since the entire area may comprise brown creeper habitat (lodgepole pine, Western larch, Douglas-fir, and ponderosa pine). The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects may occur. Temporary disturbance would occur, but potential nests sites would be protected from June 1–July 15. Active nests would be difficult to find outside of the June-July time period.

Past, present, and reasonably foreseeable future actions may affect brown creeper forage and nest habitat. Brown creepers forage in dead and live lodgepole pine and Douglas-fir trees, and nest in dead lodgepole pine and Douglas-fir trees. Impacts would primarily occur from sanitation/salvaging timber harvest in lodgepole pine and other timber harvest in mixed conifer and mixed ponderosa pine and Douglas-fir. Short and long-term impacts may result. Pre-commercial thinning would not impact brown creepers. Short-term impacts would not result from thinning since brown creepers forage and nest in mature and late succession trees. Long-term adverse impacts would probably not result since lodgepole pine and Douglas-fir trees would be retained. Approximately 8,663 acres of brown creeper habitat would be disturbed during the next 10 years. The proposed action would have additive cumulative effects in that forage and nest habitat would be reduced.

Cassin's Finch: The spatial scale was selected since the entire area may comprise Cassin's finch habitat, although ponderosa pine and Douglas-fir forest are preferred habitat. The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects would occur. Temporary disturbance may occur, but potential nests sites would be protected from June 1–July 15. Active nests would be difficult to find outside of the June-July time period.

Past, present, and reasonably foreseeable future actions may affect forage and nest habitat. Current and planned timber harvest of 878 acres in mixed ponderosa pine and Douglas-fir forests, and in mixed western larch forests may impact Cassin's finch. Cassin's finches forage and nest in mature and late succession forests. Timber harvest may impact the Cassin's finch by removing forage and nest trees. Short-term impacts

may result from tree removal during the nesting season on LEF, DNRC, and TNC lands. On these lands without wildlife design features, nests may be destroyed while harvesting trees, which would lead to nestling mortality and disrupted nesting season. Forage habitat may be reduced. Long-term impacts may result from loss of mature and late succession forest trees, which may take 100 years to replace. Pre-commercial thinning would not impact these finches, since they don't forage or nest in young conifer stands. Approximately 8,663 acres of Cassin's finch habitat would be disturbed during the next 10 years. The proposed action would have additive cumulative effects in that forage and nest habitat would be reduced.

Evening Grosbeak: The spatial scale was selected since the entire watershed may comprise evening grosbeak habitat, which prefer mixed conifer and spruce-fir habitat. The temporal scale is 10 years, which is the length of time for proposed action completion. Direct and indirect effects would occur. Temporary disturbance may occur, but potential nests sites would be protected from June 1–July 15. Active nests would be difficult to find outside of the June-July time period.

Past, present, and reasonably foreseeable future actions may affect forage and nest habitat. Current and planned timber harvest of 1,200 acres in mixed conifer and lodgepole pine/subalpine fir may impact forage and nest habitat. Short-term impacts may result from tree removal during the nesting season on LEF, DNRC, and TNC lands. On these lands, which do not have wildlife design features for special status species birds, nests may be destroyed while harvesting trees, which would lead to nestling mortality and disrupted nesting season. Forage and nest habitat may be reduced associated with tree removal. Pre-commercial thinning may impact nest and forage habitat since evening grosbeaks nest in shrub habitat, as well as mature trees. Approximately 8,663 acres of Evening grosbeak habitat would be disturbed during the next 10 years. The proposed action would have additive cumulative effects in that forage and nest habitat would be reduced.

Bird species of concern are not detected every year. Local breeding bird survey and Christmas bird survey information are summarized and indicate regional declines in the bird species of concern.

4.4.3 Soils and Site Productivity

Cumulative impacts are analyzed at the site, or "activity area" scale since the typical soil impacts of interest (compaction, displacement, erosion) do not occur away from the actual site. The CIAA is therefore a cumulative total of impacted acres within the Chamberlain-Wales analysis area.

Impacts of past and present actions: Past harvest operations (landings and skid trails) resulted in compacted soils and reduced infiltration capacity on 0.2 acres. Past fireline construction with bulldozers resulted in soil displacement and reduced site productivity on 4 acres.

Impacts of RFFAs: There are no RFFAs which would impact soils and site productivity on BLM lands and treatment activity areas.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: There would be no cumulative impact since no further treatment activity areas would be added, and no potential for soil disturbance.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: Given the design features for ground-based harvest, soil impacts would be minimized. Prescribed burning design features have provisions for avoiding excessive soil heating, hydrophobic soil, and increased erosion hazard. The construction and rehab of 2.6 miles of temporary roads would impact an estimated 9.5 acres of soils (assuming an average disturbance width of 30 feet). Soil productivity would be affected for a period of 10-15 years depending on soil type and habitat type. Road obliteration and culvert removal would restore long-term productivity on 0.95 miles of roads equating to about 3.9 acres. The cumulative impact is thus 5.8 net acres (0.2 acres existing, plus 9.5 acres proposed new, minus 3.9 acres proposed restored) impacted for a period of 10-15 years.

4.4.4 Water Quality

Cumulative impacts are analyzed at the stream reach scale for potential delivery hazards. Additionally, stream segments which are subject to TMDLs or are otherwise impaired (Clean Water Act 303d-listed) also may serve as a CIAA if relevant.

Impacts of past and present actions: Past actions most likely had some impact (early riparian logging and livestock grazing, streamside roads). DEQ lists Frazier Creek (and historically lower Chamberlain Creek) for impacts. However, DEQ has not attributed any listing causes or sources to BLM lands.

Impacts of RFFAs: There are no known RFFAs which would impact water quality.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: No Action presents a risk to water quality associated with high severity wildfire. The extent and severity of these impacts would be speculative and highly dependent on the nature of any fire event.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: The proposed action presents a low risk of sediment delivery, and in modeled quantities that are unlikely to warrant a persistent risk or recognizable source for impacting water quality such that listing would be warranted.

4.4.5 Streams and Riparian Condition

Cumulative impacts are analyzed at the stream reach scale for potential direct impacts (manipulation of bed, banks, or riparian habitat) and indirect impacts (flows).

Impacts of past and present actions: Past actions most likely had some impact (early riparian logging and livestock grazing, streamside roads). In regard to past timber harvest or roading impacts on hydrology, water yield, or peak flows, the past and present actions have had observable lasting impact on stream and riparian conditions as observed

in 2011-12 based on PFC assessments, other than those observed in East Fork of Chamberlain Creek as discussed in Section 4.3.5.

Impacts of RFFAs: There are no known RFFAs which would impact water quality.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: No Action would not add any riparian impacts, nor any indirect impacts other than a risk of altered flows from high severity wildfire. The extent and severity of these impacts would be speculative and highly dependent on the nature of any fire event.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: As demonstrated in Section 4.3.5, there are no direct or indirect impacts likely and thus no cumulative impacts.

4.4.6 Aquatic Species and Habitat

Spatial and temporal boundaries for cumulative effects are shown in Table 4-7.

Impacts of past and present actions: Culvert barriers were removed in Bear Creek in 2006 and 2010, and in Pearson Creek in 2013.

Impacts of RFFAs: There are no RFFA's in the CIAA and so no cumulative impacts would occur.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: There would be no cumulative effect because no projects would be implemented. Indirect impacts could occur as a result of altered flows, sedimentation, streamside cover loss from high severity wildfire. The extent and severity of these impacts would be speculative and highly dependent on the nature of any fire event.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions:

<u>Disturbance to Aquatic Species:</u> There are no other activities within the temporal and spatial boundaries described in Table 4-7 that could combine with the effects of the proposed culvert removals on individual aquatic organisms, resulting in cumulative effects.

<u>Sediment effects on aquatic habitat:</u> The only elements of Alternative B that would contribute sediment to aquatic habitats are culvert removals. There are no other activities that would contribute additional sediment within the within the temporal and spatial boundaries that could combine with the effects the culvert removals to generate cumulative effects.

<u>Access to Aquatic Habitat:</u> Cumulative effects to migration are considered on a stream-by-stream basis since the projects are located in hydrologically separate drainages with little likelihood of fish migration within drainages.

In Bear Creek, the current proposal combined with barrier removals in 2006 (by BLM) and 2010 (by Montana DNRC) would yield a positive cumulative effect of rendering 4.7 miles of potential habitat accessible to westslope cutthroat trout.

In Pearson Creek, the current proposal combined with recent removal of barrier at mouth of stream by Trout Unlimited would yield a positive cumulative effect of rendering 8 miles of potential habitat accessible to westslope cutthroat trout.

In the East Fork of Chamberlain Creek, the culvert removal would provide access to an additional 1.1 mile of potential habitat. A barrier culvert remains on private land, approximately 1 mile downstream of the BLM culvert to be removed, limiting the benefit of the current proposal to only the BLM-managed reach. There are no other known culvert or barrier removal projects proposed in the drainage with which the current proposal could combine to create cumulative effects.

4.4.7 Wales Creek Wilderness Study Area

The CIAA is the WSA boundary which encompasses 11,580 acres.

Impacts of past and present actions: Past and present actions in the WSA have been limited primarily to Fire Suppression. WSA management guidance requires "minimum impact suppression tactics" (MIST) or "light on the land" fire suppression tactics whenever possible. Fire Suppression has not impacted or impaired the suitability of the WSA to be designated as wilderness.

Impacts of RFFAs: The primary RFFA's in the WSA would continue to be fire suppression. WSA management guidance would continue to require MIST suppression tactics whenever possible. These fire suppression methods are not likely to impact or impair the suitability of the WSA to be designated as wilderness.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: Fire suppression would continue under the No Action alternative. There would be no cumulative impacts to WSA designation suitability.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: Fire suppression would continue under the Proposed Action alternative. The impacts are the same as the No Action alternative. The Proposed Action would create approximately 2500 acres of lands with reduced risk of large, high-severity wildfire which would not impact the suitability of the WSA to be designated as wilderness.

4.4.8 Special Status Plants

The CIAA is the project area where potentially disturbing activities would occur.

Impacts of past and present actions: There are no past or present actions that are suspected to have impacted special status plants. The impacts to Howell's gumweed

from past and present actions are unknown due to lack of information on distribution and abundance in the areas where past actions occurred

Impacts of RFFAs: There are no known RFFA's that would impact special status plants.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: If the No Action alternative is selected there would be no impacts since the proposed activities would not be implemented.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: If the proposed action is selected, a design feature has been incorporated requiring that a pre-project field inventory be conducted prior to project implementation. If sensitive plants are found during these inventories, the area would be flagged and avoided during project implementation, eliminating any potential impacts to sensitive plants.

4.4.9 Invasive Plants

The CIAA is the project area where potentially disturbing activities would occur.

Impacts of past and present actions: Past and present weed treatment efforts have, and would continue to, reduce noxious weed populations. Past logging activities and associated road construction are most likely the main cause of the present noxious weed occurrences. Public use, administrative use, and unauthorized motorized traffic are currently contributing to the introduction and spread of noxious weeds. However, public education efforts over the past 10 years and awareness of the threat posed by noxious weeds have enhanced overall weed management and have likely reduced infestation occurrences.

Impacts of RFFAs: Public and administrative use of the area would continue to be a weed introduction hazard. Actions on neighboring State and private lands may also present a hazard depending on the nature of their actions and their own weed treatment efforts. Weed treatments would likely continue in the Chamberlain/Wales assessment area under a prior decision (USDI-BLM, 2009). Cooperative agreements with state and private landowners would continue to be developed which would likely improve weed management effectiveness. Public education and awareness of the threat posed by noxious weeds would continue to enhance overall weed management and reduce infestations.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: If the Proposed Action is denied, the combined impact is the same as present actions and reasonably foreseeable future actions. Weed infestations are likely to be stable or decline.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: The Proposed Action presents a higher hazard of weed introduction than the No Action. However, the design features of the Proposed Action, combined with

ongoing weed management efforts and public education, are likely to cause weed infestations to be stable or decline.

4.4.10 Cultural Resources

For the purpose of cumulative effects only those lands inside the Chamberlain-Wales Ecosystem Assessment (USDI-BLM, 2012) boundary were analyzed. Surface-disturbing activities that are occurring outside of this boundary have already been analyzed in previous assessments. The temporal scope for cumulative effects is approximately 115 years based on the timeline of surface-disturbing activities known to have occurred on the lands within the assessment boundary thus far.

Impacts of past and present actions: Past surface-disturbing activities on lands not managed by BLM may have had some adverse effect to cultural resources. The Big Blackfoot Railroad may have been built on top of the ancient Cokahlarishkit Trail. Lands located within 3 to 4 miles of the Cokahlarishkit/Lewis and Clark Trail and Big Blackfoot Railroad are assumed to have had cultural resources damaged or destroyed by logging activities. Other prehistoric and historic sites may have been present and affected as well. Past surface-disturbing activities such as fire suppression, vegetation treatments, and road and highway construction may have damaged or destroyed cultural resources. Class III Cultural Resource Inventories of nearby lands (formerly held by private companies such as Anaconda Company, Champion, and Stimson Lumber Company) acquired by BLM show a lack of cultural resources suggesting some cultural resources may have been destroyed.

Present forest management activities within the assessment area include vegetation treatments on 350 acres in the Lubrecht Forest (University of Montana), 528 acres on Montana Department of Natural Resources and Conservation (DNRC) and 400 acres on BLM-administered lands. A Class III Cultural Resource Inventory was conducted for the 400 acres on BLM and one historic site was located. The site was determined to be ineligible for the National Register, therefore no adverse effects would occur. Neither the University of Montana nor the DNRC are subject to the federal Section 106 of NHPA law. Without an inventory to determine if cultural resources are present on State lands, it is unknown if adverse effects would occur.

Impacts of RFFAs: Reasonably Foreseeable Future Actions include vegetation treatments on 150 acres on Lubrecht Forest (University of Montana), 450 acres on The Nature Conservancy (TNC) lands, and 1127 acres on DNRC lands. These entities are not subject to the federal Section 106 of NHPA law. Without an inventory to determine if cultural resources are present, it is unknown if adverse effects would occur.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: There would be no cumulative effect because no projects would be implemented.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: Cumulative impacts would be negligible as a result of the proposed action since the design features would avoid or mitigate any adverse effects to cultural

resources. The proposed activities would be subject to Section 106 of NHPA, and may be redesigned or not implemented in order to avoid adverse effects. This process may formal consultation with the State Historic Preservation Office. In most cases however, cultural resources are simply avoided.

Presently, 4.5% of the Chamberlain-Wales Ecosystem Assessment Area has been inventoried and 15 cultural sites recorded. As the proposed action is implemented, 7000 additional acres would be inventoried and cultural resources would be recorded as they are discovered. The design features would avoid any impacts to newly discovered sites. The additional inventory and recordation would have a beneficial cumulative effect since a clearer understanding of how the Chamberlain-Wales area was used by humans prehistorically and historically would emerge. This would be a beneficial effect over the No Action alternative.

4.4.11 Lewis and Clark National Historic Trail

The CIAA is the trail starting at the western boundary of the Chamberlain-Wales Watershed Assessment area and ending at the eastern boundary. The majority of the trail is on private land and is out of the Watershed Assessment area in the CIAA.

Impacts of past and present actions: The majority of the trail is on private land. Timber harvest, road building including the building of Highway 200, and other developments (i.e. powerlines, railroad) have obliterated the LCNHT in many places. Because the trail is mostly on private land, federal laws and regulations that protect and preserve cultural resources do not apply.

Because of current federal laws and regulations and because the BLM has acquired portions of the trail in the Lower Blackfoot Corridor, Sperry Grade and Marcum Mountain area, the LCNHT is better protected and present actions on public land typically do not negatively affect it because impacts are either avoided or mitigated (i.e. visual design features).

Impacts of RFFAs: The trail itself is not located within the Chamberlain-Wales Creek Watershed Assessment area except in the Sperry Grade area. Future actions on BLM administered lands would not impact the LCNHT.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: Past, present, and RFFA's combined with the No Action Alternative would not result in any cumulative effects to the LCNHT.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: Past, present, and RFFA's combined with the Proposed Action Alternative would not result in any cumulative effects to the LCNHT.

4.4.12 Recreation

The CIAA is the Chamberlain-Wales Ecosystem Assessment area.

Impacts of past and present actions: Timber harvest has been occurring since at least the 1970s with the most recent being in the 1990s. Timber harvest will continue on State, Private and public land administered by the BLM. In the past, on BLM administered public land, design features were implemented during vegetation treatments that were being done by contract or permit to lessen the impact in the Block Management Area. It is unknown what, if anything, was done or is done on private land to lessen the impact.

Impacts of RFFAs: The impacts of the RFFAs would be the same as the impacts of past and present actions.

Impacts of No Action when added to past, present, and reasonably foreseeable future actions: The impacts of the No Action alternative when added to the past, present and RFFAs would be the same.

Impacts of Proposed Action when added to past, present, and reasonably foreseeable future actions: Past, present, and RFFA's combined with the Proposed Action Alternative would not result in any cumulative effects.

5.0 CONSULTATION AND COORDINATION

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 3. Section 1.8 provides the rationale for issues that were considered but not analyzed further. The issues were identified through the public and agency involvement process described in Section 5.2.

5.1 PERSONS, GROUPS, AND AGENCIES CONSULTED

Table 5-1. List of all Persons, Agencies and Organizations Consulted for Purposes of this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
USFWS	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	See 5.1.1
Montana State Historic Preservation Office	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	BLM would consult with State Historic Preservation Office prior to implementation of project level activities via Class III Cultural Resource Inventories. If cultural resources are located during the inventory mitigation measures would be applied to reduce or eliminate adverse effects.
Salish & Kootenai Tribes	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	BLM met with Salish and Kootenai tribes on two separate occasions to discuss both the ecosystem assessment and preliminary proposed projects on April 16, 2012 and March 14, 2013, respectively. No issues or concerns were brought forward in those

		meetings. BLM would consult again on project level implementation annually.
Montana Department of Natural Resources and Conservation	Helispots. DNRC has fire protection responsibility in the area.	Helispots included in Proposed Action.
The Nature Conservancy	Proposed burning on land currently owned by TNC(Unit F15)	Proceed with proposal. BLM is in the process of acquiring the land and will most likely have ownership prior to implementation.
Montana Fish, Wildlife,&Parks	Data on Big game, fisheries.	Jay Kolbe of FWP provided big game survey and harvest data for the analysis area.

5.1.1 Canada lynx consultation and coordination

Katrina Dixon of the US Fish and Wildlife Service was consulted regarding grizzly bear, Canada lynx, and wolverine. The proposed action, potential effects, Section 7 consultation, and determinations were discussed. The U.S. Fish and Wildlife Service reviewed the biological assessment and concurred with determinations (12/20/13) that the proposed action is not likely to adversely affect the threatened grizzly bear, the threatened Canada lynx, or designated critical habitat for Canada lynx (USDI-FWS 2013a).

Dixon joined John Squires (US Forest Service Rocky Mountain Research Station) and a group of Missoula Field Office staff on July 31, 2013, on a field trip to review the Chamberlain/Wales Resource Projects proposed vegetation treatments. Dixon's concern/interest was regarding grizzly bear, Canada lynx, and wolverine. Her comments and recommended actions included disclosure of grizzly bear effects including discussion/consideration of roads and road management, as well as the establishment of discrete spatial and temporal blocks in which to schedule treatments; and Canada lynx and lynx critical habitat conservation measures/primary constituent elements. A mutual understanding was developed between Dixon and BLM personnel regarding the project proposal and potential effects on federally listed species.

In addition to his field trip participation, John Squires, Rocky Mountain Research Station, provided input on June 28, 2013 regarding the Chamberlain/Wales Resource Projects proposed vegetation treatments and Canada lynx. Squires recommended deferring vegetation projects, prescribed fire and timber harvest, in past areas having lynx GPS monitoring points.

5.2 SUMMARY OF PUBLIC PARTICIPATION

During preparation of the EA, the public was notified of the propose action by posting to the Field Office NEPA register on March 12, 2013. A scoping letter and draft proposed action was mailed to 132 recipients on April 2, 2013. The mailing list was compiled from past interested and involved parties, past NEPA scoping efforts, and adjacent landowners. The draft proposed action and scoping notice were also posted on the BLM website and a press release was issued on April 2, 2013. The BLM received 13 responses to this initial scoping effort. Substantive comments (as per BLM NEPA Handbook) were incorporated into development of an EA and a draft FONSI was sent to mailing list

recipients and posted on the BLM webpage on November 20, 2013. Additional verbal and written comments were received and a Decision Record and FONSI were issued for a portion of the proposed actions on February 13, 2014. Additional content edits, and clarifications were made to the EA in response to public comments. Substantive public comments received along with the BLM's responses are included in Appendix D.

5.3 LIST OF PREPARERS (Table 5-2)

Name	Title	Responsible for the Following Section(s) of this EA
MariaCraig	Recreation Specialist	WSA, Visuals
Jo Christensen	Fishery Biologist	Aquatic Species and Habitat
James Sparks	Wildlife Biologist	Wildlife and Wildlife Habitat, Vegetation
Michael Albritton	Fuels Specialist	Forest Vegetation, Fuels Management
Shelagh Fox	Forester	Forest Vegetation, Fuels Management
Steve Flood	Hydrologist	Soils,Water,Riparian. ID Team Lead.
Lester Maas Dennis Leonard	GIS Specialists	GIS analysis and maps
Jody Miller	Archaeologist	Cultural Resources
John Hill	Nat. Res. Specialist	Special Status Plants (Federally listed and Sensitive)
Lonna Sandau Jim Ledger	Realty Specialists	Land status, roads
Tim LaMarr	Assistant Field Manager	Document Review

6.0 REFERENCES, GLOSSARY AND ACRONYMS

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6.2 GLOSSARY OF TERMS AND ACRONYMS

Canopy Base Height - the lowest height above ground at which there is significant canopy fuel to propagate fire vertically through the canopy (Scott and Reinhardt, 2001)

Co-dominant – as pertaining to crown canopy in a stand layer or stratum. Crowns form the main level of the crown stratum. Co-dominant trees are not restricted physically from above but have vary degrees of crowding by other trees on the sides (Oliver and Larson 1996).

DBH: Tree diameter measured at "breast height" (4.5 feet above ground)

Dominant- as pertaining to crown canopy in a stand layer or stratum. Crowns of dominant trees extend above the general level of the other trees crown cover in the stratum. Dominant trees are not restricted physically from above but may experience crowding by trees on the sides (Oliver and Larson 1996).

Fire severity: refers to the immediate effects of fire on vegetation, soils, and litter. Fire severity is traditionally expressed by classifying the magnitude of a fires impact on a particular resource into broadly defined classes ranging from low to medium to high fire severities (Robichaud et al. 2000). Crown scorch, bark char height, residence time, and depth of burn are often used as indicators of fire severity. For the purpose of this document, fire severity is defined below **(**Keeley 2009):

> Low severity: Canopy trees with green needles although stems scorched; surface litter, mosses, and herbs charred or consumed; soil organic matter layer largely intact and charring limited to a few mm depth.
> Moderate severity: Trees with some canopy cover killed, but needles not consumed; all understory plants charred or burned; fine dead twigs on soil surface consumed and logs charred; pre-fire soil organic layer largely consumed.
> High severity: Canopy trees killed and needles consumed; surface litter of all sizes and soil organic layer largely consumed; white ash deposition and charred organic matter several cm depth.

Fire intensity: refers to the rate at which a fire produces heat at the flaming front, expressed in terms of temperature or heat yield.

FLPMA: Federal Lands Policy and Management Act of 1976.

Forest Health: the continuation of ecosystem function and resilience to compromising or potentially compromising factors (examples include: climate change, invasive species, fragmentation) (Raffa and others 2009). In this respect, components of a healthy forest ecosystem should include, as outlined in Kolb and others (1995): 1) the physical environment, biotic resources, and trophic networks to support productive forests during at least some seral stages; 2) resistance to dramatic change in populations of important organisms within the ecosystem not accounted for by predicted successional trends; 3) a functional equilibrium between supply and demand of essential resources (water, nutrients, light, growing space) for major portions of the vegetation; and 4) a diversity of seral stages, cover types, and stand structures that provide habitat for many native species and all essential ecosystem process.

Hazard: the probability of an event occurring.

HRV: Historic Range of Variability/Variation. HRV is used synonymously with "natural variability" or "range of natural variation" as defined by Landres and others (1999): "*…the ecological conditions, that are relatively unaffected by people, within a period of time and geographical area appropriate to an expressed goal.*"

INFISH: Inland Native Fish strategy. May refer to the associated NEPA documentation or land use plan amendment.

NEPA: National Environmental Policy Act of 1970.

Percent Canopy Coverage: The percentage of horizontal area covered by a vertical projection downwards of the outermost perimeter of the natural foliage of the trees in a canopy layer. Small openings within the canopy are included.

PFC: Proper Functioning Condition. Used to describe both an assessment process, and the condition of a riparian area. The condition refers to how well the physical process are functioning.

Phenotype – "1. the observed state, description, or degree of expression of a character or trait 2. the product of the interaction of the genes of an organism (genotype) with the environment — *note* when the total character expressions of an individual are considered, the phenotype describes the individual" (SAF online Forest dictionary 2008). The outward appearance of a tree is called its phenotype. The phenotype is any characteristic of the tree that can be measured or observed such as its height or leaf color. The phenotype is influenced by (1) the tree's genetic potential (its genotype); and (2) the environment in which the tree grows as determined by climate, soil, diseases, pests, and competition with other plants (The Free Dictionary By Farlex 2013).

PIBO: PacFish/InFish Biological Opinion.

Risk: the socioeconomic, physical, or biological impact or consequences that would result if an event occurred.

Soil Compaction: Compression of the upper productive soil layer resulting in a higher soil density that reduces infiltration, and restricts plant rooting ability and general vigor.

Soil Displacement: Removal (but not lost to erosion) of the upper productive soil layer. Most often these are soils that were bladed and the upper layer of soil is wind-rowed or sidecast to construct landings, skid trails, firelines.

Soil Erosion: Loss of soil, especially the upper productive soil layer, from the site due to wind, water, or ice.

Spatial heterogeneity: variations in vegetative composition and structure across a landscape. A high degree of variation equals high heterogeneity.

Stand initiation: Following stand-replacing disturbance or regeneration timber harvest, a new single-story layer of trees establishes and develops into a new stand. Trees that thrive in full sunlight are likely to dominate in these conditions.

Stem Exclusion: A structural stage or phase of forest development following the typically rapid establishment of an initial cohort of trees, during which time new establishment is precluded and competition occurs within the existing cohort for light, nutrients, and space. In the context of lynx and snowshoe hare habitat, there are no live limbs accessible.

Stream Reach: A length of stream exhibiting the same general channel geometry, flow, bed and bank attributes, and riparian vegetation type along its length.

Tree Size Class
The diameter range (inches DBH) for the average tree in the canopy layer.

- Seedling/Sapling 5.0 and less
- Pole 5.0-8.9
- Medium 9.0-14.9
- Large 15-20.9
- Very Large 21.0 and over

APPENDIX A. INFISH Compliance

Part 1: USFWS Checklist for Documental the Environmental Baseline of the Project Area and Potential Effects on Bull Trout Pathways and Indicators

Note: ratings are assigned according to the *Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale (*USFWS 1998).

Indicator	**Population and Environmental Baseline**			**Effects of the Action(s)**		
	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk	Restore	Maintain	Degrade
SUBPOPULATION CHARACTERISTICS						
Subpopulation Size • Blackfoot R • Chamberlain Ck • Other streams: N/A		X	X		X	
Growth & Survival		X			X	
Life History Diversity & Isolation		X			X	
Persistence & Genetic Integrity		X			X	
WATER QUALITY						
Temperature • Blackfoot R. • Other streams	X	X			X	
Sediment • Blackfoot R Other streams	X				X	
Chemical Contamination-Nutrients	X				X	
HABITAT ACCESS						
Physical Barriers	X		Wales Ck (non BLM) Frazier Ck (non BLM)		X	
HABITAT ELEMENTS						
Substrate Embeddedness	X				X	
Large Woody Debris	X				X	
Pool Frequency & Quality	X				X	
Large Pools	X				X	
Off-channel Habitat	n/a				X	
Refugia	X				X	
CHANNEL CONDITION & DYNAMICS						
Wetted Width/Max Depth	X				X	
Streambank Condition	X				X	
Floodplain Connectivity	X				X	
FLOW/HYDROLOGY						
Changes in Peak/Base Flow	X				X	
Increase in Drainage Network	X				X	
RHCAs	X				X	
SPECIES AND HABITAT						
Integration of Species & Habitat Condition	X	X (Blackfoot R only)			X	

SUBPOPULATION CHARACTERISTICS
The only bull trout-occupied HUCs in the planning area are Bear Flat/Blackfoot and Chamberlain. Bull trout are blocked from other systems by natural or anthropogenic barriers on non-BLM lands. The proposed project does not include in-water work elements in bull trout occupied habitats that could directly affect the individuals or sub-populations.

WATER QUALITY
As described in detail in the EA, no project elements would contribute sediment to bull trout occupied waters. Likewise, water temperatures throughout the planning area would not be affected because the shade on any of the project streams would not be reduced.

HABITAT ACCESS
The project would not affect bull trout access to any waters in the planning area. No culverts would be installed in bull trout occupied streams.

HABITAT ELEMENTS /CHANNEL CONDITION AND DYNAMICS
Surveys conducted in all project streams except for the Blackfoot River indicate that habitat conditions meet or exceed INFISH requirements. No elements of the proposed work include activities that would affect existing habitat conditions.

FLOW/HYDROLOGY
See hydrology section for detailed analysis. In summary, the proposed treatments are small in scale and intensity and would not measurably affect flow amounts or duration in the affected watersheds.

PART 2: RHCA/RMO Analysis

The BLM is required to assure that activities occurring within RHCAs do not "retard the attainment" of the PIBO/INFISH Riparian Management Objectives (RMOs). The proposed action has seven vegetation treatment units where activities are proposed within RHCAs. In these instances, the proposed treatments would not retard the attainment of the RMOs. A detailed RHCA analysis with rationale follows below.

RHCA Delineation

RHCAs were delineated as directed by PIBO/INFISH. The extent of RHCAs from stream channels was established based on fishbearing status, flow duration, and the height of site-potential trees. See Table B-1.

The actual height of site-potential tree heights (SPTH) for project area RHCAs will be determined on a unit-by-unit basis during final lay-out, but are expected to be 120-150 feet based on measurements made elsewhere during the planning of other BLM projects in the Garnet Mountains in similar vegetative communities. For the purposes of estimating acreages of RHCAs in the planning area, the value of 150 feet was used for SPTH.

Additionally, for the purpose of planning and analysis, the RHCAs were divided into two zones. "Zone 1" refers to the interior portion of the RHCA, equivalent to one site-potential tree height from the stream. "Zone 2" refers to the outer portion of the RHCA, also equivalent to the height of one site potential tree.

Table B-1. RHCAs in the Chamberlain-Wales Planning Area.

RHCA Category	Definition	INFISH Default Width	Examples in the Planning Area
Category 1	Fishbearing streams	Equivalent to height of 2 SPT[1]	Blackfoot R; Chamberlain, Bear, Bear, Pearson, Frazier Creeks; several unnamed tributaries
Category 2	Permanently flowing non-fishbearing streams	Equivalent to height of 1 SPT	Unnamed tributaries throughout planning area
Category 3	Ponds, lakes, reservoirs and wetlands greater than 1 acre	Equivalent to height of 1 SPT	Not present in planning area
Category 4	Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas	one-half SPT, or 50 feet slope distance, whichever is greatest	Unnamed tributaries throughout planning area

[1] SPT=Site-Potential Tree

Condition of RHCAs in the Planning Area

INFISH/PIBO established Riparian Management Objectives (RMOs) that are numerical standards for elements of aquatic habitat that are dependent on conditions in adjacent RHCAs. These standards include values for water temperature (dependent on shade), large woody debris (dependent on supply of large trees), and pool frequency.

RMOs most directly linked to vegetative conditions in RHCAs are stream temperature (dependent on shade), large woody debris (depending on supply of large trees), and pool frequency (also depending on supply of large trees to form woody debris, the primary pool forming element in streams in the Planning Area).

The current condition of the RMOs for large woody debris and pool frequency were measured in all planning area streams were vegetation treatments are proposed except the Blackfoot River, including Chamberlain Creek, Pearson Creek, Bear Creek, and several unnamed tributaries where vegetation management projects are proposed in or adjacent to RHCAs. Additionally, stream temperatures were measured in Chamberlain, Pearson, and Bear Creeks. Stream temperatures were not measured in the Blackfoot River because the magnitude of vegetation projects proposed along the river is so small in scale that no potential effects to stream temperatures could occur. (Note: RMOs for bank stability and lower bank angle were not evaluated as these apply only to non-forested systems.)

Summary of conclusions:

- All stream segments *exceed* RMOs for pool frequency
- All stream segments *exceed* RMOs for large woody debris with the exception of one reach of upper Bear Creek. Large down wood was abundant in the area but natural bank configuration prevented wood from reaching the active channel.
- All stream segments meet RMOs for water temperature. In fact, water temperatures in some areas are *below* the optimum growth temperatures established for westslope cutthroat trout (13.1-13.6ºC) (Bear 2006).

Potential Effects to RHCAs from Proposed Treatments

Note: For the purposes of clarification in this analysis, Category 1 RHCAs are divided into two regions. "Zone 1" refers to the interior portion of the RHCA, equivalent in width to the height of one site-potential tree. "Zone 2" refers to the outer portion of the RHCA, equivalent in width to the height of the second site-potential tree.

In the Proposed Action, a variety of vegetation management actions are proposed for the Chamberlain-Wales planning area, including timber harvest, prescribed fire, planting, cone collection, transportation management, and temporary road construction. There would be no direct or indirect effects the RMOs from activities conducted ***outside*** of the RHCAs. A substantial body of scientific literature supports the capacity of INFISH RHCAs to insure the RMOs are met by preventing sediment introductions, maintaining stream temperature, and preserving future inputs of woody structure from adjacent vegetation (summary of the literature and conclusions is available from the project file).

Under the Proposed Actiontimber harvest and prescribed fire would occur ***within*** the ***outer zone*** of selected RHCAs. See Table B-2.

Effects to RMOs for Large Woody Debris and Pool Frequency

The RMOs for large woody debris (LWD) and pool frequency are considered together because they are closely related. While the frequency and area of pools is dependent on stream gradient, sediment supply, and other factors, in smaller order, forested headwater channels, such as those that are prevalent in the planning area, large wood in the stream channel increases pool frequency (Montgomery and Buffington 1993). The Chamberlain-Wales Watershed Analysis documented large woody debris as the predominate pool-forming element in planning area streams, and the recruitment of large wood into planning area streams is the most important process that creates and maintains the complex habitats required by fishes.

Table B-2. Treatments within RHCAs and Proposed RHCA Adjustments
SPTH=Site-potential Tree Height (estimated at 150 for this analysis); OS=RHCA on only one side of stream; BS=RHCA on both sides of stream; WIDTH: distance from high water mark to edge of RHCA.

Treatment Unit	RHCA Affected	RHCA Category	Length of stream in unit	Existing RHCA		Proposed RHCA	
				Width	Acres	Width	Acres
HF9	Chamberlain Ck	1	709' OS	300'	4.88	150	2.44
HF5	Chamberlain Ck	1	92' OS	300'	0.63	150	0.315
F7	Chamberlain Trib	2	1700' OS	150'	5.85	75	2.925
HF 3	Bear Ck	1	538' OS	300'	6.17	150	3.085
HF 4	Bear Ck	1	577' OS	300'	3.70	150	1.85
F12	Blackfoot R Bear Ck	1 1	BS OS	300' 300'	27.00 67.00	150 150	13.50 33.5
F9	Frazier Trib.	1	557' OS	300'	3.84	150	1.92

The treatments proposed within the RHCA boundary as described in Table B-2 would have no effect on current or future supplies of large trees and thus would not affect the RMO for LWD or pool frequency. The majority of large wood entering streams and aquatic habitats originates from within Zone 1, a distance equal to one site-potential or effective tree height from the subject area (Robison and Beschta 1990, Naiman *et al.* 2002). The proposed treatments would occur within Zone 2, leaving existing and future supplies in Zone 1 untouched.

In Treatment Unit F7, prescribed fire would be conducted within Zone 1 of the RHCA adjacent to an unnamed, non-fishbearing tributary to Chamberlain Creek. The low-to-moderate fire intensity/severity mosaic burn planned for the unit in conjunction with the requirement to avoid fire ignition within the RHCA would result in little to no large tree mortality and likely have no measureable effect on LWD or pool frequency within this channel.

Water Temperature

Riparian vegetation plays a crucial role in mediating temperatures in aquatic habitat (Beschta *et al.* 1987; Burton 2005). Numerous studies have demonstrated that reductions in streamside vegetation can cause elevated stream temperatures during periods of low summer flows due to increases in the amount of solar radiation striking the water surface (Beschta 1997). Thus, management activities in RHCAs that remove vegetation have the potential to affect the RMO for water temperature by reducing shade.

The vegetation management projects proposed for RHCAs would not affect stream temperatures. All treatments except for Unit F7 would occur in Zone 2, leaving existing vegetation in Zone 1 intact. Site potential tree heights for the RHCA treatment units will be measured during final unit lay-out, but SPTHs of 120-150 feet are expected for the treatment areas based on measurements of SPTH elsewhere in the Garnet Mountains from similar vegetative communities. Buffer strips ranging in width from 80 to150 feet in width have generally been found to provide sufficient shade to prevent changes in stream temperatures (Beschta et al. 1987, Belt et al. 1992, Quigley et al. 1997).

Prescribed fire has been proposed for Zone 1 of the RHCA adjacent to the Chamberlain Creek tributary in Unit F7. As documented previously, the project design features will likely prevent mortality of overstory large trees near the channel, effectively protecting overstory shading. Surveys of RHCA vegetation were conducted during preparation of the Chamberlain-Wales watershed analysis and in preparation for this Environmental Assessment (report available in Project File). During these surveys it was noted that the primary component of vegetative stream cover in the planning area is not overstory trees but dense communities of forbs and shrubs. The Chamberlain Creek tributary in Unit F7 where low-intensity prescribed fire is proposed for within Zone 1 of the RHCA is densely shaded by a thick streamside shrub component, dominated by currant (*Ribes* spp), mallow ninebark (*Physocarpus malvaceus),*and alder *(Alnus incana*), along with a dense covering of sub-alpine and Douglas fir. The prescribed fire planned for Unit F7 would not reach this vegetation and would therefore not affect stream shading or water temperature.

APPENDIX B: WSA Guidance for Prescribed Fire

Policy and Rationale

As stated in the BLM Manual 6330 – Management of BLM Wilderness Study Areas:

> *FLPMA mandates the BLM to "not impair the suitability" of areas that have been identified as "having wilderness characteristics." And the BLM's policy will protect the wilderness characteristics of all WSAs in the same or better condition than they were on October 21, 1976 until Congress determines whether or not they should be designated as wilderness.*

There are several exceptions to non-impairment, several of which are pertinent to prescribed burning in the Wales Creek WSA. Those exceptions are:

> *1.6.C.2.*
>
> *a. Emergencies. In emergencies, any action necessary to prevent loss of life or property may be taken, even if the action will impair wilderness suitability. Emergencies include fire. To the extent possible, emergency actions will be conducted in the matter that least impairs wilderness suitability while resolving the emergency, and the resulting impacts will be restored as asoon as possible after the situation has been solved.*
>
> *f. Protect or enhance wilderness characteristics or values. As described in section 1.6.A.2 of BLM Manual 6330, Section 2(c) of the Wilderness Act of 1964 outlines the characteristics required of every wilderness. Actions that clearly benefit a WSA by protecting or enhancing these characteristics are allowable even if they are impairing, though they must still be carried out in the manner that is least disturbing to the site.*

The BLM Manual 6330 includes a policy specifically for Fire, including Prescribed Fire (1.6.D.2.c). The goal of prescribed fire is to make conditions possible for natural fire to return to the WSA. In some instances, the goal may be to mimic a natural fire regime where reliance on wildfire in not feasible and can be done given the following:

> *Use of prescribed fires in WSAs is limited to instances where this use meets the non-impairment standard and one of the exceptions, such as to clearly protect and enhance the lands's wilderness characteristics. The BLM may utilize prescribed fire in WSAs where the natural role of fire cannot be returned solely by reliance on wildfire or where relying on wildfires might create unacceptable risks to life, property, or natural resources outside the WSA.*

The BLM Manual 6330 also includes a policy for Vegetation (1.6.D.8):

> *In general, whenever possible, natural processes will be relied on to maintain native vegetation and to influence natural fluctuations in populations. …. Manipulation of vegetation through management ignited fire… is allowed only where it meets the non-impairment standard or one of the exceptions. Exceptions that may pertain to vegetative treatment include emergencies, the protection or enhancement of wilderness characteristics… and actions taken to recover a federally listed threatened, endangered, or candidate species.*

The Vegetation policy includes Restoration:

1.6.D.8.iii.A. General

III. Broad-scale landscape function. The vegetation of some of the landscapes in which WSAs are located has undergone intentional and unintentional human caused transformation during the modern industrialized era. In some cases, these activities have resulted in a departure from the natural composition, structure, and density of native species, with impacts to habitat quality, soil stability and watershed function.

1.6.D.8.iii.B.

Where it meets the non-impairment standard or one of the exceptions, management action may be taken to restore vegetation to characteristic conditions of the ecological zone in which the area is situated where:

I. Natural successional processes have been disrupted by past human activity, to the extent that intervention is necessary in order to return the ecosystem to a condition where natural process can function;

III. It is necessary to maintain fire-dependent ecosystems when adjacent land uses do not allow for natural fire occurrence.

The fire management direction for the Wales Creek WSA is to suppress all wildfires. This direction is set forth due to the likelihood of fires escaping the WSA. The opportunity to use natural fire ignitions to play its inherent role in the ecosystem is not possible due to the potential loss of life, property and natural resources outside the boundaries of the WSA. In addition, past fire suppression has led to fuel buildup that would create unnaturally severe fires (see the Chamberlain Watershed Assessment). The Proposed Action in the Environmental Assessment for the Chamberlain Creek Watershed Assessment includes Prescribed Burning in the Wales Creek WSA. The proposed project looks to reduce the risks and consequences of wildfire within the WSA and with wildfire escaping the WSA as well as enhancing the wilderness characteristics of the WSA.

Fire suppression has altered the natural successional processes of the Wales Creek WSA thus affecting the wilderness characteristics of the WSA. Because of its size, ruggedness, diversity and opportunities for quality hunting, the Wales Creek WSA provides outstanding opportunities for primitive and unconfined recreation. The proposed project will produce a mosaic of unburned, mixed severity burns, and stand replacement burns producing a diverse habitat for big game species by providing cover and forage, overall enhancing the naturalness of the WSA and quality hunting opportunities.

Design Features of Implementing the Wales Creek WSA Prescribed Burns

Based on the above, tactics used to implement the proposed action should be the minimum amount needed in order to achieve the desired results. Handlines should not be built unless for some unforeseen reason the fire escapes. If the prescribed fire escapes, MIST should be used. Chain saw use should also follow MIST.

APPENDIX C: Reference Treatment Photos

Photo 1: Fuel loading in a lodgepole pine stand in Wales Creek WSA. The proposed action would use prescribed burning to reduce fuel loading and reduce the risk of large-scale high-severity wildfire.

Photo 2: Mountain pine beetle mortality in lodgepole pine stands in the Wales Creek WSA. The proposed action would use prescribed burning to reduce fuel loading and reduce the risk of large-scale high-severity wildfire in these stands where beetle-killed lodgepole pine is contributing to fuel loading.

Photo 3: Overview of an area proposed for lodgepole pine harvest (Units HF6 and F13) with high mountain pine beetle mortality. The proposed action would use a combination of timber harvest and prescribed burning to reduce fuel loading and continuity.

Photo 4: Foreground slope proposed for planting (Unit P1). The proposed action would include the planting of ponderosa pine to reforest sites burned in the 1991 Game Range Fire.

Photo 5: Proposed planting to improve stocking. The proposed action would include planting to improve resiliency and conifer diversity in mixed-conifer stands.

Photo 6: Stagnant lodgepole pine stand (F9 and HF12) with very little understory vegetation. The proposed action would open patches in these stands to create understory shrub, graminoid, and forb cover and diversity to enhance wildlife habitat.

Photo 7: Typical low-elevation ponderosa pine stand proposed for thinning for the purpose of restoring and maintaining ponderosa pine stands.

Photo 8: Typical mid-elevation mixed-conifer stand proposed for thinning (T14, T15, T16). The proposed action would open up these stands through thinning to reduce tree competition.

Photo 9: Typical non-regenerating western larch stand. The proposed action for HF1 through HF4 would implement uneven-age group selection harvest followed by prescribed fire to promote western larch regeneration and multi-storied forest structure in the western larch/mixed-conifer stands.

Appendix D: Chamberlain-Wales Environmental Assessment Public Comment Table.

The Chamberlain-Wales EA was released for a 30-day public comment period on November 20, 2013. Public comments were received from six different entities. The BLM addressed substantive comments as per the guidance in the BLM NEPA Handbook H-1790-1 (pages 65-68). Only substantive comments were addressed. Substantive comments are those which:

- question, with reasonable basis, the accuracy of information in the EIS or EA;
- question, with reasonable basis, the adequacy of, methodology for, or assumptions used for the environmental analysis;
- present new information relevant to the analysis;
- present reasonable alternatives other than those analyzed in the EIS or EA;
- cause changes or revisions in one or more of the alternatives.

Non-substantive comments are:

- comments in favor of or against the proposed action or alternatives without reasoning that meet the criteria listed above (such as "we disagree with Alternative Two and believe the BLM should select Alternative Three");
- comments that only agree or disagree with BLM policy or resource decisions without justification or supporting data that meet the criteria listed (such as "more grazing should be permitted");
- comments that don't pertain to the project area or the project (such as "the government should eliminate all dams" when the project is about a grazing permit);
- comments the take the form of vague, open-ended questions.

During review of public comment letters, the BLM found many non-substantive comments that were simply commenters' unsupported opinions. The BLM did not respond to these comments.
In some cases, similar comments were either lumped or combined into one comment for the sake of increasing efficiency in responding to comments.
Written comment letters specifically on the EA were received from the following entities: Alliance for the Wild Rockies/Native Ecosystem Council (AWR/NEC), Rocky Mountain Elk Foundation (RMEF), and Sun Mountain Lumber.

No.	Commenter	Comments	BLM Response
1	AWR/NEC	We note that a sow grizzly bear with 3 cubs was shot northeast of Ovando on November 3. Where is that location in respect to the Chamberlain-Wales Creek Project area (hereafter "Project Area")? What were the circumstances of this mortality, and how does this relate to management within the Project Area?	While this comment is not directly pertinent/substantive to the Chamberlain project, the bear was killed approximately 8-9 miles (straight line distance) northeast of the nearest BLM lands in the Chamberlain watershed.
2	AWR/NEC	The EA notes frequently that prescribed burning, including the creation of 20-50% bare soil, or more, will benefit blue huckleberry, an important bear food. Please cite the science that supports this claim.	The proposed action (page 18) describes an objective of achieving 20-50% mineral soil to promote lodgepole pine regeneration. In three other locations (pages 20, twice on page 23) objectives of achieving at least 50% bare mineral soil are described associated with prescribed burning to create appropriate seedbeds to regenerate western larch. None of these objectives are tied to huckleberry. The EA describes beneficial effects of fire (based on cited scientific literature) on huckleberry in several locations (pages 80, 85, 86, 97, and 108) once and discuss up to 50% mineral soil in two other portions of the proposed action. In all three cases, the mineral soil percentages are related to seedbed creation for regeneration of lodgepole pine and western larch, respectively. Citations which mention the benefit to blue huckleberry from fire are: USDA Forest Service. 2013. FEIS: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available online: [http://www.fs.fed.us/database/feis] Davis, K.M.; B. D. Clayton and W. C. Fisher. 1980. Fire Ecology of Lolo National Forest Habitat Types. USDA, FS, Intermountain Forest and Range Experiment Station, Gen. Tech. Rep. INT-GTR-79, Ogden, UT. Fischer, W. C. and A.F. Bradley. 1987. Fire Ecology of Western Montana Forest

No.	Commenter	Comments	BLM Response
			Habitat Types. USDA, FS, Intermountain Research Station, Gen. Tech. Rep. INT-GTR-223, Ogden, UT. 95 pp. Miller, M. 1977. Response of blue huckleberry to prescribed fires in a western Montana larch-fir forest. Res. Pap. RP-INT-188. Ogden, UT: USDA Forest Service. Intermountain Forest and Range Experiment Station.
3	AWR/NEC	The EA also notes that tree mortality from the pine beetle will increase huckleberry. Please compare this effect with the effects anticipated with logging and/or burning, including the fact that huckleberries in unlogged forests with pine beetles will still provide hiding cover to grizzly bears, including sows with cubs.	The EA (on page 18) describes one of the objectives of the timber harvest with prescribed fire treatments as being to "Promote and maintain blue huckleberry, where applicable, through low intensity, low severity ground fire and increase available sunlight to huckleberry patches (USDA Forest Service 2013; Fischer and Bradley, 1987)." Anticipated beneficial effects of the BLM's proposed timber harvest and prescribed burning treatments prescribed burning on huckleberry, based on cited scientific literature, are discussed in the EA on pages 80, 85, 86, 97, and 108. Effects of beetle-killed lodgepole pine mortality on huckleberry are discussed on page 138. Both natural overstory lodgepole pine mortality and timber harvest/prescribed burning treatments are expected to be beneficial to huckleberry. The BLM designed proposed treatment units to provide adequate hiding cover for grizzly bears adjacent to proposed treatment areas. In addition, to maintain hiding cover for grizzly bears and other wildlife, no precommercial thinning units are proposed adjacent to or near any timber harvest units.

No.	Commenter	Comments	BLM Response
4	AWR/NEC	The EA claims that there will be "multiple treatment blocks" in the project area to reduce disturbances to grizzly bears. Why aren't these discrete treatment blocks identified in the EA, including by a map, as well as project activities. This mitigation measure has to be fully disclosed/defined to the public.	The treatment blocks have been added to Fig 2-1 "Forest Vegetation Treatment Map'. Activities within each block are evident on Fig. 2-1. Impacts to wildlife are discussed in Sec. 4.4.2 and Table 4-19.
5	AWR/NEC	Please define exactly if there will be any "overlap" of project activities in discrete treatment blocks during the 10 years it will take to complete these projects.	Treatment blocks are designed to minimize disturbance-related effects to grizzly bear, elk, and other wildlife species. They are first described/discussed on page 30 of the EA in the description of the proposed action. The blocks have been mapped on Figure 2-1, and verbiage on page 30 has been clarified to indicate: "Project implementation would be completed in one block before being initiated in the next block." Treatment blocks are further discussed later in the EA. Section 4.3.2 (p.102) states that "Each block would be treated one at a time providing untreated blocks with high levels of habitat security" and more discussion is provided in Section 4.4.2.
6	AWR/NEC	The EA notes that open road densities in treatment areas will be up to 4 miles per section, which will be an adverse impact on grizzly bears. This conflicts with the EA conclusion that there will be no adverse impacts on grizzly bears, a NEPA violation (providing misleading conclusions to the public). The open road density during the period when each of the discrete	This issue is addressed in Sections 4.3.2 (p. 96-97), 4.4.2 (p.128-131) of the EA. Additional text and tables that were included in the Biological Assessment prepared by the BLM for ESA section 7 consultation with U.S. Fish and Wildlife Service on project effects to grizzly bears have been added to these sections to clarify this discussion. In their letter dated December 20, 2013, the U.S. Fish and Wildlife Service concurred with the BLM effects determination for this project on grizzly bears of "may affect, not likely to adversely affect".

No.	Commenter	Comments	BLM Response
		treatment blocks needs to be identified, so that grizzly bear impacts over the 10 years of project implementation can be understood by the public.	
8	AWR/NEC	There is no information about the incidental take statement and terms and conditions of the biological opinion by the USFWS in 2012. Please provide this information to the public to demonstrate the Endangered Species Act is being followed.	This issue is discussed in Section 1.6 (page 9) and in Section 3.3.2 (page 42-43). Additional discussion on the terms and conditions of the programmatic Biological Opinion for grizzly bears has been added to Section 3.3.2. The Chamberlain project meets the terms and conditions of the incidental take statement in the programmatic BO (USDI-Fish and Wildlife Service 2012).
9	AWR/NEC	If the above conditions/requirements are not being followed, this ESA violation requires completion of an environmental impact statement.	This project is consistent Endangered Species Act. Informal consultation was completed for grizzly bear, Canada lynx, and Canada lynx critical habitat. Concurrence from the U.S. Fish and Wildlife Service was received in the form of a memorandum dated December 20, 2013 (USDI-FWS 2013a).
10	AWR/NEC	Please map and define the acreage and amount of core habitat in the analysis area currently, during, and after treatments.	Grizzly bear core habitat as per the draft Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Conservation Strategy has not been officially identified for the Chamberlain-Wales project area. The BLM notes that the NCDE strategy is draft and will be followed upon its finalization. This issue has been clarified in Section 4.3.2 (page 96) of the EA by describing the draft definition of core area, and that the Wales Creek WSA has been identified as a potential core habitat area. Potential core habitat would not change currently, during, or after treatments associated with this project.

No.	Commenter	Comments	BLM Response
11	AWR/NEC	The discussion on open roads, including all motorized use during project activities, as well as total road densities, was not clear. What are the objectives/requirements for these factors, as well as core habitat, and are they being met now, as well as during project activities? Are you counting active motorized roads as "open" or "closed" roads for grizzly bears, if the public is being excluded?	The issue of open roads is discussed in sections 2.3, 3.3.2, 4.2.2, 4.3.2, and 4.4.2. For the sake of this project, although most roads are behind locked gates and are closed to motorized use by the public, "open" roads are considered to be those used by the BLM during project implementation (whether open to the public or not) as well as the few roads open to motorized public use. Clarification of proposed action effects related to open road densities has been added to sections 4.3.2 (pages 104-107) and 4.4.2 (pages 129-131).
12	AWR/NEC	How are unauthorized roads considered in the roads analysis for grizzly bears?	The majority of the project area is and has been gated off from motorized public use for many years. This gating has been effective in that there are no unauthorized roads in the gated portion of the project area. BLM personnel do visit the areas outside the gated portion several times per year. The BLM became aware in recent years of one unauthorized route (less than 0.25 mile long) and blocked it off physically, eliminating motorized use.
14	AWR/NEC	If many of the roads to be used for project activities are blown in with trees, or grown in with vegetation, they constitute an "obliterated road." Their improvement for project activities will constitute an increase in both open and total roads. This needs to be clearly identified and evaluated in the EA.	Most of the roads used for the proposal are currently clear of trees and are accessible for administrative motorized use, but are closed to public motorized use. These roads are not obliterated and are drivable once cleared of blown down trees. As needed for administrative use, roads are cleared of blowdown. Clarification has been added to section 2.3 (page 29) on numbers of miles of Class 1, 2, and 3 roads, and section 4.3.2 (pages 96 - 97) on effects of road management through the life of the project.

No.	Commenter	Comments	BLM Response
15-18	AWR/NEC	The disturbance activities in the Wilderness Study Area (WSA) would clearly represent an adverse impact to grizzly bears, in direct contradiction to claims of "no adverse impacts" noted in the EA. The EA violates the NEPA and the ESA because the agency makes false claims that the projects will not adversely impact the threatened grizzly bear. Formal consultation and a biological opinion is required for these projects because the grizzly bear will be adversely affected. The agency is violating the ESA and NFMA by failing to promote the conservation of the grizzly bear in the Garnet Mountains.	The BLM initiated informal consultation with the U.S. Fish and Wildlife Service (USFWS) on effects of this project to grizzly bear. The USFWS concurred with the BLM's determination of "may effect, not likely to adversely affect" grizzly bear in a memorandum to the BLM dated December 20, 2013 (USDI-FWS 2013a). The BLM has complied with the Endangered Species Act for this project. The NFMA (presumably National Forest Management Act) does not apply to the BLM.
		Lynx	
19	AWR/NEC	The EA does not provide any information as to what the existing programmatic biological opinion is for lynx in the project area, including the incidental take statement,	Section 1.6 of the EA has been clarified to specify that the BLM consulted on its Garnet RMP amendment to adopt the Lynx Conservation Assessment and Strategy back in 2004. The U.S. Fish and Wildlife Service concurred with the BLM's effects determination of "may affect, not likely to adversely affect" Canada lynx in a concurrence letter dated October 18, 2004 (USDI-FWS 2004). There are no terms and conditions associated with this RMP level informal consultation.

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		and terms and conditions required for project implementation. It is not clear the agency is complying with the ESA as a result.	This project has been consulted upon with the U.S. Fish and Wildlife Service for Canada lynx and Canada lynx critical habitat. During the consultation process, BLM staff did a field review of the project with the consulting USFWS biologist on July 31, 2013 to discuss project design and effects to federally listed species including grizzly bear and Canada lynx. The BLM later submitted a Biological Assessment on this project to USFWS. The USFWS concurred with the BLM's effects determinations of "may affect, not likely to adversely affect" Canada lynx and Canada lynx critical habitat in their letter to the BLM dated December 20, 2013 (USDI-FWS 2013a). There are no terms and conditions associated with this informal consultation. The BLM is complying with the Endangered Species Act with this project.
20	AWR/NEC	The projects cannot go forward until the agency receives a programmatic biological opinion for BLM lands on lynx critical habitat, to avoid a violation of the ESA. The LCAS does not address management of critical habitat. What current agency programmatic direction, that has been through formal consultation, directs management of lynx critical habitat, and is being applied to this project?	The BLM has no obligation to consult programmatically on lynx critical habitat. As per BLM Manual 6840 Special Status Species at section .06 Policy, .1F7: "There is no duty to reinitiate consultation unless there is an ongoing agency action. In the context of a land use plan, the agency action of approving a plan is complete upon approval and a plan is therefore not an ongoing action over the life of the plan. For this reason, reinitiation of consultation is not required if, for example, a new species is listed or critical habitat is designated after a plan is approved". Section 1.6 of the EA has been clarified to specify that the BLM consulted on its Garnet RMP amendment to adopt the Lynx Conservation Assessment and Strategy (LCAS) back in 2004. The U.S. Fish and Wildlife Service concurred with the BLM's effects determination of "may affect, not likely to adversely affect" Canada lynx in a concurrence letter dated October 18, 2004 (USDI-FWS 2004). There are no terms and conditions associated with this RMP level informal consultation. The BLM legally manages the Missoula Field Office as per the LCAS. This project has been consulted upon with the U.S. Fish and Wildlife Service for Canada lynx and Canada lynx critical habitat. During the consultation process, BLM

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			staff did a field review of the project with the consulting USFWS biologist on July 31, 2013 to discuss project effects to federally listed species including grizzly bear and Canada lynx. The BLM later submitted a Biological Assessment on this project to USFWS. The USFWS concurred with the BLM's effects determinations of "may affect, not likely to adversely affect" Canada lynx and Canada lynx critical habitat in their letter to the BLM dated December 20, 2013 (USDI-FWS 2013a). The BLM is complying with the Endangered Species Act with this project.
21	AWR/NEC	The agency is misrepresenting project impacts on the lynx, by claiming there will be no adverse impacts, which is a violation of the NEPA and the ESA. The agency is violating the ESA by significantly adversely modifying critical lynx habitat. An EIS is required when the ESA is violated.	Effects of the proposed action on Canada lynx and its critical habitat are described in sections 4.3.2 (pages 98-100) and 4.4.2 (pages 131-134) of the EA. This project has been consulted upon with the U.S. Fish and Wildlife Service (USFWS) for Canada lynx and Canada lynx critical habitat. During the consultation process, BLM staff did a field review of the project with the consulting USFWS biologist on July 31, 2013 to discuss project effects to federally listed species including grizzly bear and Canada lynx. The BLM later submitted a Biological Assessment on this project to USFWS. The USFWS concurred with the BLM's effects determinations of "may affect, not likely to adversely affect" Canada lynx and Canada lynx critical habitat in their memorandum to the BLM dated December 20, 2013 (USDI-FWS 2013a). The BLM is complying with the Endangered Species Act with this project.
22	AWR/NEC	The agency is violating the ESA and the NFMA by failing to promote the conservation of the lynx, including viability in the Garnet Mountains.	As previously indicated, the BLM has complied with ESA for this project. NFMA (presumably National Forest Management Act) and associated viability requirements do not apply to the BLM.

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25	AWR/NEC	It appears that the Lynx Conservation Assessment and Strategy by Ruediger and others (2000) is the management direction for the Project Area. This direction does not contain the current best science, and will be ineffective to conserve the lynx. NEPA conclusions based on this document are invalid.	The proposed action was designed using updated concepts contained in the draft 3rd edition of the Canada Lynx Conservation Assessment and Strategy (LCAS). In fact, the BLM wildlife biologist working on this project is a member of the Interagency Lynx Biology Team updating and drafting the 3rd edition of the LCAS. The 3rd edition was not cited in the public review version of this EA because it is still in "draft" form and has not been officially finalized. However, the EA has been updated to incorporate and reference the 3rd edition of the Canada Lynx Conservation Assessment and Strategy in sections 1.3, 2.3, 3.3.4, 4.3.2; 4.4.2. The commenter's opinion of the effectiveness of the LCAS for lynx conservation is beyond the scope of this project.
26	AWR/NEC	The key factor in lynx viability is winter habitat provided by multi-storied older forest stands. This habitat feature is not measured in the project landscape, including past losses, existing conditions, and impacts of the proposed projects. The EA misrepresents key winter lynx habitat, which is both an ESA and NEPA violation.	Key factors for lynx viability during winter includes multistory and stand initiation habitat. Multistory and stand initiation habitat is not proposed for treatments. Multistory and stand initiation habitat is described and quantified in the effects analyses for direct, indirect, and cumulative effects. This is discussed in the EA on page 131-134.
28	AWR/NEC	The cumulative impact of logging stem exclusion forests on lynx was never measured for the project, either due to past, ongoing or planned	Cumulative impacts of past, present, and reasonably foreseeable future vegetation management (including timber harvest) under the proposed action are addressed in Section 4.4.1 (Table 4-8 and pages 121-127) and Section 4.4.2 for Canada lynx (pages 131-134). This discussion includes disclosure that with consideration of past, present,

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		logging.	and reasonably foreseeable future timber harvest, the lynx LCAS standards would be met for all three Lynx Analysis Units in the cumulative impacts analysis area, thus making the project consistent with the Garnet RMP and the Endangered Species Act.
29	AWR/NEC	The proposed actions include measures to directly remove lynx habitat by removing climax species, as well as discouraging climax species as alpine fir and spruce, both species critical for lynx winter habitat. This objective is a clear adverse impact on lynx, and is a violation of the ESA in regards to both lynx habitat and critical lynx habitat.	The suite of activities proposed would have a range of effects on lynx habitat. Some treatments may have adverse effects to subalpine fir and Engelmann spruce. Many treatments are intended to benefit these species and lynx habitat in the long-term. For example Section 2.3 (page 25) includes tree planting of Engelmann spruce on 579 acres to promote this species to benefit lynx and snowshoe hare habitat in the long-term. Spruce would also be included as one of several species planted (where appropriate) on an additional 669 acres of proposed tree planting (Section 2.3, page 25). One of the objectives of precommercial thinning treatments on 632 acres (units T1-T8 and T12-T16) would be to "Create stand structure by reserving any subalpine fir and Engelmann spruce if present;" (Section 2.3, page 22). These treatments would eliminate seral species and select for climax species. Effects of the proposed action on vegetation communities are described by treatment type in Section 4.3.1. Effects of the proposed action on Canada lynx and their habitat are described in Section 4.3.2, with cumulative effects described in Section 4.4.2. These effects underwent section 7 ESA consultation with U.S. Fish and Wildlife Service (USFWS). The USFWS concurred with BLM's effects determinations of "may affect, not likely to adversely affect" Canada lynx and their critical habitat. The proposed action is consistent with the Endangered Species Act.
30	AWR/NEC	The EA at 73-76 claims that if shade-tolerant species (as alpine fir and spruce) become dominant, habitat diversity will decrease. Why is it that increases in lynx winter habitat will decrease habitat diversity? How	The EA discusses effects of the No Action alternative on vegetation diversity in Section 4.2.1 (page 68), and effects of the Proposed Action throughout Section 4.3.1. These locations in the EA have been edited to more specifically clarify what types of diversity, whether understory species diversity or vegetative structural and species diversity.

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		are you measuring habitat diversity? What are your criteria? It is not clear how the agency is defining habitat diversity. Please define the objectives for diversity and why these are important for various wildlife species.	
31	AWR/NEC	The EA at 100 used the entire acreage of lynx critical habitat in Unit 3 as a measure of project impacts, which come to 0.011%. How is this valid, when the LCAS directs that lynx habitat be managed at the LAU level? Use of such large amounts of lynx habitat as a measure of impact washes out any project impacts; there could never be any significant impact, so this analysis method is invalid.	Sections 4.3.2 (pages 98-100) and 4.4.2 (pages 131-134) of the EA discuss effects (including cumulative effects) of the proposed action to lynx habitat in multiple contexts and scales including at the individual LAU scale, as well as at the scale of lynx Critical Habitat Unit 3 in which all LAUs in the project are located. Since all LAUs in the project are located within Critical Habitat Unit 3, this scale is appropriate.
32	AWR/NEC	Are there any proposed units that have documented locations of lynx? This information needs to be provided, as well as mapped.	Radio tracking and/or GPS tracking data of Canada lynx from approximately 2001-2010 documented lynx presence in the project area, in some cases utilizing habitats within some of the treatment areas in the proposed action. These data have been used to assist in the design and planning of this project. This project has been consulted upon with the U.S. Fish and Wildlife Service (USFWS) for Canada lynx and Canada lynx critical habitat. During the consultation process, BLM staff did a field review of the project with the consulting USFWS biologist as well as John Squires (the researcher who provided lynx VHF and GPS tracking data) on July 31, 2013, to discuss project effects to federally listed species including grizzly

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			bear and Canada lynx. The field trip included discussion of the tracking data. The BLM later submitted a Biological Assessment on this project to USFWS. The USFWS concurred with the BLM's effects determinations of "may affect, not likely to adversely affect" Canada lynx and Canada lynx critical habitat in their memorandum to the BLM dated December 20, 2013 (USDI-FWS 2013a). Thus, the BLM is complying with the Endangered Species Act with this project. Even after complying with the ESA and successfully completing section 7 ESA consultation, the BLM further considered the data referenced above. As a result, two initially proposed prescribed burning units totaling 761 acres have been eliminated from the proposed action in response to this comment. Because the Canada lynx is a federally "threatened" species, site-specific information on their known habitat use is sensitive information and the BLM is hesitant to provide maps of Canada lynx locations in a public document like this EA for fear of potentially putting individual animals at risk of being trapped, harassed, or otherwise harmed. The BLM did provide the subject lynx data to the commenter as part of its response to a FOIA request from the commenter.
33-34	AWR/NEC	The EA concludes there will be no adverse impacts to lynx because the LCAS recommendation of no more than 30% unsuitable habitat within LAUs will be met. This LCAS recommendation allows unlimited, progressive removal of all lynx winter habitat within a landscape over time, and cannot provide a valid measure of project impacts on lynx. The EA notes that 4475 acres of lynx	Since amending the Garnet RMP with the Lynx Conservation Assessment and Strategy and consulting on this amendment with the U.S. Fish and Wildlife Service in 2004, the LCAS has been the legal management direction for the Missoula Field Office for Canada lynx. During the planning of the Chamberlain-Wales project, the BLM used the draft third edition of the LCAS for guidance. The BLM wildlife biologist for this project is a member of the interagency team that has drafted the third edition of the LCAS. Therefore, the BLM has used the most current direction and scientific thinking with regard to Canada lynx in designing this project. Discussion of direct and indirect effects of the proposed action on Canada lynx is located on pages 98-100 of the EA, including discussion that proposed treatments would have variable effects and would be consistent with the LCAS.

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		habitat will be affected by the Project (EA 101). The only basis for claiming this will not be adverse impact for lynx is the LCAS. The agency has to provide independent information, outside agency documents, to assess these impacts. Please provide what current science substantiates the LCAS direction, especially as the LCAS is over 13 years outdated.	The portion of this comment pertaining to the commenter's opinion about the LCAS is beyond the scope of the current BLM project**.**
36	AWR/NEC	Please define the cumulative effects of past management activities within each LAU in regards to older, multi-storied forest habitat. Also, please clarify in the EA as to whether multi-storied forest habitat summarized at 130 is older forest habitat and what activities have already occurred within any of these older stands that would compromise lynx winter habitat.	Cumulative effects of past, present, and reasonably foreseeable future actions in each Lynx Analysis Unit are described in Section 4.4.2 (pages 131-134). Further clarification on how much multistory habitat is present in the LAUs, as well as the fact that it has not been subjected to previous vegetation management, has been added to Section 4.4.2 on page 132.
37	AWR/NEC	Please provide a map of lynx winter habitat in association with past harvest units and proposed harvest units on all lands in the LAUs.	There is no requirement for the BLM to provide such a map. The BLM does not believe that such mapping would help inform/clarify the decision at hand. Additional clarification regarding cumulative impacts of past timber harvest as related to Canada lynx and LAUs has been added to page 132 of the EA.
39	AWR/NEC	Please define how it has been determined that no snowshoe hares are present in "matrix" habitat, significant acreages that are to be	The Federal Register Notice on revised designation of critical habitat for lynx (USDI-FWS 2009) and the LCAS 3rd edition (Interagency Lynx Biology Team 2013) define matrix habitat as hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares that occurs between patches of boreal forest. The BLM

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		precommercially thinned in this project.	interdisciplinary team for this project field-verified areas identified as matrix habitat for the Chamberlain-Wales project. Proposed precommercial thinning units T14, T15, and T16 (86 acres) are dry Douglas-fir matrix habitat (Section 2.3, page 22). Matrix habitat and project-related effects are described in Section 3.3.2 (page 44), Section 4.3.2 (pages 98-100), and Section 4.4.2 (page 132).
40	AWR/NEC	Where are the previously-logged areas that do provide snowshoe winter habitat, areas that will not be precommercially thinned? How many acres of this habitat exist in the project area?	Previously logged areas are located throughout the three LAUs, provide winter connectivity to other lynx habitat, and are not proposed for treatments. Stand initiation habitat providing lynx winter habitat is located in all LAUs: Chamberlain 4,886 acres (21% of lynx habitat), McElwain 3,500 acres (7% of lynx habitat), and Elk Creek 3,908 acres (20% of lynx habitat). This is discussed in the EA on page 44.
41	AWR/NEC	Please provide more information on the research project that is measuring precommercial thinning activities on hares, or T9-11.	The snowshoe hare research proposal was provided to commenter through their December 11, 2013, FOIA request.
42	AWR/NEC	How do the units to be precommercially thinned, or T9-11, differ from the other precommercial thinning units (801 acres total)?	Precommercial thinning units T9-11 for snowshoe hare research are proposed to be variable density thinning on a total of 37 acres, leaving 2/3 of each unit unthinned. A total of 669 acres of precommercial and variable density thinning are proposed with this project, and are described in Section 2.3 (pages 21) and summarized in Table 2-1 in the EA.
43	AWR/NEC	There is no analysis of fragmentation impacts of openings on lynx. How will the treatment units affect the ability of lynx to use this landscape in the winter, when they avoid crossing openings?	Section 4.3.2 includes discussion of fragmentation and how the project has been designed with this concept in mind. Additional clarification on this topic has been added to page 99 of the EA. The proposed action implements conservation measures to minimize habitat fragmentation outlined in the LCAS 3rd edition, such as: emphasizing land uses promoting or retaining conservation of contiguous blocks of lynx habitat; maintaining a

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		How have the large clearcut areas acquired from Plum Creek affected habitat fragmentation, including for lynx in the winter?	mosaic of vegetation and features such as riparian areas, forest stringers, unburned inclusions and forested ridges to provide habitat connectivity within and between LAUs; identifying linkage areas to maintain connectivity of lynx populations and habitat; considering topographic and vegetation features important to lynx movement patterns; retaining lynx habitat and linkage areas in public ownership to maintain or facilitate lynx movement. Vegetation treatments in the proposed action are designed to provide lynx movement around harvest and prescribed fire units.
		Wilderness Study Area/Ecosystem Management	
44	AWR/NEC	The EA at 71 refers to insects and disease, as the pine beetle, as "ecosystem destabilization." What is the reference for this?	The EA does not refer to insect and disease, such as the mountain pine beetle, as ecosystem destabilization. This section of the EA (pages 68-70) has been clarified and includes multiple references.
45	AWR/NEC	The EA at 71 also suggests that logging is an appropriate disturbance. Please provide the reference(s) that report that logging replicates natural ecosystem disturbances, including insects and fire. Why isn't product removal a significant difference from fire and insects?	The EA does not claim that logging replicates natural ecosystem disturbances. The BLM recognizes that the effects of logging are different than the effects of natural disturbances related to fire and insects.
46	AWR/NEC	Wild fire is repeatedly referred to as a problem that needs to be prevented, including within the WSA. Why isn't fire identified,	Section 4.2.1 of the EA describes that wildland fire is an ecosystem process that creates pulses of dead wood, and is doing so with greater intensity and severity today under the ongoing policy of fire suppression. This section of the EA describes anticipated trends for wildland fire in the context of the No Action alternative.

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		instead, as a critical ecosystem process that creates pulses of dead wood?	
47	AWR/NEC	Please define how "forest health" is being measured. Does it include wildlife, or are you just looking at trees? If you are just looking at trees, why not also wildlife?	Forest health as discussed in this document refers to ecosystem forest health, in particular the continuation of ecosystem function and resilience to compromising or potentially compromising factors (examples include: climate change, invasive species, fragmentation) (Raffa and others 2009). In this respect, components of a healthy forest ecosystem should include, as outlined in Kolb and others (1995): 1) the physical environment, biotic resources, and trophic networks to support productive forests during at least some seral stages; 2) resistance to dramatic change in populations of important organisms within the ecosystem not accounted for by predicted successional trends; 3) a functional equilibrium between supply and demand of essential resources (water, nutrients, light, growing space) for major portions of the vegetation; and 4) a diversity of seral stages, cover types, and stand structures that provide habitat for many native species and all essential ecosystem process. This definition has been added to the glossary.
48	AWR/NEC	The WSA is 11,580 acres. It is not clear where these areas are in the project area as per the EA maps.	The WSA boundary has been included on other maps in the EA where inclusion of the boundary does not detract from the key information being communicated by each map.
49	AWR/NEC	The rationale for treating the WSA is invalid. The pine beetle epidemic and fire control in the WSA is the rationale for slashing/burning 2500 acres of forest, in patches up to 100 acres or more. It is not clear why pine beetles and fire are ecosystem problems that need to be addressed with the proposed treatments.	The proposed action for the WSA burning does not include slashing, it only includes prescribed burning. The prescribed burning would occur on approximately 1,075 acres within an area that is approximately 2,150 acres. The 1,075 acres of prescribed burning would be in patches called ignition zones within the 2,150 acre area. These ignition zones would be between 20-100 acres in size. The rationale for treatment is that fire, which these areas evolved with, including the flora and fauna, has not been allowed to play its full ecological role for 90 years due to the human practice of fire suppression during that time. It is unlikely that wildfire will be allowed to have an ecological role in the next 20-30 years due to current fire

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		What are the problems for wildlife habitat that will be corrected with treatment of the WSA?	management policies. Analysis of two fires in the Chamberlain watershed that escaped initial attack in the past indicates long-term ecological benefits to flora and fauna in these areas. Since wildfire has and will have a limited role in this area, the BLM proposes to use prescribed fire to ecologically fill the void that wildfire otherwise would. Wildfires may escape initial attack in some cases as we have seen in the area. With the current full suppression fire management strategy, only a few fires escape initial attack, and those that do escape do so on the driest years, on the driest days, and on the windiest days. One major difference from the past to the present is the existing condition of fuels. We now have a high fuel component in the dead lodgepole across the analysis area. If a wildfire escapes initial attack on the driest and windiest day, in this landscape full of dead lodgepole pine, such a fire's severity, intensity, and extent may well be more extreme than desired. GPS data from collared lynx collected by Jim Squires from 2006 to 2010 in the analysis area indicates there is high lynx use in the areas burned in the 1964 North Fork Elk Creek Fire and the 1994 East Fork Chamberlain Fire by the lynx. The prescribed burning in the WSA would be designed to emulate these types of habitats in the future, not only for the lynx but for other wildlife as well. Treated stands would enhance habitat for grizzly bears and elk in the short term, and lynx and moose in the long term.
51	AWR/NEC	The EA notes that the pine beetles have created vast acreages of snags in the WSA. So why are more snags needed with burning? Burning will eliminate snag recruitment over time. In addition, fires are likely in the future, so why create more burned habitat now? It will happen on its own over time. In the mean time, existing forests will continue	The BLM does not believe that more snags are needed in the Chamberlain-Wales watershed. Creation of snags is not one of the objectives with proposed prescribed burning in the Wales Creek Wilderness Study Area. Page 8 of the EA describes the objectives of the proposed prescribed burning in the WSA as follows. With prescribed burning inside the Wales Creek Wilderness Study Area: a) restore and enhance natural disturbance processes; b) create patches within the existing continuous lodgepole pine forest to aid in

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		to create snag recruitment, important for many wildlife species.	future wildland fire management; c) create stand initiation structure to diversify habitat for Canada lynx, grizzly bear, elk, and moose.
53	AWR/NEC	Why do WSA lands have to be protected from fire in order to maintain natural ecosystem processes?	The objective of proposed prescribed burning in the WSA for this project is to emulate the natural ecosystem process of wildland fire in the context of the ongoing State of Montana policy to suppress all wildland fires regardless of where they occur.
56	AWR/NEC	What direction for WSA's allows slashing of habitat to increase the effects of prescribed burning? How does the agency propose to slash trees (chain saws) and ignite the burns (helicopters) that are consistent with natural processes of wilderness areas?	Section 2.3 of the EA, subheading "Prescribed Fire without Fuel Augmentation: Wales Creek Wilderness Study Area" on pages 24 and 25, describes the proposal to prescribe burn in the WSA. It does not state anywhere that trees will be slashed. Appendix B on discusses BLM policy for using prescribed fire as a tool in WSAs. As per the BLM Manual 6330, it states, "The BLM may utilize prescribed fire in WSAs where the natural role of fire cannot be returned solely by reliance on wildfire or where relying on wildfires might create unacceptable risks to life, property, or natural resources outside the WSA." Given the size of the WSA, current fuel conditions, general wind direction, and the current wildfire suppression management strategy, the BLM's proposed action for prescribed burning in the WSA meets current BLM policy. Fire is a natural process, and section 3.3.1 on pages 37-38 of the EA describes how fire suppression has severely limited fire as a natural process on the landscape. The BLM proposes to use helicopters to ignite the prescribed burns in the WSA. This is a standard operating procedure for prescribed burning. Section 4.3.7 on page 116 states that the proposed action will not impair the suitability of the WSA.
57	AWR/NEC	The EA suggests that 2-3 "maintenance" burns may be required in units F2,3 and 4, which are in the WSA. How can this intensive management be considered natural management?	The BLM does not claim that maintenance burns are "natural management". Units F2, F3, and F4 are not in the WSA, rather they are located north of the WSA (Figure 2-1 of EA).
58	AWR/NEC	Please cite the "current" literature that	The BLM does not use the term "soil sterilization" in the EA. There are multiple

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		identifies that soil sterilization will occur in the affected WSA if a wild fire develops.	sections in the EA that discuss fire severity (which relates strongly to soil effects) and effects of fire on soils. Section 3.3.1 (Pages 38-39) includes discussion of potential fire severity under current fuel loading conditions. Section 4.2.1 (page 68-70) describes fuel loading as related to fire severity under the No Action alternative. Section 4.2.3 (page 76) describes potential effects of the No Action alternative including impacts of fire to soils. This discussion addresses potential wildfire effects throughout the project area, not specifically to the WSA. Section 4.3.3 (page 110) describes effects of the Proposed Action on soils, including effects related to prescribed fire. The Cumulative Impacts (Section 4.4) discusses the potential for larger, higher severity fire in the context of whether or not the Proposed Action is implemented.
59	AWR/NEC	Please discuss existing science that reports that fire cycles are not out of their natural range of variation, and that pine beetles do not increase fire risk once the red needles have fallen off the trees.	The EA does not state that fire cycles are not out of their natural range of variation, nor does it state that pine beetles do not increase fire risk once the red needles have fallen off the trees. The commenter's intent is unclear with this comment. If the intent is for the BLM to address specific concepts the commenter believes, based on specific scientific literature, then the commenter should provide references to support his/her point. The EA does address fire regimes and fire severity in a number places/contexts. Part of the Purpose and Need for the project as described in Section 1.3 (page 7) is that "stands with dense lodgepole pine killed by bark beetle infestation are at risk for higher than normal fire severity. This condition presents potential risks to water quality, fisheries, soil productivity, and wildlife habitat in the event of severe fire." Effects on fire regimes and fire severity under the No Action alternative (current conditions) are discussed in several places for multiple vegetation types in Chapter 4 (pages 66-72), including discussion of possible effects if existing cover types continue along their current ecological pathways/trajectories.
		Birds	
61	AWR/NEC	The EA at 127 refers to "wildlife	

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		design features" that are lacking on adjacent, non-BLM lands. They are clearly lacking on BLM lands as well. There are no habitat objectives or conservation strategies identified for any bird species, including Sensitive Species and SOC. There is therefore no basis for measuring project or cumulative impacts on a large number of wildlife species that will be impacted by this project, making this NEPA analysis invalid and meaningless. Claims by agency personnel that species viability will not be affected are arbitrary since there is no supporting analysis; agency expertise alone is also not adequate for NEPA processes, since the public has no basis to question such opinions, as they would if science were used. Providing a tally of acres of habitat to be disturbed by the project does not define to the public how their habitat is being managed, or that populations are not be progressively eliminated by management actions, which we believe to be the case. The agency has not demonstrated that the project will avoid significant direct and significant cumulative impacts on	The BLM has no control over wildlife design features on non-BLM lands. Wildlife design features for bird species include following the Northern Region Snag Management Protocol for cavity dependent species, vegetation treatments not occurring during the nesting season from June 1 to July 15, buffer zones 40 acres around active bird species of concern, and buffer zones of 40 acres around active raptor and pileated woodpecker nests from April 15 to August 15. While there are many design features described throughout Section 2.3 of the EA that would benefit wildlife, specific design features for wildlife are listed on pages 30-31. Bird populations are not being progressively eliminated by management actions. The BLM has monitored birds through the Breeding Bird Survey process for over 30 years and population trends have indicated a stable bird community. The Chamberlain Watershed is forest habitat composed of vegetation composition, structure, and function supporting healthy bird communities. Direct and indirect effects of the proposed action are described in Section 4.3.2 on pages 102-109. Cumulative effects on bird species of concern are addressed on pages 140-143 of the EA. The BLM land is managed under the Federal Land Policy and Management Act (FLPMA) of 1976. Unlike the National Forest Management Act that provides direction for the Forest Service, FLPMA does not have the requirement to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” Under FLPMA, the BLM will manage public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use. The proposed action for the Chamberlain project is consistent with FLPMA.

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		many bird species, impacts that require a full disclosure and analysis in an EIS.	
62	AWR/NEC	The EA does not define how bird nests will be "located" in treatment areas, including in the WSA. Please define how various bird species nests will be located prior to treatment. Failure to complete an EIS means that mitigation measures from project impacts will be effective. However, for the proposed project, the mitigation measures identified for wildlife are vague and undefined. Most notably, the EA repeatedly claims that if bird species nests are encountered, "some" type of evaluation will be done to determine how to handle these situations. The public needs to know what the mitigation measures would entail, that they are based on valid science, and that they will be implemented. If the agency can't define these, it raises a huge red flag about the actual intent to protect bird nests.	Pages 30-31 of the EA describe how nests of bird species of concern would be addressed. Additional clarification on how such nests would be detected has been added to this section. In addition, Section 3.5 of the EA describes that the BLM will monitor vegetation treatment stands prior to implementation to survey for sensitive wildlife, including raptors, woodpeckers, and other bird species of concern. Results will help facilitate management of bird species of concern.
64	AWR/NEC	Please define direct and cumulative impacts on goshawks, a species we believe is a good MIS for older forest habitat species, including	The analysis area has diverse cover types suitable for 5-10 northern goshawk territories (based on 1,000-10,000 acres per home range territory depending on age and sex as well as habitat quantity and quality). Large trees for nesting and mixed forests for

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		many songbirds. Please don't bundle up habitat for the entire project area. Please instead define the habitat conditions for each potential goshawk territory, about 6,000 acres, as per the southwest goshawk guidelines by Reynolds and others (1992). The structural stages defined in the EA (page 162) are quite close to the southwest guidelines. If canopy cover is added (this information appears to be available as noted in the EA), this would provide a good analysis of current and projected goshawk habitat, including on all land ownerships in this landscape, not just BLM. It is not clear why the wildlife analysis has generally been limited to BLM lands, since many adjacent land ownerships have past, ongoing and planned logging, and goshawks prefer mid to lower elevation habitat.	foraging are currently available. Diverse habitat is present throughout the analysis area providing excellent nest, post-fledging, and forage locations which together define goshawk home range. Mid to late successional stage conifer forest composed of Douglas-fir, ponderosa pine, and lodgepole pine, with >50% canopy closure, and high stem exclusion are optimum nest habitats. Post fledging habitat is dominated by small-sized trees, with >50% canopy closure. Forage habitat is generally composed of large trees with well-developed canopies and adequate flight space beneath canopies. Food items are comprised of red squirrels, chipmunks, snowshoe hares, ground squirrels, and various forest birds, including robins, flickers, and woodpeckers. McGrath (2003), Smith and Keinath (2004), and Sampson (2006) are used for analysis. The effects of past actions on BLM and non-BLM lands may have impacted goshawk forage and nest habitat. Large tree removal in the past which occurred through timber harvest or wildfires may have had negative effects. Present and reasonably foreseeable future actions may temporarily displace goshawks, but are not anticipated to have long-term effects on nest territories. Large tree removal is not prescribed in these foreseeable actions. Goshawks nest in early spring. The seasonal restriction period of June 1–July 15 would prevent adverse impacts on goshawks. As stated above if nests are found treatments would be evaluated and modified. Approximately 9,424 acres of goshawk habitat would be disturbed during the next decade. The effects of this proposed action, in addition to pre-existing cumulative effects, may impact goshawks, but impacts are considered insignificant. Effects to goshawks are discussed in the EA on pages 46, 103, and 136.
65	AWR/NEC	Please give the science that indicates that logging will benefit the goshawk, and specifically, what structural stages will be created that are a benefit in this landscape as per the southwest guidelines.	The BLM does not claim that logging will benefit goshawks**.**

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66	AWR/NEC	Please address the impact of projects on goshawk prey species, including the red squirrel and snowshoe hare.	This point is addressed on page 103 of the EA. Food items for goshawks are comprised of red squirrels, chipmunks, snowshoe hares, ground squirrels, and various forest birds, including robins, flickers, and woodpeckers. McGrath (2003), Smith and Keinath (2004), and Sampson (2006) are used for analysis. Snowshoe hare habitat, such as stand initiation and multistory coniferous habitat is not proposed for vegetation treatments and would therefore not adversely impact snowshoe hare.
67	AWR/NEC	What data is available to indicate that goshawks are done nesting and young have fledged and developed good flight abilities, by July 15?	Wildlife design features (page 30 of EA) have been modified to reflect a goshawk nesting/fledging season of March 1 to September 30 as per Reynolds et al. (1992).
68	AWR/NEC	The cumulative impacts of past activities on 51,103 acres (EA 127) appear to have already eliminated vast acreages of habitat for bird and bats. The agency needs to provide some quantitative measure of these habitat conditions, not just for the goshawk, but for other bird MIS, Sensitive species, and SOC.	Past timber harvest reduced altered an estimated 51,103 acres, of which all but 3,000 acres has fully recovered and providing various structural conditions. Present timber harvest on all lands within the watershed is altering 1,048 acres of wildlife habitat. Reasonably foreseeable future vegetation treatments would alter wildlife habitat by an additional 2,427 acres. The proposed action combined with past, present, and reasonably foreseeable actions would result in 12,528 acres of wildlife habitat alteration. The total represents 20% of the watershed, which would still provide habitat for sensitive species and species of concern (the BLM does not have Management Indicator Species (MIS). An estimated 80% of the watershed provides diversified habitat for wildlife. This is discussed in the EA on pages 136-137, 140-143. The commenter's reference to MIS is an apparent reference to Management Indicator Species, a component of U.S. Forest Service management. The BLM does not identify or use the concept of MIS.
69	AWR/NEC	There are management recommendations available for the sensitive species and SOC, the pileated woodpecker as well as the	Section 2.3 of the EA includes project design features to benefit or minimize impacts to wildlife species. The commenter does not any specific measures or guidelines for the BLM to consider.

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		goshawk. Why aren't these guidelines used to manage for this species in the project area, as well as to evaluate impacts?	
70	AWR/NEC	There is no information on old growth habitat, other than to indicate that larch old growth stands will be logged and fragmented, and that old growth is limited in this landscape. There are a host of bird species that are benefited by or require old growth, from the goshawk, great gray owl, flammulated owl, many bats, and the brown creeper, for a few examples. Please provide an old growth inventory for all BLM lands in the project area, and define the old growth criteria that were used. Please provide a map of old growth in this landscape, as well as how much old growth has been lost in the past due to logging.	The term "old growth" is a highly subjective term that means different things to different people. The BLM does not have a definition of "old growth"; it is not discussed in the Chamberlain EA; nor is there a requirement for the BLM to define/analyze "old growth".
71	AWR/NEC	What is the recommended level of old growth on a landscape for wildlife, and how does this compare to current and projected conditions in the entire landscape of this project, including non-BL lands?	The term "old growth" is a highly subjective term that means different things to different people. The BLM does not have a definition of "old growth"; it is not discussed in the Chamberlain EA; nor is there a requirement for the BLM to define/analyze "old growth".
72	AWR/NEC	Please provide the science that demonstrates that logging old growth habitats does not reduce their	The term "old growth" is a highly subjective term that means different things to different people. The BLM does not have a definition of "old growth"; it is not discussed in the Chamberlain EA; nor is there a requirement for the BLM to

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		quality to associated species, such as the goshawk, brown creeper, great gray owl, and various woodpecker species, for example.	define/analyze "old growth".
73	AWR/NEC	The current conservation strategy for Clark's nutcracker is to maintain abundant low elevation habitat, especially ponderosa pine (which has the best, largest seeds for this species). How will the project promote conservation of this species, and other species as the Cassin's finch and evening grosbeak that depend upon conifer seeds?	This issue is discussed/addressed on pages 141-143 of the EA. Mature ponderosa pine trees would be retained, and deferred from treatment in all harvest and thinning units. The ponderosa pine restoration prescription would be for pre-commercial thinning in overstocked stands (546 acres in units T1-T8, T12, and T13) where objectives would be to manage for healthier ponderosa pine stem densities. Therefore, cones and seeds would be available for nutcrackers, Cassin's finches, and evening grosbeaks. Treatments within ponderosa pine cover-types would provide sustained habitat for birds dependent on seeds. Nutcrackers, finches, and grosbeaks also forage on other conifer and non-conifer seeds from composite plants for example.
74	AWR/NEC	Please define the level of reduction of conifer seed production that has already occurred in this landscape, and will occur in the reasonable future, as a result of logging and burning? What does this trend in forage reduction indicate for population trends of various seed-eating birds?	The EA, in Chapters 2 and 4 discusses the creation of seedbeds for regeneration of seral tree species (i.e. ponderosa pine, western larch and lodgepole pine) within the proposed project area. Within the ponderosa pine/Douglas-fir and the western larch/mixed conifer types, no major cone production capabilities are known to have been lost. The ponderosa pine/Douglas-fir and the western larch/mixed conifer types, provide seed sources for the seed-eating birds within the area. There is no mature or cone producing whitebark pine or limber pine within the Chamberlain project area. A section on Effects of Treatments on Conifer Seed Production has been added to the EA on pages 94-95, particularly as related to proposed timber harvest and prescribed fire treatments in lodgepole pine stands.

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75	AWR/NEC	Please provide a snag inventory on previously-logged lands. How has past logging affected the carrying capacity of cavity-nesting birds and woodpeckers? Why aren't these impacts considered significant? What level of habitat loss would have to occur before significant impacts to cavity-nesting wildlife would be triggered?	There is no requirement for the BLM to provide a snag inventory on previously-logged lands. Cumulative impacts of past, present, and reasonably foreseeable future actions in the watershed are discussed relative to cavity-nesting birds on page 140 of the EA. Key excerpts include: Past timber harvest reduced altered an estimated 51,103 acres, of which all but 3,000 acres has fully recovered and provides various structural conditions. Present timber harvest on all lands within the watershed is altering 1,048 acres of wildlife habitat. Reasonably foreseeable future vegetation treatments would alter wildlife habitat by an additional 2,427 acres. The proposed action combined with past, present, and reasonably foreseeable actions would result in 11,767 acres of wildlife habitat alteration. The total represents 19% of the watershed, which would still provide habitat for bird species of concern. An estimated 80% of the watershed provides diversified habitat for wildlife. BLM typically retains snags on their lands, while private timber lands do not. Currently 40-80% mortality in LP from pine beetles and mortality in Douglas-fir in the past ten years from bark beetles has created potential cavity nesting sites for primary and secondary cavity nesting birds and mammals.
76	AWR/NEC	Please clarify that snags on one part of the landscape cannot be averaged out to define overall landscape quality for cavity-nesting birds, as this implies that snags and birds are present where they do not actually exist.	Snags are not averaged, but are present, at various levels, throughout the planning area. The compositions of current snags are represented by all conifer species and at all structural sizes (heights and diameter conditions). The cumulative effects section of the EA (page 140) discusses snags in the context of past, present, and reasonably foreseeable future actions.
77	AWR/NEC	The EA implies that the current best science, Bull et al. (1997) was used to manage and measure impacts to snag-associated wildlife. This	Bull et al. (1997) does not recommend snag densities. The Northern Region Snag Management Protocol recommends snag densities based on Vegetative Response Units. Green trees as future replacement snags would be present in treated and

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		science recommends a minimum of 4 snags per acre over 10 inches dbh WITHIN a FOREST Stand. How will this be met in treatment units over time?	untreated forest habitat for snag sustainability. This has been clarified in Section 2.3 of the EA (pages 18, 19, 20, 22, and 30).
78	AWR/NEC	Research on several bat species identified as SOC in this area do not nest in logged areas. Leaving snags in units thus will not mitigate impacts. Given this, how will impacts be mitigated for these SOC?	Potential effects of the proposed action on bats are discussed on page 101 of the EA. Key EA excerpts relative to bats that do not nest in forested areas include: Bat foraging habitat would not be impacted. Townsend's big-eared bats and fringed myotis roost in caves and mine adits/shafts and would not be impacted by current or planned actions. Roosting habitat for long-eared and long-legged myotis would be maintained. Riparian habitat, late succession structure, snags, and live tree habitat would continue to develop through natural ecological processes. Natural disturbance processes (fire, insects, and disease) would continue, enhancing foraging and roosting habitat, especially for long-eared and long-legged myotis. As per the Northern Region Snag Management Protocol, snags occur in pulses of high density, persisting for short periods (5-25 years) then are gone until the next fire event or other disturbance. This is the ecology of these vegetative response units (USDA-FS, 2000). Vegetation treatments, such as timber harvest, would incidentally remove lodgepole snags, which are potentially used by bats for roosting. Taylor (2006) suggests that vegetation management creates openings and edges for foraging habitat. Suitable forage and roosting habitat results from group selection harvest, snag retention, prescribed fire, thinning, and other mechanical treatments.
79	AWR/NEC	Please identify the length of time it will take for snag habitat at least 10 inches dbh will recover in clearcuts? Why isn't this considered an	Under the proposed action, single-storied lodgepole pine average conifer canopy coverage would be reduced by >75% on up to 359 acres (page 18 of EA). Snags and green-tree replacement snags would be retained as per the Northern Rockies Snag

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		irretrievable impact given it will take over 100 years?	Protocol. Snags occur in pulses of high density, persisting for short periods (5-25 years) then are gone until the next fire event or other disturbance. This is the ecology of these vegetative response units. Further clarification of this point has been added to pages 101-104 of the EA. The BLM acknowledges that it may take multiple decades at the individual tree or site scale for trees to sprout, grow, reach >10 inches dbh, and die to become snags. However, snags are constantly being created in the Chamberlain landscape by natural processes. Numerous acres not being proposed for treatment in the watershed have undergone widespread tree mortality (snag creation) due to the ongoing mountain pine beetle outbreak and already have an abundance of large snags. Given this context of currently abundant snags and ongoing recruitment of snags throughout the watershed, the removal of snags proposed with this project is not an irretrievable impact.
80	AWR/NEC	The EA at 108 claims that the project will enhance pileated woodpecker habitat, but no references/monitoring were provided. What is this claim based on?	Effects of the proposed action on pileated woodpecker have been clarified on page 109 of the EA.
82	AWR/NEC	The EA at 33 claims that the Northern Region Snag Management Protocol will be applied to the project. No further information was provided. What specifically does this mean, including within clearcuts and group selection cuts?	The following design features follow the Northern Region Snag Management Protocol have been clarified in the EA on pages 18 and 21: Timber harvest with prescribed fire: lodgepole pine stand replacement (habitat types 675-790, 920, 930, 940, and 950) – recommended snag densities of 5-10 snags per acre, leaving the largest snags available; Douglas-fir when available. Timber harvest with prescribed fire: western larch-mixed conifer stand restoration (habitat types 250-319, 505, and 506) – recommended snag densities of 4 snags per acre at least 20 inches dbh, western larch and ponderosa pine where available, Douglas-fir as a second choice.

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		Moose	
83	AWR/NEC	The EA at 135 indicates the planning area is good moose habitat. It also noted that moose are declining. This same trend is occurring throughout the state, as well in other areas. However, the EA does not define any habitat management strategies for this declining species.	Section 1.3 of the EA describes objectives for the project, including objectives to benefit wildlife species, including moose. Objective #1(d) specifically mentions enhancement of forage habitat for moose while Objective 7(c) specifically mentions diversifying habitat for moose.
85	AWR/NEC	If older forest habitat is essential for moose winter range in this landscape, please define the cumulative impact of past logging and fire on moose in this area.	Cumulative impacts to moose are described in Section 4.4.2 (page 138) of the EA. Additional clarification of these effects has been added to this section**.**
86	AWR/NEC	Why isn't thermal cover management considered important for this species in this landscape?	Thermal cover for moose is considered and addressed in the EA. Effects of the proposed action on moose are discussed in Sections 4.3.2 (page 106). This discussion includes consideration of thermal cover/winter habitat. Thermal cover is also addressed in the discussion of cumulative impacts in 4.4.2 (page 138) of the EA. Additional clarification has been added to these sections to address this comment.
88	AWR/NEC	The EA claims that logging will benefit the moose in the long term, by creating young forest areas. However, if logging removes winter habitat, this would be a detriment, not a benefit, and a misrepresentation of project impacts on this species.	Effects of the proposed action on winter habitat for moose are discussed in Section 4.3.2 (page 106) and cumulative impacts are discussed in Section 4.4.2 (page 138). This discussion includes clarification about project effects on moose winter habitat.

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		Wolverine/Fisher	
89	AWR/NEC	Projects in this landscape will impact up to 9,424 acres, and these impacts are considered innocuous to both the wolverine and fisher. There are no habitat measures in place for either species, so it is unknown how they will be affected. It is clear the impacts may be significant, especially if current populations and habitat quality is already reduced due to past activities. It is also not clear how treatments in riparian areas will maintain fisher habitat. There is not enough information in the EA to support claims of no significant impacts on either species. It is especially clear that treatments will degrade fisher habitat, and may reduce the "refrigeration zone" areas for wolverine due to forest opening. The wolverine and fisher may both be listed as threatened species during project implementation, which means that incidental take statements and conservation measures (terms and conditions) would be required at that time in order to avoid violations of the ESA. It is not clear how specifically in the case of the	With regard to wolverine, climate change and trapping are regarded as the major risks to wolverine viability (USDI-FWS, 2010; USDI-FWS, 2013d). Current road management limits trapping access, other than snowmobile use, and trapping mortality risk is considered low. Effects of the proposed action on wolverine are discussed in Section 4.3.2 (page 100) of the EA but this project would not contribute to the primary threats to this species. Potential effects of the proposed action on fisher are described on page 101. Cumulative impacts related to wolverine are discussed in Section 4.4.2 (page 134). Cumulative impacts relative to fisher are discussed on page 135. If either wolverine or fisher is federally listed during the life of this project, the BLM would do whatever is necessary to comply with the Endangered Species Act under any new federal listing of either of these species.

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		wolverine this problem is being addressed.	
		Elk	
90	AWR/NEC	Please define security and map it in the project area as per the current best science or Hillis et al. 1991 (250 plus acres of hiding cover located at least 0.5 miles of an open motorized route during the hunting season. What is the current level of elk vulnerability in the analysis area? Are the impacts of past activities significant, in that they have reduced security below recommended minimum levels? If existing effects are significant, how will additional impacts be nonsignificant?	Effects of the proposed action on elk are described in Section 4.3.2 (pages 104-106). This section has been revised to add data on acres and discussion of elk security habitat that would be available under the proposed action, as well as clarification on elk vulnerability**.**
92	AWR/NEC	Please define habitat effectiveness within each treatment block during the life of the project, including any overlap of project activities.	Section 4.3.2 (pages 104-106) specifically addresses and discusses this issue. Elk habitat effectiveness during active treatment periods in treatment blocks would remain above levels recommended where elk are one of the primary resource considerations (Christensen et al. 1993).
94	AWR/NEC	The EA at 126 notes that 26 -+- 25 miles of roads, or closed roads, will be needed for the project. This will increase roads by 51 miles. These will include unauthorized routes, and currently gated routes, and grown-in routes. How can these increases not affect current	No new permanent roads would be built for this project and only 2.5 miles of temporary road would be built and later obliterated. The roads described by the commenter already exist and most of them are closed and will continue to be closed to public use through the life of this project. The BLM patrols the project area regularly and has become aware of only one unauthorized route (approximately 0.25 mile) in recent years. This route has been barricaded and is growing in with vegetation.

No.	Commenter	Comments	BLM Response
		security?	Effects of the proposed action on elk are described in Section 4.3.2 (pages 104-106). This section has been revised to add data on acres of elk security habitat that would be available under the proposed action, as well as clarification on elk vulnerability. This section also includes disclosure on elk habitat effectiveness relative to activities during their occurrence in the treatment blocks. Elk habitat effectiveness during active treatment periods in treatment blocks would remain above levels recommended where elk are one of the primary resource considerations (Christensen et al. 1993).
95	AWR/NEC	The EA notes that only 10 miles of BLM roads are currently open to the public. With the above addition of roads needed for the project, it appears that the disturbances to elk and other wildlife in the summer will be quite significant. The EA, however, does not identify what the ORD will be in the treatment blocks. So the actual impact of treatments and associated roads is not known.	The majority of roads that would be used to implement the proposed action already exist, but are closed to motorized use by the public. They would not be additional roads added to the landscape. Table 4-19 in Section 4.4.2 (page 130) has been added to the EA to disclose open road densities by treatment block for the duration of treatments in each block. Pages 110-111 of the EA describe effects on elk security and habitat effectiveness, including disclosure of effects related to treatment blocks, that would occur under the proposed action. Elk security and habitat effectiveness would be maintained under the proposed action.
96	AWR/NEC	What level of hiding cover exists currently in this landscape, and what will it be after treatments?	Effects of the proposed action on hiding cover are described in Section 4.3.2 (page 104-106). This section has been clarified in the context of the areas relevant to elk herds in the project area as follows: "Hiding cover current condition is approximately 90,000 acres of the Chamberlain and McElwain area. Approximately 84,000 acres of hiding cover would be available post-treatment."

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97	AWR/NEC	The EA claims that reserves will be left in treatment units for hiding cover, at least 600 feet wide. There is no mention of the size of these blocks, however. Will they be large enough for elk hiding cover?	The design feature of leaving 600 foot-wide "leave areas" specifically in timber harvest units is a requirement of the Garnet RMP. The BLM does not necessarily believe they would be large enough to provide elk hiding cover in all cases. In units HF1, HF2, HF3, and HF4 (total of 314 acres), proposed treatments would occur in 2-5 acre patches, across a cumulative total of 20-30% of the units as described in the EA. Elk hiding cover would be maintained in these units. However, units HF5, HF6, HF7, HF8, and HF9 (total of 359 acres) consist of single-storied stands, predominantly beetle-killed lodgepole pine, so elk cover is already diminished in these areas. The 600 foot-wide leave areas in these units may not maintain hiding cover for elk in all cases due to the mountain pine beetle-induced high degree of overstory mortality (and loss of foliage) in even-aged lodgepole pine stands.
98	AWR/NEC	Since 5,739 acres of hiding cover will be removed with this project, how can security areas not be impacted? There is an estimated 9,424 acres of habitat disturbance, and likely loss of hiding cover, in the next 10 years. It appears that this project in regards to cumulative effects will have significant impacts on big game security, requiring an EIS.	As clarified on page 104 of the EA, total open road density during the hunting season on BLM lands would be 0.29 mi/mi^2. Public motorized access is not permitted behind locked gates at any time of year, including pre-treatment, during-treatment, or post-treatment. With a ½ to 1-mile road buffer, approximately 17,000 acres of elk habitat security would be available. No public motorized access is permitted during the hunting season or any other time of year on the majority of BLM lands in the watershed. Road management has been this way for more than 30 years. Therefore elk vulnerability during the hunting season in the project area would be zero. Hiding cover current condition is approximately 90,000 acres of the Chamberlain and McElwain area. Approximately 84,000 acres of hiding cover would be available post-treatment.
		Range of Alternatives, Cumulative Effects	
99	AWR/NEC	The ERA at 75 states that analysis of wildlife effects are limited to BLM lands except for elk, lynx and lions. Why aren't other impacts in adjacent lands considered important to	The statement referred to in the comment was in the context of direct and indirect effects. Section 4.4, beginning on page 118 of the EA, describes cumulative impacts of the proposed action, with an initial summary of cumulative impacts analysis areas by resource in Tables 4-8 and 4-9. Section 4.4.2 describes cumulative impacts to wildlife on all lands, not just BLM lands, in the cumulative impact analysis area.

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		cumulative effects?	
101	AWR/NEC	There are only two alternatives; it is noted that alternatives must address unresolved issues (18). It is also noted that this is accomplished by the proposed alternative, and no more are needed. We have identified many unresolved issues with wildlife, indicating that the range of alternatives is not adequate. We suggest an alternative that addresses ecosystem management, including wildlife, which would eliminate many of the unauthorized and unnecessary roads, and reforest the past logging areas that are lacking trees.	Section 1.4 on page 9 of the EA indicates: "The BLM will decide whether or not: (1) to implement the vegetation treatments including fuels reduction, (2) to remove culverts and restore stream and riparian sites, and (3) to implement road maintenance and obliteration or repair work. The BLM may decide to implement either all or a subset of the actions considered in the Proposed Action. If there is a decision to move forward with some or all of these activities the BLM will also decide the extent, location, timing, and project design features associated with each activity." So while there are only two alternatives described in detail in the EA, the BLM has been up-front that it may decide to implement only portions of the proposed action.
103	RMEF	In the cumulative impacts analysis you may be overestimating the amount of early seral habitat available and minimizing the benefits of the vegetation treatments on a short-term horizon of 2 to 3 years.	This point has been clarified in Section 4.4.2. These actions may provide forage within two years and hiding and thermal cover within 15 years. Roughly 8,644 acres of treatments would result in early stand initiation structure benefiting elk forage habitat.
104	Sun Mtn	Include additional harvest acres for tractor and other harvest systems. The markets will not support helicopter logging. But they will support escaline and skyline operations.	The proposed harvest areas were identified and delineated by the Interdisciplinary Team to meet restoration objectives. Other considerations, such as visual resource management, are often considered in conjunction with the interdisciplinary team process in identifying potential areas where timber harvest may be appropriate. The Missoula Field Office has learned through experience in the recent past that planning timber harvest in areas with topography that is not easily operable with conventional ground-based logging systems creates a risk of timber sales not being viable. Even

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			planning timber sales on ground that requires skyline logging systems puts sales at risk of not being viable.
105	Sun Mtn	Look for harvest substitutions to replace other disturbance activities. For instance, if acres disturbed are a limiting factor, reduce the acres disturbed with prescribed fire and increase the harvest acres.	The proposed prescribed burn areas were identified and delineated by the Interdisciplinary Team to meet restoration objectives. The proposed areas for burning were identified by the need to reintroduce fire into these areas on the landscape for regeneration of seral tree species, as well as increasing the abundance and/or richness of understory plant species.
106	Sun Mtn	Make sure the acres treated within the analysis area are maximized. For instance, lynx protection standards allow disturbance up to 30% of the acres in an analysis area. This project as it stands today is proposing disturbance activities on roughly 15% of the analysis area. There are many more acres that could be treated and still afford protection to lynx.	The acres proposed for treatment with this project are the result of an interdisciplinary team effort focusing on a wide range of vegetation and habitat objectives for the project as well as many issues described in the EA. Canada lynx is not the only issue considered in the development of the proposed action. Other considerations, such as visual resource management, are also considered in conjunction with the interdisciplinary team process in identifying potential areas where timber harvest may be appropriate. In addition, in the context of timber harvest, the Missoula Field Office has learned through experience in the recent past that planning timber harvest in areas with topography that is not easily operable with conventional ground-based logging systems creates a risk of timber sales not being viable. Even planning timber sales on ground that requires skyline logging systems puts sales at risk of not being viable.
107	Sun Mtn	Clarify that obliteration of existing and temporary roads will not entail putting them back to contour. This is extremely expensive and unnecessary. Pulling drainage structures, scarifying, seeding and spreading slash on the surface is an effective way to obliterate a road.	These clarifications have been made in the EA. Section 2.3 under the "Road Obliteration" (page 28) subheading has been reworded to clarify. Most of the obliteration would entail decompaction, outsloping, drainage structure removal, slashing and seeding. A short section of the obliteration (0.3 miles) must be fully recontoured because of unstable hillslope.

No.	Commenter	Comments	BLM Response
108	Richard Fichtler	The Lewis and Clark National Historic Trail is worthy of discussion in any thorough assessment of recreation for the Chamberlain Assessment	The Lewis and Clark National Historic Trail is discussed in the EA in sections 3.3.10, 3.3.11, 3.3.12, 4.2.10, 4.4.10, and 4.4.11.

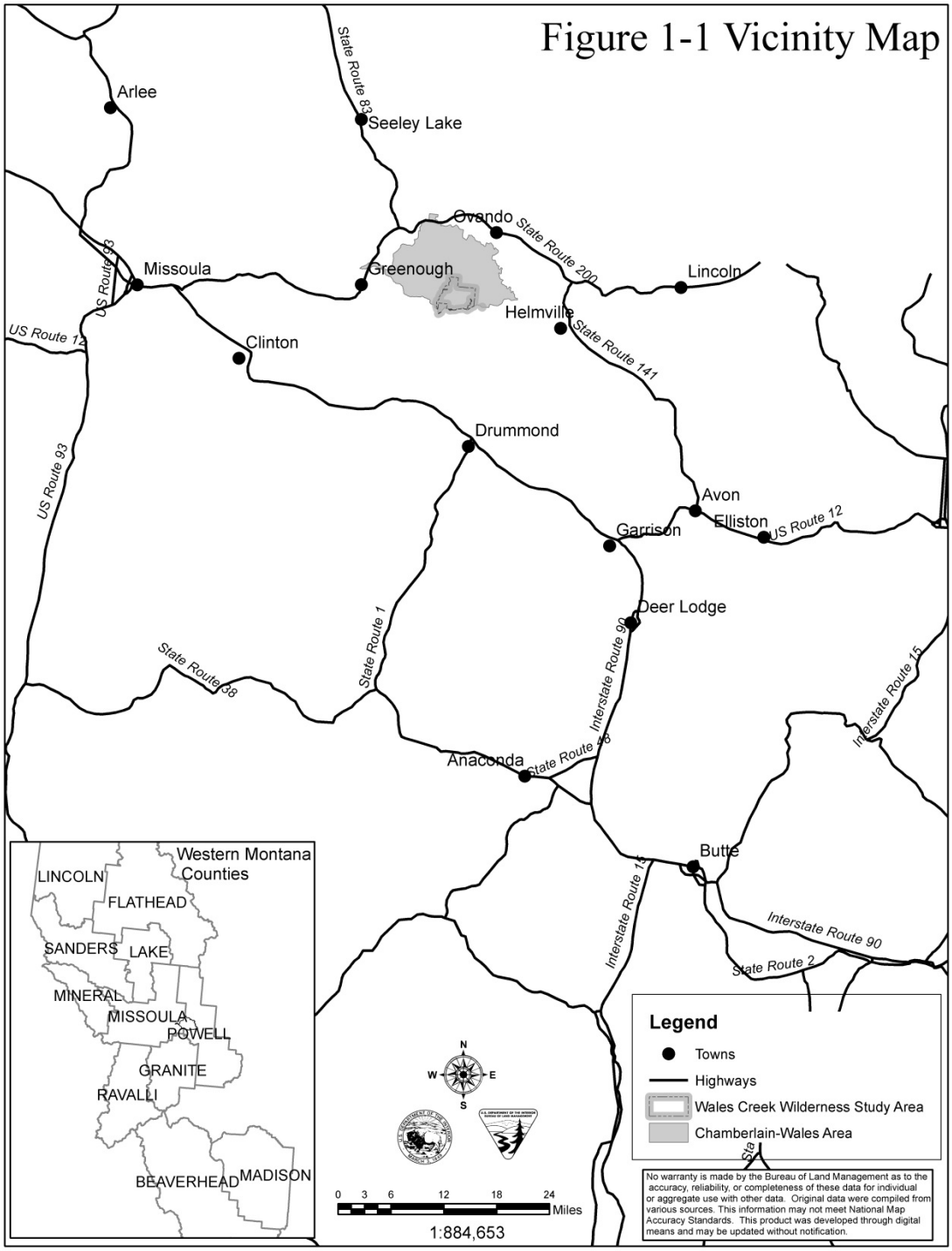
Figure 1-1 Vicinity Map
Arlee
Seeley Lake
State Route 83
Ovando
State Route 200
Lincoln
Missoula
US Route 93
Greenough
Helmville
State Route 141
US Route 12
Clinton
Drummond
US Route 93
Avon
Elliston
US Route 12
Garrison
Deer Lodge
State Route 1
Interstate Route 90
Interstate Route 15
State Route 38
Anaconda
State Route 48
Butte
Interstate Route 15
Interstate Route 90
State Route 2
Western Montana Counties
LINCOLN
FLATHEAD
SANDERS
LAKE
MINERAL
MISSOULA
POWELL
GRANITE
RAVALLI
BEAVERHEAD
MADISON
N
W
E
S
0 3 6 12 18 24
Miles
1:884,653
Legend
Towns
Highways
Wales Creek Wilderness Study Area
Chamberlain-Wales Area
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July 12, 2013

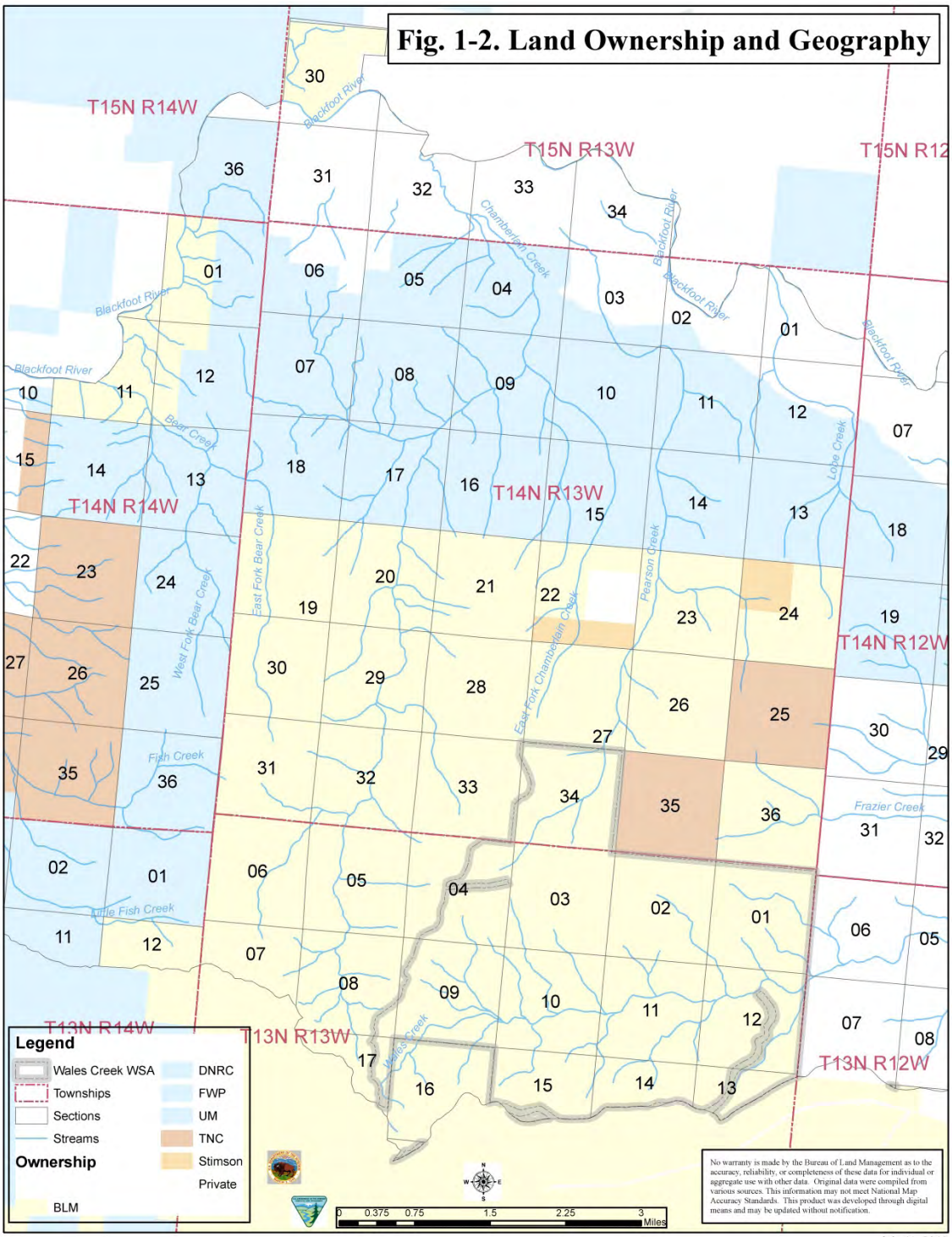
Fig. 1-2. Land Ownership and Geography
T15N R14W
T15N R13W
T15N R12
T14N R14W
T14N R13W
T14N R12W
T13N R14W
T13N R13W
T13N R12W
Blackfoot River
Chamberlain Creek
Bear Creek
West Fork Bear Creek
East Fork Bear Creek
East Fork Chamberlain Creek
Pearson Creek
Lope Creek
Fish Creek
Little Fish Creek
Frazier Creek
Wales Creek
Legend
Wales Creek WSA
Townships
Sections
Streams
Ownership
BLM
DNRC
FWP
UM
TNC
Stimson
Private
0 0.375 0.75 1.5 2.25 3 Miles
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July 11, 2013

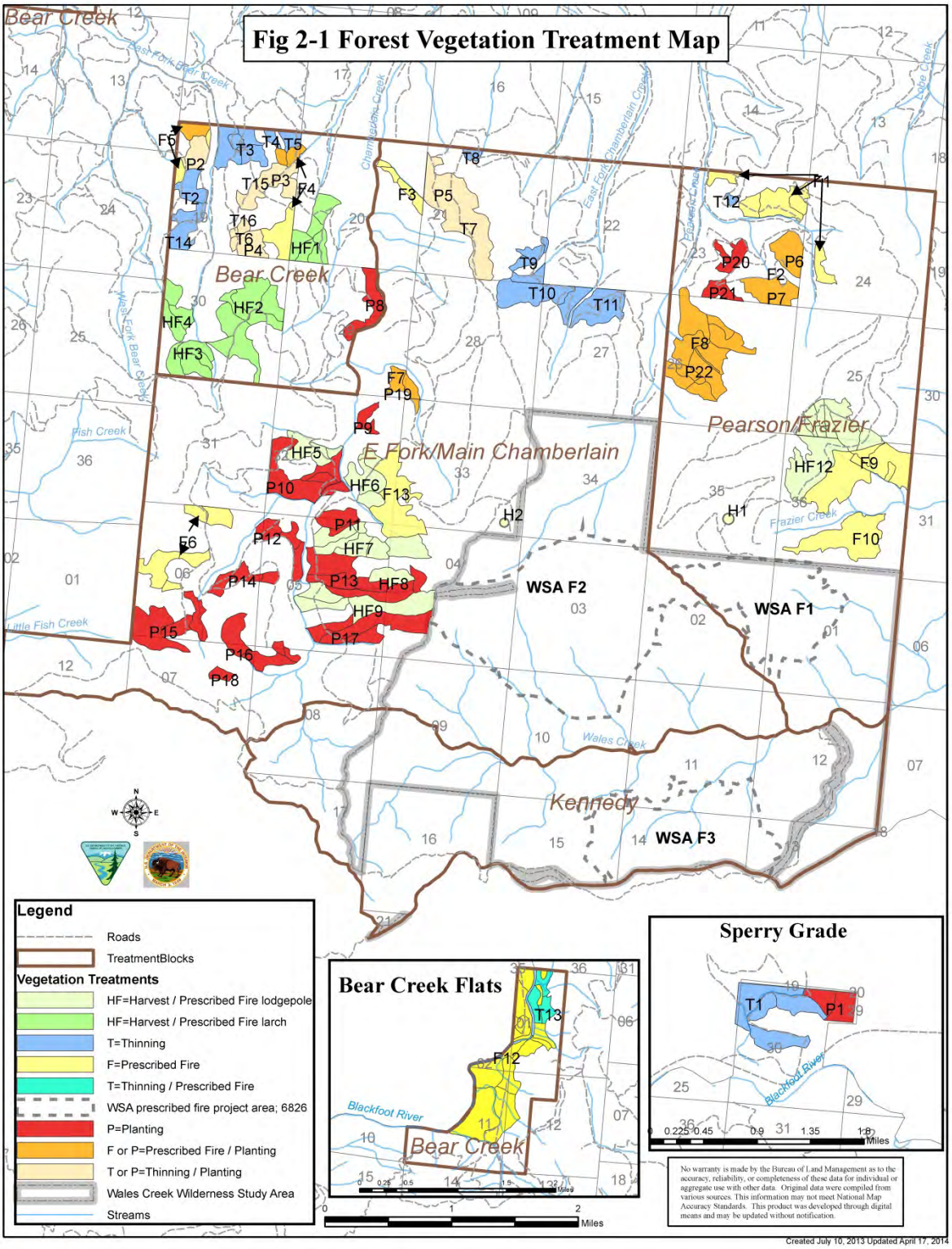
Fig 2-1 Forest Vegetation Treatment Map
Bear Creek
Bear Creek
E Fork/Main Chamberlain
Pearson/Frazier
Kennedy
WSA F1
WSA F2
WSA F3
Fish Creek
Little Fish Creek
Frazier Creek
Wales Creek
Legend
Roads
TreatmentBlocks
Vegetation Treatments
HF=Harvest / Prescribed Fire lodgepole
HF=Harvest / Prescribed Fire larch
T=Thinning
F=Prescribed Fire
T=Thinning / Prescribed Fire
WSA prescribed fire project area; 6826
P=Planting
F or P=Prescribed Fire / Planting
T or P=Thinning / Planting
Wales Creek Wilderness Study Area
Streams
Bear Creek Flats
Blackfoot River
Sperry Grade
Blackfoot River
Miles
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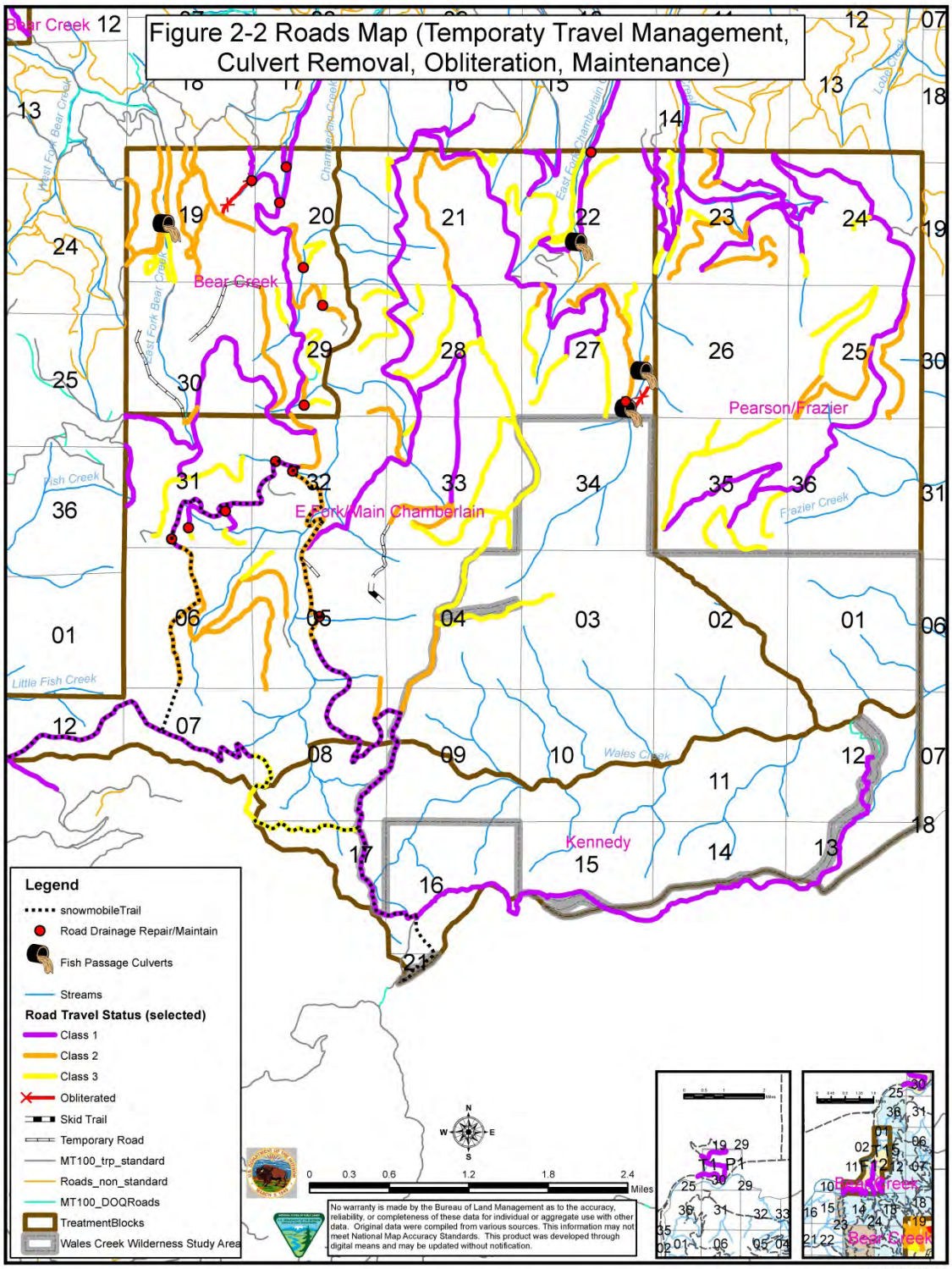

April 22, 2014

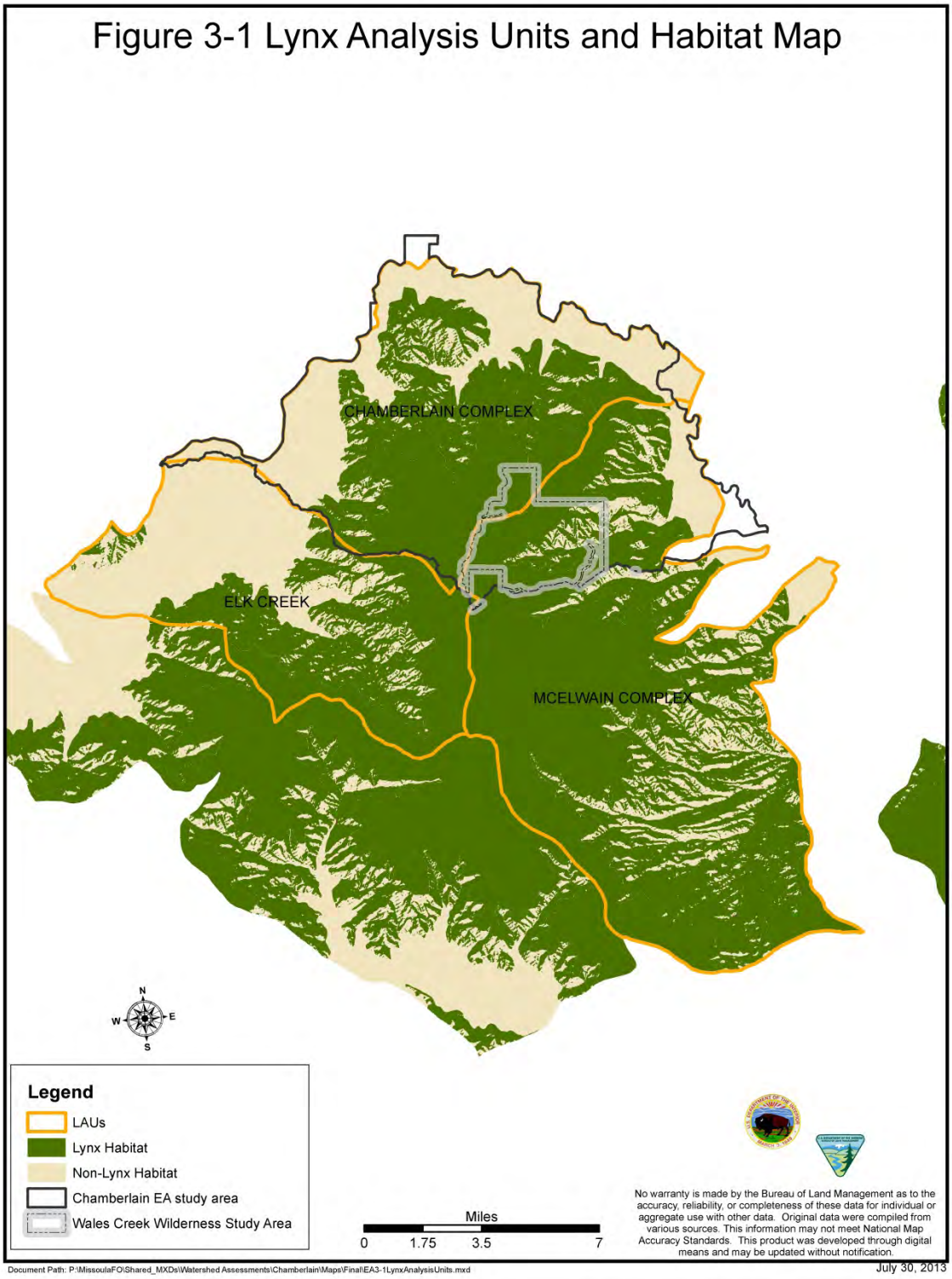
Figure 3-1 Lynx Analysis Units and Habitat Map
CHAMBERLAIN COMPLEX
ELK CREEK
MCELWAIN COMPLEX
N
W
E
S
Legend
LAUs
Lynx Habitat
Non-Lynx Habitat
Chamberlain EA study area
Wales Creek Wilderness Study Area
Miles
0
1.75
3.5
7
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July 30, 2013

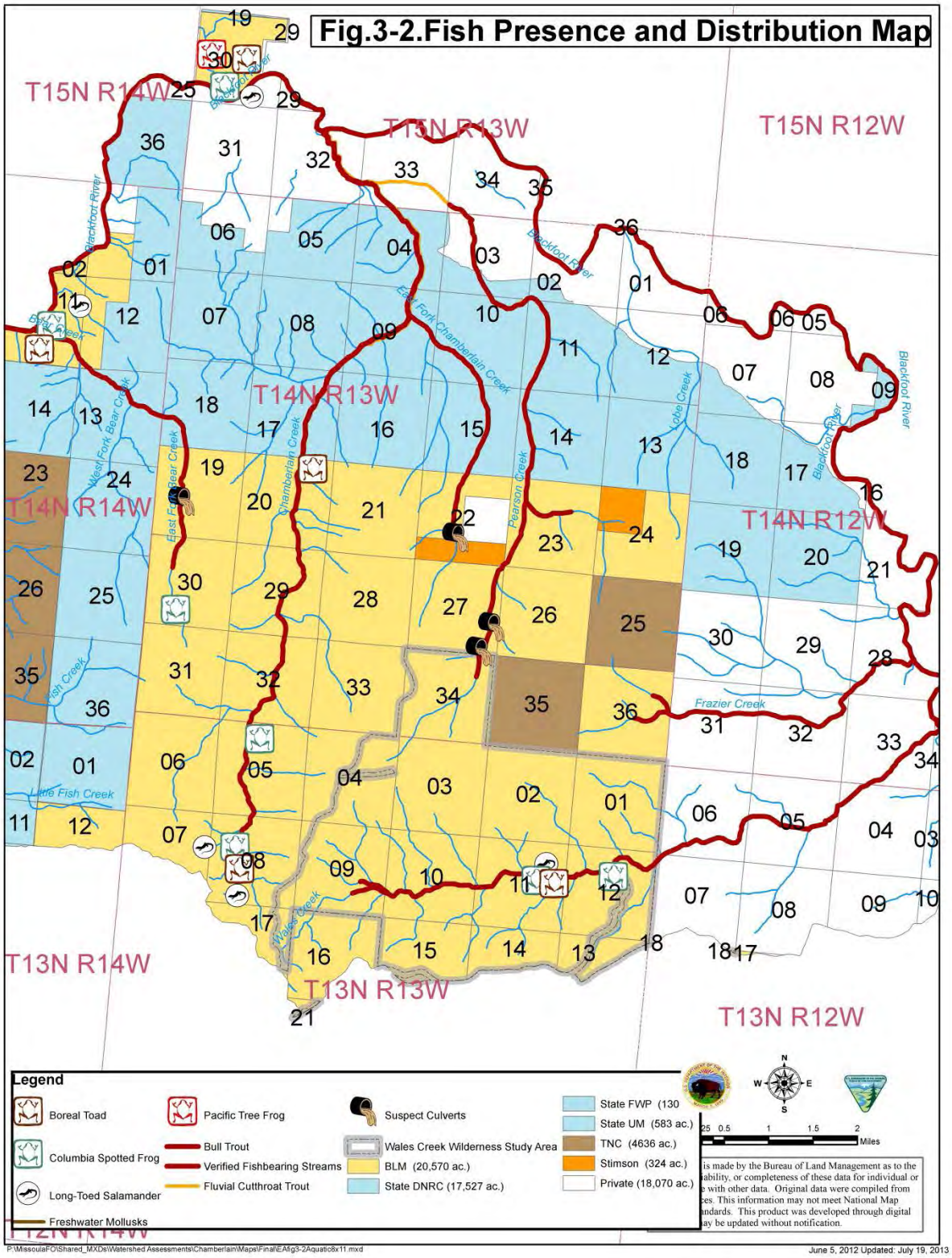
Fig.3-2.Fish Presence and Distribution Map
T15N R14W
T15N R13W
T15N R12W
T14N R13W
T14N R14W
T14N R12W
T13N R14W
T13N R13W
T13N R12W
Blackfoot River
East Fork Chamberlain Creek
Chamberlain Creek
Pearson Creek
Lobe Creek
Frazier Creek
Little Fish Creek
Fish Creek
West Fork Bear Creek
East Fork Bear Creek
Wales Creek
Legend
Boreal Toad
Columbia Spotted Frog
Long-Toed Salamander
Freshwater Mollusks
Pacific Tree Frog
Bull Trout
Verified Fishbearing Streams
Fluvial Cutthroat Trout
Suspect Culverts
Wales Creek Wilderness Study Area
BLM (20,570 ac.)
State DNRC (17,527 ac.)
State FWP (130
State UM (583 ac.)
TNC (4636 ac.)
Stimson (324 ac.)
Private (18,070 ac.)
Miles
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June 5, 2012 Updated: July 19, 2013