United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-MT-B010-2016-0008-EA
June 19, 2017

Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration and Fuels Reduction

Location: Lower Blackfoot River, including Gold Creek and Belmont Creek and vicinity Montana.

T.13N R.16W sec 1-6, 10 and 11
T.14N R.16W sec 8-35
T.14N R.15W sec 7, 18, and 19

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1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared to disclose and analyze the potential impacts of a variety of proposed vegetation management treatments located on public lands managed by the U.S. Department of the Interior, Bureau of Land Management, Missoula Field Office (BLM) and the U.S. Department of the Agriculture, US Forest Service, Missoula Ranger District (USFS). This EA is a site-specific analysis of potential impacts that could result from the implementation of the Proposed Action or its alternative. This EA assists the BLM and USFS 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, and the 1986 Lolo Forest Plan (LFP) and ROD (USDA-FS 1986), hereafter referred to as the Lolo Forest Plan. If the decision makers determine that this project would have "significant" impacts, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA that approves the selected alternative.

1.1 Background

The planning area for this assessment is defined as the Lower Blackfoot Corridor (LBC), which is located approximately 20 miles east of Missoula, Montana, in the Blackfoot River sub-basin in west central Montana. The public lands covered by this assessment total 20,509 acres, which lay adjacent to the Blackfoot River for about eight miles upstream from McNamara Bridge.

Most of the lands covered by this assessment have been acquired by the BLM and USFS over the past 20 years. In 1997, working with The Nature Conservancy (TNC) through a land exchange process, the BLM and USFS acquired 11,770 acres of Plum Creek Timber Company (PCTC) land in the planning area. In 2010, 3040 acres were added adjacent to and south of the original block in the Morrison Peak area, and in 2016, 5,446 acres adjacent to and north of the original block in the Sunflower Peak/Belmont Creek area were added. The last two acquisitions have utilized Land and Water Conservation Fund (LWCF) funding to purchase former PCTC lands from TNC. See Map 1 and 2 in Appendix G for a general location and land ownership.

The Proposed Action in this document was developed by an Inter-Disciplinary Team (ID Team) to identify issues and desired future conditions on public lands.

Issues identified internally and through public involvement served to establish the scope of this assessment.

1.2 Purpose and Need for the Proposed Action

The need for this proposal is to address upland forest conditions. Due to past management activities, upland forest communities on acquired lands have shifted away from fire tolerant, open stands dominated by ponderosa pine and western larch toward less fire tolerant stands dominated by smaller, more densely spaced Douglas-fir. These upland forest communities have a moderate or greater risk of undesirable disturbance from insect, disease and wildfire.

The purpose of this Proposed Action is to implement the BLM's and USFS's current policy and direction to reduce the risk of wildfire and manage forest habitats using an ecosystem management approach. Specifically treatments are needed to:

1. Increase the acreage of forest communities in the natural range of variability (NRV), dominated by large and very large ponderosa pine and western larch where these communities are now shifting toward relatively small diameter and densely stocked Douglas-fir trees;
2. Improve forage quality for ungulates by increasing the vigor and density of native bunch grasses, forbs and shrubs;
3. Reduce the risk of undesirable disturbance by insect, disease and wildfire.

An additional purpose of this Proposed Action is to provide economic benefits to the local communities through harvest of forest products where compatible with forest management and habitat objectives.

1.3 Decision to be Made

The BLM and USFS will decide whether to implement the Proposed Action. The BLM and USFS may decide to implement either all or a subset of the actions covered in the Proposed Action. If there is a decision to move forward with some or all of these activities the BLM and USFS will also decide the extent, location, timing, and project design features associated with each activity.

1.4 Conformance with Land Use Plans

The Proposed Action is in conformance with the Garnet RMP and Lolo Forest Plan as amended. Most of the planning area has established Management Areas with specific management goals and guidelines. The Proposed Action complies with these goals and guidelines. Management Areas are displayed in Appendix G on Map 10. A full description of the Management Areas can be found in the Garnet RMP.

1.5 Relationship to Statutes, Regulations, or other Plans

This document has been prepared to comply with the National Environmental Policy Act (NEPA). The authority for BLM and USFS actions is found in the Federal Land Policy and Management Act (USDI-BLM 1976) (43U.S.C. 1701) and National Forest Management Act (NFMA 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 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 planning area.

Section 7 of The Endangered Species Act (ESA) requires that the BLM and USFS consult with the U.S. Fish and Wildlife Service (USFWS) 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.

Canada lynx (threatened), grizzly bear (threatened), and American wolverine (proposed threatened), may inhabit the planning area. The Canada Lynx Conservation Assessment and Strategy, 3rd edition (Interagency Lynx Biology Team 2013) would be followed. Canada lynx critical habitat is present and Federal Register, Vol 79, No. 177, Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment would be followed. The Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy (USDI-FWS 2013), and the amended incidental take statement for the biological opinion on the effects of the Missoula Resource Management Plan (USDI-FWS 2012) and the Grizzly Bear Recovery Plan (USDI-FWS 1993) would be followed. American wolverine literature and other guidance would be followed.

The Bull Trout Plan Implementation Biological Opinion (PIBO) and the Inland Native Fish Conservation Strategy (INFISH) (USDA-FS 1995a, USDI-FWS 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).

1.6 Identification of Issues

Issues were identified during ID team meetings and through public involvement. The affected environment and environmental effects analysis of the Proposed Action and No Action Alternative are focused on these issues:

How would the Proposed Action impact livestock movement and available forage in the area?

How will the Proposed Action impact forest resources in context of species composition, density, fuel loading, and structure?

Will the Proposed Action have impacts to Canada lynx and Canada lynx Critical Habitat, grizzly bear and their habitat, American wolverine and their habitat, sensitive species and their habitat, migratory birds and their habitat, and big game and their habitat?

Will the Proposed Action have impacts to bull trout, bull trout critical habitat and BLM sensitive aquatic species and amphibians?

What is the Proposed Action 's impact to the spread of noxious weeds?

Will the Proposed Action impact water quality?

What impact will the Proposed Action have on cultural resources?

Will the Proposed Action impact recreation opportunities and visual resource management including the Lewis and Clark National Historic Trail?

1.7 Issues Considered But Not Analyzed in Detail

What effects would the Proposed Action have on Special Status plants? Vegetation inventories in the planning area are extensive and no Special Status plants have been found. There should be no effect on Special Status plants.

What would be the effects of smoke (prescribed burning) and dust (road traffic) on air quality? The planning area contains a mix of broad valleys 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 features for abatement, and smoke effects would be controlled with adherence to the procedures and standards developed by the Montana Idaho Airshed Group.

1.8 Summary of Agency and Public Involvement

The ID Team was formed in March of 2016 and had regular meetings through April 2017, including field visits. The project was posted on the BLM's eplanning website in February of 2016. On June 21, 2016, at a Clearwater Blackfoot Project (CBP) working group meeting, the project was announced including the planning phase of the project, basic goals and objectives, and timelines.

A public meeting was held on October 26th, 2016 at Lubrecht Experimental Forest. Outreach for the public meeting included a BLM press release, a Facebook post on the Blackfoot Challenge's Facebook page, an email to the members of the CBP working group, a posting in the Potomac School newsletter that was emailed out, emails to several adjacent landowners, and posting flyers at the local gas station in Potomac and at the Greenough Potomac Community Center.

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 2.5 page 16 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 so additional action alternatives are not necessary.

2.2 No Action Alternative

The No Action Alternative would not implement the Proposed Action. The No Action Alternative would not meet the purpose and need of the Proposed Action to reduce the risk of undesirable disturbance from insect, disease and wildfire in upland forest communities. The BLM and USFS would continue to implement current federal and state regulations, policies, and decisions concerning water and air quality, fire suppression, noxious weed management, and threatened and endangered species.

2.3 Proposed Action Alternative

Proposed Action Objectives

1. Maintain past treatments that were designed to reduce hazardous fuels, move upland forest conditions towards the natural range of variability (NRV), and improve forage for ungulates.
2. Reduce hazardous fuels in the wildland urban interface (WUI).
3. Move upland forests toward the natural range of variability (NRV).

Prescribed fire, manual, and mechanical treatments will be used alone and in combinations to achieve these objectives. Specifically, these treatment types are:

1. Prescribed Fire (approximately 2,472 acres): Prescribed fire is the intentional ignition and application of fire to wildland fuels under pre-planned specified conditions of fuels, weather, and other variables. Preparation for prescribed fire includes fuels augmentation, which is manually done with chainsaws.
2. Mechanical (approximately 1,546 acres timber harvest and prescribed fire, 663 acres mastication with prescribed fire or cut-pile-burn, and 585 feet of new road construction): Mechanical treatments involve the use of vehicles such as wheeled tractors, crawler-type tractors, skidders, feller bunchers, excavators, bobcats, or specially designed vehicles with attached implements. These treatments include timber sales, mastication, and road building.
3. Manual (approximately 4,964 acres of pre-commercial thinning, 641 acres of pre-commercial thinning and prescribed fire, and 924 acres of tree planting): Manual treatments include the use of hand tools and hand-operated power tools. These include thinning with chainsaws, cutting and piling, planting, and fuel augmentation.

See Appendix G Map 3 for approximate location of treatments and Appendix F for treatment names and acres. Acres and locations are approximate and will change slightly during project layout. While total acres analyzed will not be exceeded, individual treatment units are expected to be slightly different in acres and location. In most cases, individual treatment units will be smaller in size and extent due to routine features encountered in the field during layout. In some cases, they will be larger, incorporating adjacent stands with similar vegetation conditions.

Prescribed Fire Treatments (5,322 acres)

Prescribed fire will be used by itself as a treatment and in conjunction with other treatments. This covers all acres that will have a component of prescribed fire, including mastication with prescribed fire or cut-pile-burn, timber harvest and prescribed fire, chainsaw thinning and prescribed fire, and prescribed fire with chainsaw fuels augmentation.

Objectives for the prescribed fire treatments are to restore and maintain early seral conditions in ponderosa pine and western larch stands, reduce fuels by consuming slash created by other treatments and naturally, create seedbeds to encourage natural ponderosa pine and western larch regeneration, and sustain and improve big game habitat through improvement and maintenance of the forage and browse vegetation. The prescribed burns will be low to moderate intensity burns resulting in high severity to the seedlings, saplings, and pole sized conifers, and low to moderate severity in the overstory and soils. In units where fuel augmentation is needed, sapling to pole-sized trees will be hand slashed to augment the fuels in sufficient quantities to support the burns. In Douglas-fir and ponderosa pine cover types the burns will be intended to reduce the encroaching conifers by 50 to 75%, while keeping mortality in the medium to large trees at less than 10%, and would reduce duff to less than 40 percent from present levels, and increase mineral soil exposure less than 10 percent. In larch cover types the burns will be intended to increase mineral soil exposure by at least 50% to create favorable seedbeds for western larch regeneration. 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.

Mastication with Prescribed Fire or Cut-Pile-Burn (663 acres)

These treatments occur in the Wildland-Urban Interface (WUI) and are both adjacent to or near private land, and high use recreation areas. The objective is to reduce fuels so that during a wildland fire event, there will be a greater potential for ground fire rather than crown fire. In these thinning from below and improvement cutting treatments, trees favored for removal would be shade tolerant species such as Douglas-fir and trees favored for retention would be shade intolerant species such as ponderosa pine and western larch. Trees will be cut mechanically with machinery such as a masticator, chipper, excavator, bobcat, or grinder, or manually with

chainsaws to site specific specifications. Fuels reduction would be accomplished either by the machinery (masticator, chipper, etc) or by burning the slash created by the treatment either by a broadcast burn or in piles.

Timber Harvest with Prescribed Fire (1,546 acres)

Improved forest resiliency, diversity and health would occur through treatments by shifting tree species composition, density and arrangement to conditions that more closely resemble the natural range of variability in ponderosa pine savannah and Douglas-fir/western larch forest types. This would be accomplished by: increasing ponderosa pine and Western larch representation and accelerating the development of larger size classes of trees; developing open, multi-aged stand structures; recruiting quality snags and coarse down woody debris; and increasing patch sizes to more closely resemble past patterns in forest communities.

Uneven-aged silvicultural systems to include group selection and single tree selection to a residual stand density index of approximately 110 would be utilized to move harvested stands toward a multi aged stand structure, which mimic stand structures developed by mixed severity fire regimes. Opening size would be sufficient to recruit and sustain shade intolerant ponderosa pine and western larch regeneration. The BLM would utilize naturally occurring retention groups and openings such as areas incompatible with harvesting (talus slopes, rock outcrops) and agency specified reserve areas (riparian areas, wildlife travel corridors, retention parches) to create or maintain groups and openings. At the stand level, these harvests would randomly distribute individuals, clumps (retention groups) and openings (ICO) across the harvest area.

Trees of commercial value would be cut, skidded and removed to reduce live fuel loadings and to reduce fire caused mortality in remaining trees. Harvest would remove an estimated 40-60 percent of the present tree density, primarily targeting the shade tolerant, encroaching pole to medium-sized Douglas-fir component. Tree tops and limbs broken during harvesting operations would add to sapling to pole-sized trees hand slashed post-harvest to establish a fuel bed. It is estimated that 75 percent of the treatment area would be tractor-skidded with the remainder cable yarded. Cable yarding would be used on slopes over 40 percent and in all riparian protection zones. A low to mixed severity prescribed burn would follow harvest. The result of both treatments would be a reduction in average overstory canopy coverage from approximately 40 to 60 percent. Post treatment duff reduction and increased mineral soil exposure relative to pretreatment levels is estimated at 40 and 20 percent respectively.

Chainsaw Thinning and Prescribed Fire (641 acres)

The objective of chainsaw thinning and prescribed fire would be to reduce stem densities to allow for growing space and corresponding improved tree vigor, and reducing fuels created by the thinning. In these thinning from below and improvement cutting treatments, trees favored for removal would be shade tolerant species such as Douglas-fir and trees favored for retention would be shade intolerant species such as ponderosa pine and western larch. Variable density thinning practices would randomly distribute gaps and patches across the treatment areas where needed for wildlife habitat. Improved forest resiliency, diversity and health would occur through treatments by shifting tree species composition, density and arrangement to conditions that more closely resemble the natural range of variability. Trees will be manually cut with chainsaws to site specific specifications. Fuels reduction would be accomplished by burning the slash created by the thinning either by a broadcast burn or in piles.

Pre-Commercial Thinning (4,964 acres)

The objective of pre-commercial thinning would be to reduce stem densities to allow for growing space and corresponding improved tree vigor. In these thinning from below and improvement cutting treatments trees favored for removal would be shade tolerant species such as Douglas-fir and trees favored for retention would be shade intolerant species such as ponderosa pine and western larch. Variable density thinning practices would

randomly distribute gaps and patches across the treatment areas where needed for wildlife habitat. Improved forest resiliency and species diversity would occur through treatments by shifting tree species composition to conditions that more closely resemble the natural range of variability. These treatments will provide long-term fuels reduction and create stands more resilient to future insect and disease outbreaks. Trees will be manually cut with chainsaws to site specific specifications. Trees would be lopped and scattered so slash does not exceed a depth of 18 inches.

Tree Planting (924 acres)

The objectives 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 natural range of variability. Species that would be planted are ponderosa pine and western larch.

Road Construction

Approximately 585 feet of permanent road would be constructed to access treatment areas and to transport commercial forest products. This road would be retained as part of the transportation system for future administrative and emergency access by BLM, and a gate will be installed. The proposed road falls inside restricted use areas and therefore will not be open for public use. Gravel from a local gravel source on BLM will be used if needed during road construction. Several short segments (< 1/10 mile) of temporary road will be constructed to access interior landing in treatment areas to transport commercial forest products. Slash and soil moved during temporary road construction would be stockpiled, and replaced on the road surface after use is completed and freshly placed soil would be re-seeded. Conventional road building equipment such as bulldozers and excavators will be used for all road building.

2.4 Design Features for Proposed Action

The following design features would be used to design and implement the Proposed Action. Design features are developed to mitigate or avoid potentially adverse impacts. Some features are required by law, regulation, or policy.

If, during project layout or implementation, the BLM and USFS determine that one or more design features should be modified to address a site-specific condition, the modification will conform to the extent of environmental effect(s) described in this assessment. If modification to a design feature were expected to exceed the effects discussed in this EA, a new EA would be prepared and circulated for public review and comment.

Forestry and Fuels

1. Site-specific burn plans would be developed to implement low to moderate intensity prescribed fire projects to meet Proposed Action objectives in such a manner that mitigates risk to life, property and resource values.
2. Prescribed fire treatments would be monitored to determine effectiveness in meeting Proposed Action objectives and to prescribe any necessary remedial actions.
3. Pre-burn treatments, such as timber harvest or fuel augmentation would be used to create the fuel arrangements and conditions necessary to meet Proposed Action objectives.
4. Site productivity would be maintained by limiting reduction of soil organic matter (duff) and coarse down woody debris (> 6 diameter) to less than 50% (average) as compared to pre-burn conditions.
5. Prescribed fire treatments would minimize secondary bark beetle mortality to larger trees by limiting crown, root, and bole injury through control of scorch height, duff reduction and flame duration, respectively.

6. All existing roads used to transport machinery and logs would be maintained or improved to the standards found in *Best Management Practices for Forestry in Montana, as revised* (MT-DNRC 2015).
7. Standard timber harvest, thinning, mastication and road use contract stipulations would be followed to mitigate potential adverse impacts associated with water quality, soil productivity, hazardous fuels, noxious weeds, species of special concern, antiquities, and hazardous materials.
8. New road locations would avoid crossing terrain where road development would result in undesirable contrast with the visual characteristics of the landscape.
9. Commercial hauling would not be conducted when roads are saturated or otherwise subject to deep rutting, damaged drainage features, or excessive repair and maintenance.

Wildlife and Wildlife Habitat

1. Treatments would follow 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 et al. 1997) to maintain and/or improve snag or large woody debris habitat.
2. The current BLM 2017, Western Montana District's food storage order would be followed during project implementation to reduce potential human/wildlife conflicts.
3. Treatments would be designed to maintain wildlife corridors within home ranges, between seasonal home ranges, and for dispersal. Wildlife travel corridors typically follow ridges, saddles, and riparian corridors.
4. New roads would be designed to maintain wildlife security and travel corridors.
5. All treatments except planting and hauling would not occur from June 1 to July 15 to mitigate potential adverse effects during big game parturition (calving and fawning) and migratory bird nesting.
6. Vegetation treatments would discontinue and potentially be modified in areas were an active eagle, goshawk, great gray owl, or flammulated owl nest is discovered and resume after the nesting season.
7. A mixture of spring and fall burns would be prescribed to mitigate potential adverse effects to migratory birds, grizzly and black bears, elk and other big game.
8. If possible plan to accomplish all treatments within 5-years to reduce negative impacts on wildlife.
9. For treatments within Canada lynx Critical Habitat, defer treatments in the moist and cool subalpine fir habitat types. In areas where moist and cool subalpine fir habitat types are adjacent to moderately moist and cool Douglas-fir habitat types, a buffer of 600 feet will be established from the edge of the moist and cool subalpine fir habitat type and treatments will be deferred in this area.
10. Retain biological legacies, such as retention of structural legacies such as large healthy trees, large decadent trees, snags, logs, and other coarse woody debris on the forest floor
11. Adequate big game hiding cover will be maintained along McNamara road. This will require deferring treatment by up to two chains in specified areas as determined by the wildlife biologist in conjunction with a forester and/or fuels specialist.
12. In moderately moist and cool Douglas-fir habitat types, up to 50% variable stem spacing will be incorporated into prescriptions. Development of these prescriptions will include wildlife biologist input.
13. In big game winter range, special attention would be paid to retention of trees or groups of trees with full crowns to maximize potential snow intercept to provide forage and thermal cover.

Rangeland Vegetation and Health

1. Temporary fencing may be necessary in broadcast prescribed burn units as needed to allow rangeland vegetation to regrow in areas accessible by cattle. Specifically areas near water sources and/or light slopes and including areas where cattle normally access.
2. Temporary fenced areas will remain in place for 1-2 years or until vegetation management objective are achieved.
3. Temporary fencing may consist of but not limited to, 2-3 strand barbwire or electric fencing.
4. For the purpose of reducing impacts to fall and winter wildlife movement, electrical fencing components (i.e. solar panel, turbo tape) will be installed prior to livestock turnout and removed at the end of the livestock grazing season. Barbwire fences - all barbwire will be dropped to the ground when exclosure is not in use. BLM personnel will perform these activities as well as fence maintenance.

5. Once vegetation objectives are achieved, all fencing components and support structures will be removed.
6. Grazing lessee will be instructed not to place salt within ¼ mile of any pile burns or prescribed burns.

Noxious Weeds

1. Environmental analysis for projects and maintenance programs will need to assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices. Determine prevention and maintenance needs, to include the use of herbicides, if needed, at the onset of project planning.
2. Monitoring, prevention and control of noxious weeds would be implemented through an integrated, cooperative strategy as directed by the Missoula Field Office Integrated Weed Management Plan (USDI-BLM 2003).
3. All off-road equipment will be power-washed and weed free prior to arriving on public land. This practice does not apply to service vehicles traveling frequently in and out of the planning area that will remain on the roadway.
4. The successful timber sale bidders will be required to contribute funds for weed control.
5. Before ground-disturbing activities begin, inventory and prioritize weed infestations for treatment in project operating areas and along access routes. Identify what weeds are on site, or within reasonably expected potential invasion vicinity, and do a risk assessment accordingly. Control weeds as necessary before, during, and after implementation of the Proposed Action based on site-specific conditions and need.
6. 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).
7. Prescribed Burning:

   A. Ensure that equipment is free of weed seed and propagules before the prescribed fire treatment begins.

   B. Pre- inventory planning area and evaluate weeds present with regard to the effects on the weed spread relative to the fire prescription. Inspect and document weed establishment at fire access roads, cleaning sites, all disturbed staging areas, and within burned areas; control infestations to prevent spread within burned area.

   C. Use appropriate preparation and suppression tactics to reduce disturbances to soil and vegetation.

   D. Minimize soil disturbance to no more than needed to meet vegetation management objectives. Prevention practices to reduce soil disturbance include, but are not limited to: Treating fuels in place instead of piling, minimizing heat transfer to soil in burning, and minimizing fire line construction.
8. Timber Harvest:

   A. Treat weeds on projects used by contractors, emphasizing treatment of weed infestations on existing landings, skid trails, and helibases before activities commence.

   B. Minimize soil disturbance to no more than needed to meet project objectives. Logging practices to reduce soil disturbance include, but are not limited to: Over-snow logging, Skyline or helicopter logging, and reuse landings, skid trails and helibases when they are weed free.

   C. Minimize period from end of logging to site preparation, revegetation, and contract closure.
9. Road Management/Construction:

   A. Treat weeds in road decommissioning and reclamation projects before roads are made impassable. Re-inspect and follow-up based on initial inspection and documentation.

   B. Periodically inspect system roads and rights-of-way for invasion of noxious weeds. Inventory weed infestations and schedule them for treatment.

   C. Schedule and coordinate blading or pulling of noxious weed-infested roadsides or ditches in consultation with the local weed specialist. Do not blade or pull roadsides and ditches that are infested with noxious weeds unless doing so is required for public safety or protection of the

roadway. If the ditch must be pulled, ensure the weeds remain on-site. Blade from least infested to most infested areas. When it is necessary to blade noxious weed- infested roadsides or ditches, schedule activity when seeds or propagules are least likely to be viable and to be spread. Minimize soil surface disturbance and contain bladed material on the infested site. Soil will be revegetated with a certified weed-free seed mixture of forbs and grasses to cover the site trees re-establish.

Aquatic Species and Habitat

1. Final design of all vegetation treatments would incorporate the Riparian Habitat Conservation Area (RHCA) as specified by INFISH (USDA-FS 1995a), and the Bull Trout Plan Implementation Biological Opinion (USDI-FWS 1998). In RHCAs, primary management emphasis would be given to protecting and maintaining 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 as it relates to stream temperature.
   Project Specific RHCA Boundaries:
   Category 1 - Fish-bearing streams and Category 2 – Permanently flowing non-fish bearing streams: RHCAs consist of the stream and the area on either side of the stream extending 100 feet slope distance (200 feet, including both sides of the stream channel). No timber harvest, mastication, nor ignition activities would occur within 100 feet of fish bearing streams to include Gold Creek, Belmont Creek, and the Blackfoot River.
   Category 3 - Ponds, lakes, reservoirs, and wetlands greater than 1 acre: Interim RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.
   Other Streams - Class 2 and 3 streams as defined by Montana SMZ Law: Defer management to adhere to Montana SMZ Law.
2. No tree felling, ground-based skidding or yarding would occur in RHCAs, with the exception of hand thinning.
3. The thinning would not involve the use of mechanized equipment, yarding, or the removal of any material after felling. All felled trees would be left on the floodplain. No trees responsible for providing shade or contributing to bank stability would be felled during the work.
4. Prescribed fire would be allowed in RHCAs, 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.
5. 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.
6. Prescribed fire would be hand-ignited adjacent to RHCAs unless doing so would compromise the safety of burn personnel.
7. Only hand-constructed firelines 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.
8. Mixing of fuels (gasoline, diesel, and oils), fueling of equipment, and storage of fuel would not be allowed 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.
9. Toxic materials, including spheres and torch fuel, would be transported, stored, and used to minimize accidental spillage and/or introduction into streams.
10. Helicopter landing sites/refueling areas would not be established in RHCAs.

11. 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 (~0.1").
12. If conditions warrant, dust abatement would be performed on main haul roads for road surface retention and to avoid potential sediment source to river. BLM forestry, fisheries, and hydrological specialists will determine if dust abatement is needed during project implementation.

Water quality, Soils and Site Productivity and Stream and Riparian Condition

1. For water quality protection, Montana Forestry Best Management Practices will be applied (MT-DNRC 2015). This design feature also meets the Memorandum of Understanding for Water Quality Management (USDI-BLM 2010) and the Lower Blackfoot TMDL (MT-DEQ 2009).
2. Existing road drainage structures on haul roads in the activity area will retain/attain functionality.
3. Streamside Management Zones (SMZ) will be applied to any stream where the forest practices are implemented under a timber sale as per Montana SMZ Law, specifically:
   A. HF5-west will use a 50-ft SMZ for Dog Monument Draw (Class III).
   B. HF4-south will use a 50-ft. SMZ for the seeps (Class III) at the southeast end of the unit
   C. HF3-northern portion will use a 50-ft SMZ for slopes less than 35%, and a 100-ft SMZ for slopes greater than 35% (Class II).
   D. HF2 will use a 50-ft SMZ for Gold Creek (Class I) for slope less than 35%.
   E. HF11 will use a 100-ft SMZ for the Class I Blackfoot River since the slope is >35%.
   F. HF7 will use a 50-ft SMZ for a seep area at the east end (Class III).
   G. HF10 will use a 50-ft SMZ for two Class III seeps in Dunnigan Gulch.
   H. Mastication treatment units will also recognize SMZs along Gold Creek (Class I), Blackfoot River (Class I).
4. Post treatment levels of coarse woody debris (> 3 inches diameter) will be at 4.5 – 9 tons per acre for timber harvest and prescribed fire units where available.
5. New road construction segment may encounter the Bignell soil type, which can have low strength and high erodibility, and thus may need a gravel running surface, suitable drainage, and/or seasonal use restrictions to avoid road damage. BLM forestry and hydrological specialists will determine after initial pioneering of the road.
6. Conduct prescribed burning when there is adequate moisture in the soil, duff, and fuels to avoid high-severity, soil-damaging fire.
7. Equipment use (ground-based skidding, unsuspended cable yarding, mastication) would not occur when soils are wet and subject to compaction or displacement outside of designated skid trails. Equipment use would take advantage of frozen ground, snow cover, slash cover, or dry soil conditions to reduce compaction and displacement hazard.
8. Skid trails would not disturb more than 15% of any skidded treatment unit.
9. Any skid trails with exposed bare mineral soil will be decompacted, covered, and seeded after use.

Recreation and Visuals

1. Cutting units should resemble natural openings. To achieve this, the unit boundaries should avoid straight, linear edges.
2. Transition in cutting units should be feathered by retaining scattered, full crowned trees to reduce the abrupt edge effect.
3. Retaining stringers of trees through the cutting unit would aid in mitigating visual impacts.
4. Hauling will be limited to weekdays during the peak recreation season (Memorial Day through Labor Day) to reduce conflict during this high use period.
5. Timber sale contracts will have a road safety plan for hauling to reduce conflicts with recreation use.
6. Slash piles that are burned should be revegetated with native grass seed to reduce the impact of these burn marks on the visual landscape.

Cultural Resources and National Historic Trails

1. For public land in the planning area, National Historic Preservation Act Section 106 processes would be followed pursuant to the National Programmatic Agreement between the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.
2. Class III cultural resource inventories would be conducted prior to project implementation. If cultural resources are discovered, mitigation found in the Cultural Resource section of this document would be applied. In addition, all identified heritage properties would be flagged by a BLM Archaeologist to create a buffer area surrounding the site to protect them from project impacts. No management action within these buffers will take place unless an archaeologist is on site.
3. If cultural resource sites are discovered during project activities, or if known sites are damaged during operations, all work would stop in the immediate vicinity of the site and not begin again until authorized by a BLM Archaeologist.

Air Quality

1. Prescribed burning operations would follow procedures and standards developed by the Montana Idaho 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 (MDEQ) which regulates open burning in Montana.
2. If conditions warrant, dust abatement would be performed on main haul roads to avoid potential impacts to air quality. BLM forestry and fuels specialists will determine if dust abatement is needed during project implementation.

2.5 Alternatives Considered but Eliminated from Further Analysis

An Alternative to remove a bridge across Belmont Creek that is not meeting BLM standards was discussed, but did not meet the purpose and need.

An alternative to obliterate a section of road next to Belmont Creek, was discussed, but did not meet the purpose and need.

An Alternative restoring a historic cabin was discussed but did not meet the purpose and need.

An Alternative designating float in only campsites was discussed, but did not meet the purpose and need.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 Introduction

Affected environment describes the existing condition of resources brought forward for analysis, while environmental effects describes the expected environmental effects to those resources of implementing each of the Alternatives. Three levels of environmental effects are considered in this assessment:

-Direct Effects are adverse or desirable impacts resulting from implementation of the Proposed Action or No Action Alternative where there is a direct cause and effect.

-Indirect Effects are adverse or desirable impacts resulting from implementation of the Proposed Action or No Action Alternative which occur at a later time or different location.

-Cumulative Effects are those anticipated from implementation of the Proposed Action or No Action Alternative in the context of past, present, and reasonably foreseeable future actions. Reasonably foreseeable actions are described in 3.1.1. The geographic area used to assess cumulative effects varies by individual resource.

In order to understand the contribution of past actions to the cumulative effects of the Proposed Action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. Current conditions, or the affected environments, reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. The Affected Environment sections for each Issue summarize past actions to describe the present conditions. As such, this discussion of cumulative effects utilizes present conditions to identify the aggregate impact of past actions, and specific past actions are only identified where their aggregate impact is still applying direct impacts to the project environment relevant to each Issue. These conditions along with all known present and reasonably foreseeable future actions, and have been considered as appropriate in conducting cumulative affects analysis for the project.

The environmental effects analysis is focused on the issues identified by the interdisciplinary team and through public involvement.

3.1.1 Reasonable Foreseeable Future Actions

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.

Reasonably foreseeable future actions are those for which there are existing decisions, funding, formal proposals, or which are highly probable based on known opportunities or trends. The reasonably foreseeable future actions would cumulatively affect the same resources in the cumulative impact area as the Proposed Action and the No Action alternative. Reasonably foreseeable future actions on public lands include continued maintenance of roads, management of noxious weeds, recreation use by the public, and vegetation management by the DNRC, Lubrecht, TNC, and private landowners. See Appendix C for a summary of the reasonable foreseeable future actions and past actions.

Livestock grazing is expected to continue on private and state lands adjoining BLM lands based on existing decisions and trends. Because market forces and private landowner decisions will influence future livestock grazing use levels on private and state lands, use levels may fluctuate.

Development of private lands for housing on both large and small tracts has been on an upward trend in this area for the past ten years. Any increase in residential development in the planning area will add to the number of acres in the WUI, thereby increasing the threat of wildfire to human health and safety and property. Although we assume this trend of development will continue, the extent is unknown because there is no reliable way to predict how much subdivision and/or residential development will continue to occur in the next ten years, since the market place strongly influences these uses. Thus, we assume the acres of WUI will increase to some extent.

3.2 Forestry and Fuels

3.2.1 Affected Environment

Fire has been important in shaping vegetation structure and composition in the Interior Columbia Basin for thousands of years and was the dominant disturbance process that historically sustained forest ecosystems and biodiversity at the watershed scale (Johnson et al. 1994). Many anecdotal and scientific reports have documented the widespread occurrence of fire throughout the region. The causes of these fires were both natural and human-caused. Lightning caused fires during the summer months were abundant and spread across the landscape

according to fuels, weather, and topography. Native Americans purposefully ignited fires for thousands of years for a multitude of reasons including food gathering, clearing migration routes, hunting large game, enhancing plant resources, and fighting battles (Pyne 2001). These fires were mostly surface fires that maintained low and variable tree densities, light and patchy ground fuels, and favored fire-tolerant trees such as ponderosa pine and a low and patchy cover of associated fire-tolerant shrubs and grasses (Hessburg et al. 2005). These fires also provided other important feedbacks and effects to the forest landscape. For example, frequent surface fires favored fire tolerant trees such as western larch by periodically exposing patches of mineral soil which allows for seedling establishment. They maintained fire tolerant forest structures by elevating tree crown bases and scorched or consumed many seedlings, saplings, and pole-sized trees. The fires cycled nutrients from branches and foliage to the soil where they could be used by other plants and promoted the growth and development of low and patchy understory shrub and forb vegetation. Surface fires reduced the long-term threat of running crown fires by reducing the fuel bed and metering individual tree and group torching, and they reduced competition for site resources among surviving trees, shrubs, and herbs (Hessburg et al. 2005).

As a result of timber harvest activities that took place in the Lower Blackfoot Corridor just after the turn of the 20th century (1920's), many large trees were removed. The most obvious remnants of timber harvest are large stumps scattered throughout the planning area. Many of these old stumps are six to twelve feet tall and have notches cut in them. These notches, referred to as "spring board notches" were cut into the trees just before the trees were harvested. The springboard was primarily just a wood plank, and the springboard notch was how the logger fastened the springboard in place. Putting the springboard in the notch created a small sturdy platform that the logger could stand on while cutting the tree. Most of the taller stumps in the planning area that are from trees harvested around 1920 are fire scared. Upon observation, the fire scars were partially healed over by 1 to 3 inches of growth, an indication that the trees had been scarred 10-20 years prior to being harvested. Based on these observations, it is logical to assume that one or more large-scale fires burned through the planning area in the late 19th or early 20th centuries. There are records of a large fire that burned on the north end of the planning area in 1910, but it is thought to have stopped short of burning far enough to the south to burn through the entire planning area. There are no other known records of historical fires within the planning area, although based on historical accounts (Arno 1980, Gruell 1983) and recent fire-scar studies (Agee 1993, Agee 1998, Fischer and Bradley 1987, Arno et al. 1997), fire in the Blackfoot watershed was a relatively frequent disturbance event prior to Euro-American settlement.

Fires continued to play an important role in shaping the landscape until the 1940's, when fire suppression was effective enough to limit the role of natural fire throughout the region (Pyne 1982). Currently the role of wildfire is very limited in the planning area, due in part 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, including all of the lands within the planning area. Over five decades, the BFPA built a system of roads, trails, and lookouts that made the organization highly effective in suppressing most fires at less than 10 acres in size. In 1970, the BFPA transitioned fire suppression responsibilities to the State of Montana Department of Natural Resources and Conservation (DNRC). Since 1921, very few fires have escaped initial attack or affected any major vegetation change within the Blackfoot Corridor. The last substantial wildfire event in the planning area was the Mineral-Primm fire in 2003. This fire started on the Lolo National Forest and burned onto recently acquired BLM lands in the Sunflower Mountain area, and burned approximately 434 acres of BLM land. The most influence of fire within the planning area during the past 24 years has been the implementation of prescribed burning and mechanical fuels reduction (timber harvest,

chipping, and grinding) as a fire surrogate. From 2003 to 2005, 1,021 acres of the planning area was treated with prescribed fire (906 acres) or treated mechanically (115 acres). Aside from occasional fire starts due to lightning and humans which have been suppressed by the DNRC (approximately 2 per year with none more than 5 acres in size), these treatments have been the only impacts of fire in the planning area since the BLM began acquiring these lands in 1996.

It is generally accepted that past management practices including the successful suppression of many wildland fires in some western United States ecosystems over the past century have resulted in excessive accumulations of surface and canopy fuels which have, in turn, increased the potential for severe fires (Finney and Cohen 2003, Mutch et al. 1993, Kolb et al. 1998, Keane et al. 2002, Stephens and Ruth 2005). Exclusion of historically frequent fire from these ecosystems has resulted in dramatic changes to vegetation structure and fuels compared to conditions in the 19th century. These alterations in fuel structure, specifically the in-growth of trees and accumulation of dead woody fuels, tend to readily support extreme fire behavior (crown fire, spotting) (Finney and Cohen 2003). Tree seedlings, saplings, and fire-sensitive shrubs have become more common and thereby have increased understory fuel loadings. In most coniferous forests, canopy fuels also increase and become more available without disturbance as more shade tolerant trees become established in the understory and overstory (Keane et al. 2002), which is the case within much of the planning area. Douglas-fir seedlings and saplings have encroached and are proliferating in the understory in stands of ponderosa pine and western larch. This has, in effect, created a fuel ladder for fire to easily transition from a low intensity surface fire into a high intensity crown fire. On many sites, the risk of high severity wildfire and insect and disease infestation has steadily increased due to past fire management practices.

Historical fire regimes of the Lower Blackfoot Corridor have and continue to be directly and indirectly altered by human actions. Native Americans interacted and influenced this landscape for thousands of years by the use of fire, and those influences are incorporated into the fire history of the area. It is the extent of human influence over the last 100 years that is of primary concern when considering the cumulative impacts to the fire regimes of the Lower Blackfoot Corridor. Domestic livestock grazing, commercial logging, road and rail construction, urbanization, and rural development all have contributed to the direct or indirect exclusion of fires (Hessburg et al. 2005). In particular, land conversion to residential and urban development are obvious changes. The majority of urban development in the planning area has occurred in the southwestern portion of the Lower Blackfoot Corridor near the historic log landing site of McNamara. There are numerous residences and structures located on private lands in the Messina and Lower Bear Creek Subdivisions, as well as in dispersed areas located on Last Stand Drive, Only Sierra Lane, and Jewel Lane (see Map 9 in Appendix G). Johnsrud Park, which is a popular developed recreation site along the Blackfoot River, is also in this area.

The Lower Blackfoot Corridor is within the area assessed in the Missoula County Community Wildfire Protection Plan (CWPP), drafted in 2005. The Missoula County CWPP is a county level document emphasizing collaborative efforts to reduce hazardous fuels. The county level CWPP efforts are directly tied to the Healthy Forests Restoration Act of 2003 (HFRA). The HFRA effort asked communities to assume a greater role in identifying lands for priority fuels reduction treatment and proposed treatment recommendations. The CWPP defines wildland-urban interface (WUI) as a 1.5-mile zone around areas of high population density. Most of the BLM managed lands that are within the Lower Blackfoot Corridor on the south side of the Blackfoot River are within the WUI (see Map 8 in Appendix G). Lands located in the eastern portion of the planning area are also within the WUI given their close proximity to residences in the Ninemile Prairie area. The CWPP has an overall rating for communities based on two subcomponents: wildfire risk and human safety factors. Wildfire risk is

based on critical infrastructure, water supplies, transportation corridors, fuels, slope, and facilities. Human safety risk factors are based on population density, critical egress, and fire response capabilities. The combination of these two risk factors establishes the overall risk rating. The overall risk rating for the residences adjacent to BLM lands in the Lower Blackfoot Corridor planning area are rated as moderate and were ranked as the second highest priority for fuels treatments within the Greenough/Potomac Fire Service Area (Wallace and Reeves 2005). Within the Missoula County CWPP, fuels treatment goals and guidelines recommend the following for Federal Lands within Missoula County:

Federal (Public) Lands

- *Treatment Priorities*
  - Select projects in High and Moderate Priority Areas for Fuel Reduction (preferred) that maximize safety, or best protect community values.
- *Treatment Strategies*
  - In lower and mid elevation, ponderosa pine/larch/Douglas fir forests, remove understory vegetation to eliminate fuels that lead to the canopy of mature, healthy trees; so as to reduce the likelihood of fast-moving, tree-killing fire. Additionally, seeding, sapling or pole-sized stands with little or no overstory may need thinning to reduce crown density and fuel continuity.
  - In higher elevation, lodgepole pine forests, select projects with enough scale so as to reduce fire severity around communities, critical infrastructure, or other community values, so they can survive without the immediate intervention of firefighters.
  - Design projects specifically to reduce hazardous fuel levels. Timber harvest and ecosystem restoration may be project outcomes. However, emphasis is on fuel reduction. Sell material targeted for removal, if it is profitable to do so.
  - Use existing fuel-mitigation projects to create perimeters around communities, roadways, railway lines, powerlines, etc.
  - Prescribed fire use is allowed, where/when appropriate, i.e. under all circumstances community safety must be preserved.
- *Machinery*
  - Make equipment choices that minimize disturbance to the land and prevent soil erosion.
- *Biomass Disposal*
  - Choose methods for disposing of unwanted vegetation (slash) that maximize profit and minimize future risk to landscapes.

In addition to the recommendations brought forth in the Missoula County CWPP of 2005, a study conducted by the Ecosystem Management Research Institute titled "Blackfoot Watershed Fuels Assessment" recommended the following as one of 18 management recommendations within the Blackfoot River Watershed: " Wildfire fuel mitigation programs and establishment of the Wildland Urban Interface should be developed with full consideration given to the ecosystem restoration goals identified in this assessment" (EMRI 2008).

As previously discussed, land use and land management programs and policies that have functionally suppressed fire in the landscape have had profound effects on many ecological communities, ecosystem processes, and the biodiversity dependent on the fire-influenced native condition. A comparison was made between current conditions and what is considered to be a natural range of variability (NRV) to quantitatively define the affected environment and to develop desired conditions for forest vegetation within the planning area. The NRV was developed by using "Historical Vegetation of Montana" (Losensky 1997) as a basis for developing ecologically sustainable conditions. Current conditions were determined by using data collected within the planning area.

Managing forest ecosystems within their natural range of variability (NRV) will sustain native species and biodiversity; maintain ecosystem productivity; and provide for the long-term sustainability of ecosystem values and services (Duncan et al. 2010, Landres et al. 1999, Swanson et al. 1994, Haufler 1999, Morgan et al. 1994). The concept of managing forests to move towards or remain within their NRV was utilized to create desired conditions for the Lower Blackfoot Corridor. Historic conditions provide insight for understanding the set of conditions and processes that historically sustained ecosystems and biodiversity, and provides a reference against which to evaluate current ecosystem change. Historic conditions were used to provide a context for evaluating current ecosystem conditions, identifying departures and associated risks to ecosystem components, and was used to develop desired conditions. Desired future conditions address landscape size class and structural distributions and tree-stocking levels as a strategy to minimize forest vulnerability to stressors consistent with the long-term disturbances expected under current and future climates (www.adaptationpartners.org). Managing vegetation in the face of uncertainty requires a variety of approaches and strategies that are focused on enhancing ecosystem resistance and resilience. Overall, desired future conditions are a reflection of what are ecologically sustainable conditions.

In order to contrast differences between present conditions and the NRV, forest vegetation in the planning area was divided into four broad habitat type groups (HTG) and a comparison of current and a NRV was completed. HTGs are groupings of similar habitat types. Habitat types are an aggregation of ecological sites of like biophysical environments (such as climate, aspect, and soil characteristics) that produce plant communities of similar composition, structure, and function. The vegetation communities that would develop over time, given no major natural or human disturbances—the climax plant community—would be similar within a particular habitat type. Existing vegetation condition (cover type) in a given habitat type can and does vary widely, reflecting each site's unique history, forest character, pattern of disturbances, and point in time along successional pathways. Habitat types are described in detail in Pfister et al. (1977). Differences between current and the NRV and a description of desired conditions are summarized below by habitat type group and are displayed in more detail in Appendix E.

Habitat Type Group 1: Warm and Dry Douglas-fir (5,725 Acres, 28%)

These are low elevation dry sites that support ponderosa pine on the driest sites and Douglas-fir on the more moist sites in this group. Bunchgrasses dominate the understory and tree density was historically low. The dominant fire group is within dry Douglas-fir habitat types (fire group 4). Fires were generally frequent and non-lethal with a relatively uniform pattern. Average fire frequency ranged between 5 and 25 years (Fisher and Bradley 1987). Pre-suppression composition and structure was typically open, park-like, multi-storied and multi-aged stands of ponderosa pine and/or Douglas-fir. The frequent low severity fires maintained open stand conditions by removing understory shrubs and selectively thinning understory trees. Historic fires characteristically moved rapidly through the grass understory vegetation with natural fuel loadings about 5 to 10 tons per acre on dry ponderosa pine sites. Historic fuel loading on dry Douglas-fir habitat types was higher and averaged about 11 tons per acre (Fischer and Bradley 1987).

Fire suppression efforts have successfully excluded fire for several natural cycles. This has resulted in the warm and dry Douglas-fir habitat types being dominated by increased Douglas-fir composition and density with marked changes in forest structure. Dominant species composition has shifted away from ponderosa pine toward more shade tolerant Douglas-fir. The bunchgrass and shrub component is currently characterized by lower coverage and vigor as compared to historic conditions. Prolonged absence of fire on many sites has resulted in an

overabundance of trees in mid-range size classes and a lack of large trees. The amount of area in seedling/sapling sized trees as well as the very large size classes (> 21" dbh) individuals (especially within the seral species components) has been reduced from historic ranges. Pole (5"-9" dbh), medium (9.1"-15") and large (15.1"- 21") tree size classes exceed historic ranges. Historic open uneven aged stand structures are currently under-represented and have been replaced by dense even aged second growth ponderosa pine and multi-storied Douglas-fir dominated stands. Current fire frequency in most of the planning area is greater than 50 years. Fire occurrence within the planning area under current conditions may result in rapid spread of stand-destroying crown fires (Fischer and Bradley 1987, Graham et al. 2004).

Habitat Type Group 2: Moderately Warm and Dry Douglas-fir (9,890 Acres, 48%)

This habitat type group is similar to Habitat Group 1 in that it supports relatively open grown ponderosa pine and Douglas-fir forests. However, these sites have slightly higher soil moisture and cooler temperatures resulting in some vegetation differences, most notably the occurrence of western larch. Increased moisture availability on these sites allows them to support greater tree densities. Shrubs and moist site forbs dominate the understory; pinegrass and elk sedge are often well represented. Ponderosa pine and western larch are shade intolerant species whose abundance varies by habitat type phase. Douglas-fir is typically present at most stages of stand development. Western larch is often a seral dominant on moist Douglas-fir habitat types. The dominant fire groups are dry Douglas-fir habitat types (fire group 4) and the more moist Douglas-fir habitat types (fire group 6) (Fischer and Bradley 1987). Average fire frequency ranged between 5 and 50 years. Historically fire severity was variable, ranging from frequent, low intensity, non-lethal, understory fires to infrequent, mixed severity fires. Down, dead fuel loads averaged about 12 tons per acre, but may have been much higher as they ranged from 1 to 74 tons per acre (Fischer and Bradley 1987).

The absence of fire as a disturbance process and past harvest have resulted in corresponding shifts in species composition and stand structures. In terms of the NRV, ponderosa pine and western larch are underrepresented and have been replaced by shade intolerant Douglas-fir which is overrepresented. The amount of area in a very large size class (> 21" dbh trees) has been reduced from historic ranges (especially within western larch and ponderosa pine species components). Pole (5"-9" dbh), medium (9.1"-15") and large (15.1"- 21") tree size classes exceed historic ranges. Much of the area occupied by Habitat Type Group 2 within the LBC has dense, continuous, closed canopy Douglas-fir dominated stands with declining ponderosa pine and western larch. Overstocked Douglas-fir stands with dense understories often result in moderate to high burn severities (Fischer and Bradley 1987).

Habitat Type Group 3: Moderately Cool and Dry Douglas-fir (3,223 Acres, 16%)

The major forest types within this habitat type group are Douglas-fir and western larch (fire group 6). On some habitat types within this group, Douglas-fir is the primary species in all stages of stand development. Lodgepole pine and western larch are common shade-intolerant species where site conditions permit adequate sunlight and moisture. Mixed species stands of Douglas-fir, lodgepole pine, western larch, and ponderosa pine are also common. Stands in this habitat type group may be either single or multi-storied as both conditions were historically prevalent and dictated by disturbance history, site conditions, and seed availability.

In the absence of fire or other disturbance, stand understories have developed Douglas-fir thickets over much of the area occupied by the habitat type group within the LBC area. Common understory species include ninebark, snowberry, huckleberry, beargrass, and pinegrass. The natural fire interval for low severity burns was probably

between 10 and 50 years. Low severity, mixed severity, and high severity fires were all historically common and varied as a function of site and climatic conditions. Historic fuel loading was also quite variable with wide ranges from site to site, as described in Habitat Type Group 2. A shift in species composition has occurred in both the overstory and the understory in this habitat type group. Currently there is more Douglas-fir cover than western larch while the natural range of variability indicates that there should be equal amounts of each. There is an overabundance of pole, medium and large sized structure components as compared to desired conditions and a lack of very large trees. The grass/forb/shrub component that would have comprised 5-10 percent of this HTGs natural structural distribution is currently not represented at all. Continuous, closed canopy Douglas-fir dominated stands with declining ponderosa pine and western larch have developed in the absence of fire.

Habitat Type Group 4: Cool and Moist Subalpine fir (298 Acres, 1%)

These habitat types comprise a small portion (1%) of the planning area. The cool moist habitat types currently have a Douglas-fir cover type with a mix of associated conifer species to include lodgepole pine and subalpine fir. Common conifers include lodgepole pine, Douglas-fir, and subalpine fir. Engelmann spruce is also a key component on moist sites. Understory vegetation is abundant and consists of moisture favoring species. Average fire frequency is probably 130 years, but in many stands exceeds 130 years. Small, moderate severity fires occurred on mesic sites with discontinuous fuels. More severe, infrequent fires were more prevalent on the drier sites within this group. While some low intensity surface fires probably did occur, they were not typical, as the moisture on these sites would preclude such events to a very narrow window during the summer. Down woody fuel loading averages 25 tons per acre, but may be considerably higher exceeding 70 tons per acre (Fisher and Bradley 1987).

Data collected for this HTG indicates that the current cover type and species composition is within what is considered to be natural ranges. In terms of structure, the pole and medium sized components exceed natural ranges while the grass/forb/shrub, seedling/sapling, large and very large components are lacking. Severe infrequent fires in this HTG would have created more even aged stand structures which are what is found in the cool and moist HTG in the planning area.

3.2.2 Environmental Effects (Proposed Action and No Action)

The specific purpose and need of Proposed Actions are to: (1) increase the acreage of forest communities in the natural range of variability (NRV), dominated by large and very large ponderosa pine and western larch where these communities are now shifting toward relatively small diameter and densely stocked Douglas-fir trees; (2) improve forage quality for ungulates by increasing the vigor and density of native bunch grasses, forbs and shrubs; (3) reduce the risk of undesirable disturbance by insect, disease and wildfire and; (4) provide economic benefits to the local communities. This effects analysis addresses how both the Proposed Action and the No Action alternatives will impact forest resources in the context of species composition, density, structure and fuel loading. The amount of proposed treatment by habitat type group is displayed in Table 1 below. Treatments within the WUI are also shown in Table 1.

PROPOSED ACTION

Direct and Indirect Effects

Table 1: Treatment Type and Acres by Habitat Type Group and WUI

Acres and percent of Proposed Action alternative treatments displayed by habitat type group (HTG). Values in parenthesis are the percent of the HTG that would have a given treatment implemented in it. For example, prescribed fire is proposed on 932 acres or 39% of the warm dry Douglas-fir HTG. Proposed treatments within the WUI are also shown and included in the total.

Proposed Action Alternative	Warm Dry Douglas-fir (HTG 1)	Mod. Warm Dry Douglas-fir (HTG 2)	Mod. Cool Dry Douglas-fir (HTG 3)	Cool Moist Subalpine fir (HTG 4)	Total	Total within WUI
Prescribed fire treatments	932(39)	1,259 (20)	171 (7)	0	2,362	846
Pre-commercial thinning	474 (20)	3,052 (48)	1,456 (63)	0	4,982	316
Timber harvest with prescribed fire	171 (7)	939 (15)	430 (19)	0	1,540	827
Chainsaw thinning or mastication with prescribed fire or cut-pile-burn	478 (20)	656 (10)	170 (7)	0	1,304	850
Tree planting	345 (14)	485 (8)	94 (4)	0	924	0
Total acres per HTG	**2,400**	**6,391**	**2,321**	**0**	**11,112**	**2,839**

Pre-commercial thinning, timber harvest with prescribed fire, thinning or mastication with prescribed fire, and cut-pile-burn treatments are proposed on 7,826 or 70% of the proposed planning area across HTGs 1, 2 and 3. These treatment types are expected to have similar effects to forests and fuels within the planning area so they are grouped for purposes of the effects analysis. The direct effects of thinning, timber harvest, thinning or mastication with prescribed fire and cut-pile-burn treatments include: 1) a shift in species composition towards desired conditions which are within the natural range of variability. As described in the detailed Proposed Actions these treatments are designed to target removal of shade tolerant species (Douglas-fir) and retain shade intolerant species (ponderosa pine and western larch); 2) a reduction in tree density, mostly within the pole to medium-sized Douglas-fir component. Proposed harvest and thinning treatments would remove an estimated 30-50 percent of the present tree density; and 3) increased tree vigor as thinning increases stand photosynthetic efficiency and net primary productivity in residual trees by as much as 20%, functioning to increase crown vigor and resulting diameter growth (Smith et al. 1997).

Indirect effects of proposed pre-commercial thinning, timber harvest with prescribed fire, mastication with prescribed fire and cut-pile-burn treatments include: 1) accelerated development of a size class distribution (stand structure) that more closely resembles desired conditions which would be within the natural range of variability; 2) movement toward open uneven aged stand structures that are currently under-represented through thinning and harvest of the dense even aged second growth in the planning area. Uneven aged silvicultural systems that are proposed for timber harvest create or maintain multi-aged stand structures (Smith et al. 1997); 3) proposed treatments would increase tree vigor and as a result increase resilience to insect and disease disturbances outside of the natural range of variability over time by diminishing competition for water and nutrients and by favoring non-host species and creating species diversity (Hood et al. 2016, Byler 1990, Carlson 1989); and 4) wildfire risk in the context of occurrence probability would not be affected through implementation of the Proposed Action. Proposed treatments would modify fuel loading, arrangement and continuity to reduce the risk of high intensity crown fire at the stand level across the planning area while improving fire suppression efficacy and efficiency adjacent to and within the WUI. Mechanical fuel treatments followed by prescribed burning has been shown to reduce fire severity over burning alone or deferring pre burn fuel treatments (Pollet and Omi 2002, Omi et al. 2006, Peterson et al. 2005). Increased ground cover of bunchgrasses, forbs and shrubs would occur as a result of Proposed Actions due to a reduction in tree canopy cover and the resulting abundance of sunlight.

Prescribed fire without thinning or harvest is proposed on 2,362 acres or 21% of the planning area across HTGs 1, 2 and 3. This treatment is proposed on sites that support understory vegetation with thickets of conifer encroachment below the main canopy. Douglas-fir is the primary understory conifer species. As described in the Proposed Action, one of the objectives of this prescribed treatment is to restore and maintain early seral conditions in ponderosa pine and western larch stands. Direct effects of proposed prescribed burning would include a reduction in seedling and sapling sized Douglas-fir by 50 to 75%, an increase in mineral soil exposure which creates favorable seedbeds for western larch and ponderosa pine regeneration and a reduction in ladder fuels and surface fuel loading. These direct effects would create the following indirect effects: 1) a shift in species composition from an overabundance of shade tolerant Douglas-fir to early seral fire adapted ponderosa pine and western larch; 2) increased representation and vigor of understory bunchgrasses and shrubs; 3) movement towards or maintenance of open uneven aged stand structures; and 4) a reduction in risk of fires burning outside their natural range of variability.

Planting treatments are proposed on up to 924 acres or 8% of the planning area in HTGs 1, 2, and 3. The majority (90%) of proposed planting would occur in HTGs 1 and 2 which are the warmer and dryer habitat types in the area. As previously discussed, these warm dry habitat types have experienced an increase in Douglas-fir and a decrease in ponderosa pine and western larch especially in the seedling and sapling size classes. Planting would increase the amount of ponderosa pine and western larch within the proposed planning area in the seedling and sapling size classes.

Treatments in the WUI cover 2,839 acres of all treatment types except planting and include 14% of the planning area and occur in HTGs 1, 2, and 3. Direct and indirect effects are described above per treatment type.

Cumulative Effects

As previously discussed in the forestry and fuels affected environment section of this document, current conditions of the planning area have been shaped by past land ownership and associated management practices since the late 1800s. In the more recent past, timber harvest has affected approximately 13% of public lands in the planning area. Ten percent of that past harvest consisted of an overstory removal and occurred on what was then land owned by The Nature Conservancy which is now owned by BLM. This resulted in a reduction in trees in the large and very large size classes in the 10% of the planning area in which that harvest occurred. The remaining three percent of the past 13% of past harvest occurred on BLM and were grouped shelterwood harvests that resulted in regeneration of western larch and ponderosa pine, a reduction in Douglas-fir density and improved growth and vigor in residual trees.

In addition to past timber harvest, the following vegetation management treatments occurred on BLM managed lands from 2003 to 2005:

Table 2: Past Treatments on BLM Land

Treatment Type	Acres	Percent of Planning area
Prescribed fire	906	4%
Planting	177	<1%
Pre-commercial thinning	1568	8%
Chipping/Mastication	115	<1%

The effects of these past treatments are: a reduction in seedling, sapling and pole sized Douglas-fir as a result of prescribed fire and thinning; an increase in ponderosa pine and western larch through planting and seed bed preparation from timber harvest and prescribed burning; a reduction in fuel loading and fire risk to private

property as a result of chipping or mastication and prescribed fire. The purpose and need of the environmental assessment that was completed in 2000 and implemented in the early 2000s was to reduce the risk of wildfire, maintain or improve water quality, and manage forests, rangelands, and aquatic and riparian habitats using an ecosystem approach. The 2000 EA addressed the problems and opportunities identified in aquatic/riparian habitats, upland vegetation, and road conditions. The BLM began the process of restoring historic forest structures, species composition and density by implementing these actions in the past. Implementation of the actions that are currently being proposed would advance movement of forest vegetation in the planning area towards desired future conditions.

Timber stand improvement (including pre-commercial thinning, planting), timber harvest, and prescribed burning treatments to reduce fire and insect risk (including increasing seral tree species such as ponderosa pine and western larch) and improve wildlife habitat, is envisioned over the next decade on approximately 9% of forest land within and adjacent to the planning area. The majority of future proposed treatments would be intermediary (i.e., timber stand improvement through thinning) with objectives to restore the landscape to a natural range of variability while simultaneously improving or maintaining wildlife habitat and minimizing risk of wildfire to the wildland urban interface.

NO ACTION

Direct, Indirect, and Cumulative Effects

The No Action alternative does not involve any active management strategies and the landscape would remain highly vulnerable to stressors coupled with a changing climate. Proposed Actions designed to increase stand vigor and long-term resistance to unnatural fire and insect and disease damage would be deferred, increasing 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 over time (Hood et al. 2016, Byler 1990, Carlson 1989, Fiedler et al. 2004, Graham et al. 1999). The No Action alternative would allow understory vegetation to continue to develop, intensifying ladder fuel accumulations. This would result in a continuation of the shift in species composition to Douglas-fir in the understory. Where young ponderosa pine and western larch exists in the understory it would be outcompeted by Douglas-fir, as conditions are favorable for its dominance. Wildfire occurrence could result in rapidly spreading high intensity crown fires due to sapling and pole thickets beneath the main canopy (Fischer and Bradley 1987). This type of fire is likely to result in high levels of mortality in the ponderosa pine and western larch component in the understory and overstory and consume ponderosa pine and western larch seed sources, potentially reducing its distribution across the landscape. Opportunity to reduce fire risk to adjacent high value areas would be also be lost while the risk of independent crown fire and severe surface fire would increase over time. The opportunity to increase fire suppression efficiency and effectiveness through establishment of fuel breaks adjacent to and within the WUI would be lost. A continued decline in associated wildlife habitat would occur over time as bunchgrass communities would be reduced as conifer canopy cover continues to increase. Overall, the effects are a degradation of ecologically at-risk native forb and bunchgrass communities and dry, open ponderosa pine, western larch and Douglas-fir communities. This alternative would move sites on their present trajectory away from ecologically sustainable desired future conditions.

3.3 Wildlife and Wildlife Habitat

3.3.1 Affected Environment

Special Status Species

The Lower Blackfoot Corridor (LBC) provides habitat for several terrestrial special status species. Species included in Table 3 are protected under the Endangered Species Act; species included in Table 4 are recognized by the BLM Montana/Dakotas State Director as sensitive species.

Threatened and Endangered Species

Table 3: Threatened and Endangered Species Occurrence and Habitat Potentially Affected By the Proposed Action

Species	Status	Occurrence	Habitat Potentially Affected
Grizzly Bear (*Ursus arctos*)	Threatened	Resident	Yes; Habitat present
Canada Lynx (*Lynx Canadensis*)	Threatened	Transient	No; Lynx not affected
Canada Lynx (*Lynx Canadensis*)	Critical Habitat	Yes	Yes; Unit 3, Northern Rockies
American Wolverine (*Gulo gulo*)	Proposed	Yes	Yes; Habitat present
Western yellow-billed cuckoo (*Coccyzus americanus*)	Threatened	No	No; Habitat not present

Grizzly bear (threatened) is a resident of Missoula County and the planning area is in occupied habitat. The Proposed project is approximately three miles south of the Northern Continental Divide Grizzly Bear Recovery Zone (NCDE). The proposal is located in Zone 1 of the draft NCDE Grizzly Bear Conservation Strategy (USDI-FWS 2013). Grizzly bears have expanded their range south of the NCDE in the last 10-years and are routinely reported in the Lower Blackfoot Corridor (Jamie Jonkel, Montana Department of Fish, Wildlife, and Parks, personal communication 2015). Grizzly bear will be further analyzed.

Canada lynx (threatened) is a resident of Missoula County, but has not been verified in the planning area, and is considered transient. The proposed project is located in core lynx habitat (USDI-FWS 2005). The planning area has approximately 298 acres (1%) of non-contiguous subalpine fir habitat types (boreal forest) and is predominantly composed of dry ponderosa pine and Douglas-fir forest habitats with south-facing aspects; warm, cool, and moist Douglas-fir habitat types; with ponderosa pine, Douglas-fir, and western larch cover-types. Due to the lack of contiguous primary lynx habitat in the planning area, Lynx Analysis Units (LAUs) have not been delineated. The Interagency Lynx Biology Team recommends 16,000 to 25,000 acres of contiguous primary lynx habitat for designating Lynx Analysis Units (2013). The nearest LAUs to the planning area are located on the Lolo National Forest: Gold (2-miles west) and Boles (5-miles north). Canada lynx will be further analyzed.

Canada lynx Critical Habitat, Unit 3, Northern Rockies, is present and includes 8,050 acres (36%) of the planning area. The Primary Constituent Element (PCE) specific to lynx in the contiguous United States is: 1) Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing: 1a) Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs, or overhanging boughs that protrude above the snow and mature multistoried stands with conifer boughs touching the snow surface; 1b) Winter conditions that provide and maintain deep, fluffy snow for extended periods of time; 1c) Sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and 1d) Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range (USDI-FWS 2014).

The PCE, 1) boreal forest landscapes is under represented in the project area. The proposal is located in dry ponderosa pine and Douglas-fir forest landscapes. Critical habitat in the proposed treatment area (8,050 acres) includes a minor component of boreal forest habitat (298 acres; 4%), represented in six locations, that has been deferred from treatment. An additional 200-meter buffer of Douglas-fir forest would surround each of the six locations to protect boreal forest attributes. Snowshoe hare (1a) is generally not present, although dense

understories of young trees, shrubs and overhanging boughs protruding above the snow are present in dry ponderosa pine and Douglas-fir forest. Mature multistory stands (1a) with conifer boughs touching the snow surface are not present. Winter conditions (1b) that provide and maintain deep, fluffy snow for extended periods of time are not present; snow is typically gone by late March. Sites for denning (1c) that have abundant coarse woody debris, such as downed trees and root wads are uncommon. Approximately 7,768 acres (96%) of critical habitat is located in matrix habitat (1d); 4,496 acres of treatments are proposed in matrix habitat. Canada lynx Critical Habitat will be further analyzed.

Western yellow-billed cuckoo (threatened) is known to inhabit Missoula County, but their preferred habitat, riparian areas with cottonwood galleries and willows, is not present in the planning area. For these reasons, Western yellow-billed cuckoo will not be further analyzed.

American wolverine (proposed threatened) is known to inhabit Missoula County, and their preferred habitat of coniferous forest is present. American wolverine has been recorded in the Lower Blackfoot River corridor. Wolverine will be further analyzed.

Terrestrial Sensitive Species

Table 4: Sensitive Species Occurrence and Habitat Potentially Affected By the Proposed Action

Species	Occurrence	Habitat Potentially Affected
Birds		
Bald Eagle (*Haliaeetus leucocephalus*)	Resident	Yes
Golden Eagle (*Aquila chrysaetos*)	Resident	Yes
Black-backed Woodpecker (*Picoides arcticus*)	Resident	Yes
Lewis's Woodpecker (*Melanerpes lewis*)	Migratory	Yes
Great Gray Owl (*Strix 28ebulosi*)	Resident	Yes
Flammulated Owl (*Psioscops flammeolus*)	Migratory	Yes
Mammals		
Gray wolf (*Canis lupus*)	Resident	Yes

Bald eagle is a resident species, nesting territories have been established along the Blackfoot River, and at least two known nesting territories are located within or near the planning area. Bald eagles forage in the treatment area. Golden eagle is a resident species that nests and forages in the planning area. Black-backed and Lewis's woodpecker are resident fire-obligate species, but are not currently present due to lack of recent fire in the planning area. Prescribed fire treatments would create habitat for these two species. Great gray owl is a resident species and inhabits the planning area. Flammulated owl is a migratory species that is known to inhabit the planning area. Gray wolf is a resident species and the Belmont Creek wolf pack inhabits the planning area (Tyler Parks, FWP personal communication 2017).

Other Wildlife

Migratory Birds

At least 25 migratory birds, such as western tanager, mountain bluebird, and chipping sparrow inhabit the planning area during the nesting season. These birds are grouped into one of four nesting guilds in Table 5. A few of these bird species include: brown creeper, Cassin's finch, Clark's nutcracker, evening grosbeak, northern goshawk, pileated woodpecker, American kestrel, American robin, brown-headed cowbird, chipping sparrow, mountain bluebird, Lincoln's sparrow, and Swainson's thrush.

Table 5: Migratory Bird Nesting Guilds for 25 Species and Potential Habitat Affected By the Proposed Action

Nesting Guild	Number of Species and Frequency	Habitat Potentially Affected?
Ground	4 (10%)	Yes
Shrub	9 (23%)	Yes
Tree	21 (53%)	Yes
Snag	6 (14%)	Yes

Big Game

Moose, elk, mule deer, white-tailed deer, mountain lion, and black bear inhabit the planning area throughout the year (Table 6). A large portion of the proposed treatment area is located in big game winter range, Management Area 6 (10,200 acres). Although big game species are present year-round, winter range condition is the most important factor for survival and population stability or growth. Big game winter-kill provides carcasses for grizzlies, wolverine, and wolves.

Table 6: Big Game Species and Potential Habitat Affected By the Proposed Action

Species	Occurrence	Habitat Potentially Affected?
Moose	Yes	Yes
Elk	Yes	Yes
Mule Deer	Yes	Yes
White-tailed Deer	Yes	Yes
Mountain Lion	Yes	Yes
Black Bear	Yes	Yes

Upland Game Birds

Wild turkey, dusky grouse, ruffed grouse, and spruce grouse inhabit the planning area. Wild turkey inhabits ponderosa pine forests and associated riparian areas. Ruffed grouse are quaking aspen obligates and also inhabit riparian areas. Dusky and spruce grouse inhabit upper elevations primarily north of the planning area and winter in lower elevation riparian areas in the proposal area.

3.3.2 Environmental Effects (Proposed Action and No Action)

PROPOSED ACTION

Approximately 5,427 acres of timber harvest, pre-commercial thinning, prescribed fire, tree planting, and mastication has occurred in the past on BLM and TNC managed lands.

Direct, Indirect, and Cumulative Effects (The cumulative effects boundary is the planning area boundary)

Special Status Species

Terrestrial threatened and endangered species

Grizzly Bear – Direct effects would occur from prescribed fire treatments (5,322 acres), mastication with prescribed fire or cut-pile burn (663 acres), chainsaw thinning and prescribed fire (641 acres), timber harvest with prescribed fire (1,546 acres), pre-commercial thinning (4,964), tree planting (924 acres), and road construction (0.11 miles). Temporary disturbance would occur. Grizzly bear would move away from these disturbances into

other available habitat. The surrounding forest would provide security habitat during treatment implementation. Much of the area is located in big game winter range, which in spring provides winter kill as well as spring vegetation for grizzlies. The BLM, Western Montana District food storage order would be followed. Implement wildlife design features for spring and fall burning to mitigate impacts.

Indirect effects would occur. Loss of hiding and thermal cover would occur from vegetation treatments and road construction, but would not occur from tree planting. Post-burn vegetation, such as grass and forbs, would provide nutritional forage for five or more years. Mitigate impacts by accomplishing a mix of spring and fall burning. Temporary roads, 0.10 mile, would be constructed and obliterated when no longer needed. Total open road density would remain at 0.40 mi/mi² before and after treatment, without hunting, snowmobiling, and hauling. Total open road density, during the life of the project, with hauling would be 1.71 mi/mi² and 1.80 mi/mi² with hauling, hunting, and snowmobiling, but would return to 0.40 mi/mi² and 0.50 mi/mi², respectively, post treatment. The BLM goal for open road density is < 1mi/mi² in grizzly bear habitat. See Table 7.

The Fish and Wildlife Service (FWS) issued the BLM, Missoula Field Office a Biological Opinion and Incidental Take Statement in October, 2006, which was later revised in October, 2012 (USDI-FWS 2012). The Incidental Take Statement allows a maximum of 5-miles of permanent road and 27-miles of temporary road construction through 2022. The 0.11 miles of new road and 0.10 miles of temporary road would be within the FWS terms and agreements. Direct and indirect effects would occur, therefore, cumulative effects would occur. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features. Treatments would be positive rather than negative. The proposed action may affect, but would not likely adversely affect the grizzly bear and its habitat.

Table 7: Road Density, Lower Blackfoot Corridor

Road Density	Pre-Treatment	During Treatment	Post-Treatment
Total Road Density	5.60 mi/mi²	5.60 mi/mi²	5.60 mi/mi²
Total Open Road Density	0.40 mi/mi²	0.40 mi/mi²	0.40 mi/mi²
TORD During Hunting Season	0.50 mi/mi²	0.50 mi/mi²	0.50 mi/mi²
TORD During Hunting and Snowmobiling	0.50 mi/mi²	0.50 mi/mi²	0.50 mi/mi²
TORD During Hunting, Snowmobiling, and Hauling	0.50 mi/mi²	1.80 mi/mi²	0.50 mi/mi²
TORD with Hauling	0.50 mi/mi²	1.71 mi/mi²	0.50 mi/mi²

Canada Lynx – Direct effects may occur, but would be limited to temporary displacement and disturbance during project implementation. Indirect and cumulative effects would not occur from proposed treatments. Canada lynx are not known to inhabit the planning area. Lynx habitat, representing 298 acres (1%) of the 22,509 acre planning area, would be deferred from treatment, with an additional 200 meter buffer. Lynx Analysis Units have not been delineated due to the lack of lynx habitat in the planning area. Proposed treatments would not affect key lynx habitat features such as mature multistory and stand initiation habitat. Denning and foraging habitat would not be affected. Treatments in the stem exclusion phase of stand development in lynx habitat would not occur. Effects from disturbance, such as timing and duration factors, would not occur. The Forest Carnivore Monitoring crew explored the planning area in March, 2017 and did not find evidence of snowshoe hare until one mile north of the proposed planning area (Eric Graham, Forest Carnivore Monitoring Crew, personal communication 2017). Snowshoe hare are uncommon and are restricted to boreal forest habitat. Indirect effects would not occur, since lynx habitat would not be impacted. Cumulative effects would not occur, since lynx habitat would not be impacted. The proposed action may affect, but would not likely adversely affect the Canada lynx and its habitat.

Canada Lynx Critical Habitat – Direct, indirect, and cumulative effects would occur from proposed treatments in matrix habitat. However, treatment activities changing vegetation structure or condition in matrix habitat would not create a barrier or impede lynx movement between patches of foraging habitat or between foraging and denning habitat. Approximately 8,050 acres of lynx critical habitat, Unit 3; Northern Rockies, is present in the planning area. An estimated 4,496 acres of matrix habitat within critical habitat is proposed for treatment: Timber harvest and prescribed fire (354 acres), pre-commercial thinning (3,059 acres), chainsaw thinning and prescribed fire (123 acres), tree planting (862 acres), and prescribed fire treatment with chainsaw fuel augmentation (502 acres). Timber harvest would be accomplished using variable density thinning techniques (skips, gaps, and thinning) to mitigate the loss of biological legacies. Pre-commercial thinning would be accomplished with variable spacing guidelines which may help mitigate the loss of dense horizontal understories. Ridges, saddles, and stream channels would be protected, with a 100 meter buffer on either side, to maintain travel corridors and linkages. The proposed action may affect, but would not likely adversely affect Canada lynx critical habitat.

American Wolverine – Direct effects would occur from all proposed treatments and are related to temporary disturbance. Like the grizzly bear, the wolverine is a generalist and utilizes a wide range of habitats. Security habitat within and outside of the planning area would be available and would offset the potential impacts of direct effects. Indirect effects from vegetation treatments, such as pre-commercial thinning, would have a negative effect. Pre-commercial thinning would reduce hiding and thermal cover, as well as reduce prey species. Prescribed fire would create forage habitat for wolverines consisting of small mammals and birds. Winter kill would be available during winter and spring. Tree planting and permanent and temporary road construction would not cause indirect effects. Follow wildlife design features for spring and fall burning to mitigate impacts. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features. Follow wildlife design features, such as itigate impacts by retaining travel and linkage corridors and applying variable density thinning techniques. The proposed action is not likely to jeopardize the continued existence of the wolverine.

Terrestrial sensitive species

Bald Eagle – Direct effects would occur. The Goose Rock bald eagle nest and territory would be disturbed by all resource treatments. The nest is located in treatment area T10 and has been active annually for the last 10-years. To mitigate impacts, all treatments, including driving the access road, would be prohibited from February 1 to August 15 (T14N, R16W, Sections 25 and 26, south of the Blackfoot River), unless the nest is determined to be inactive by the wildlife biologist. Follow the *Montana Bald Eagle Management Guidelines: An Addendum to Montana Bald Eagle Management Plan (1994)* (Montana Bald Eagle Working Group 2010) to mitigate impacts. Indirect effects would occur based on the impacts of treatments around and in the nest vicinity. Treatments may impact visual barriers discussed in the management plan. Treatments would not diminish foraging habitat, which is predominantly for fish and waterfowl along the Blackfoot River. Planting and road construction would not impact bald eagles. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features.

Golden eagle and great gray owl- Direct effects would occur and would be associated with temporary disturbance and displacement during treatment activities. As with the grizzly bear, Indirect effects of treatments involving prescribed burning would be beneficial by enhancing post-burn vegetation, which would enhance small mammal population foraging opportunities. Tree planting and road construction would not impact golden eagles or great gray owls. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features.

Gray Wolf - The Belmont Creek wolf pack, composed of 5-adults and 5-pups in 2016, inhabits the planning area. Direct effects would occur. Human activity related to all treatment activities would temporarily disturb and displace gray wolves. Indirect effects would be beneficial due to enhanced foraging activity on post-treatment areas. The cumulative effects boundary is the same as the grizzly bear. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features

Black-backed woodpecker and Lewis's woodpecker – Direct effects would not occur, since these two species prefer burned forest habitat for nesting and foraging. Black-backed and Lewis's woodpeckers would not be present when treatment activities occur. Indirect effects would be beneficial in post-burned habitat. These woodpeckers would benefit from some level of large tree mortality in burned areas. Foraging and nesting opportunities would increase. The indirect effects of post-burn treatments may last 5-10 years. Planting and road construction would not cause direct or indirect effects. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features.

Flammulated owl – Flammulated owl is a migratory bird, which inhabits the planning area during the summer from May until September. Direct effects would occur to nesting birds during mastication, chainsaw thinning, timber harvest, and pre-commercial thinning. These activities would disturb flammulated owls during the nesting season potentially causing nest abandonment. Follow wildlife design features to mitigate impacts, especially protecting active nests if they are discovered. Indirect effects would occur. Thinning forest understories would reduce foraging habitat. Follow variable density thinning techniques to diversify understory thinning treatments. Flammulated owls are secondary cavity nesting birds and reducing snags within their breeding territories, especially snags with nesting cavities, would lower nesting opportunities. To mitigate impacts retain all large old snags with nesting cavities, and apply variable density thinning methods The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features. Follow wildlife design features.

Other Wildlife

Migratory Birds - Direct and indirect effects would be similar to those described for special status species birds: Direct effects would cause temporary displacement, but the nesting season would be protected from June 1 to July 15. Follow the *Migratory Bird Treaty Act* (MTBA 1918). Indirect effects associated with timber harvest, thinning, mastication, and pre-commercial thinning would reduce habitat for nesting birds. Birds nesting in trees, shrubs, and snags would experience a loss of nesting habitat. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features.

To mitigate impacts, variable spacing techniques would be applied. Species diversity may decrease, with potential decline in species abundance and stable species richness.

Big Game - Direct and indirect effects would occur. Direct effects would cause temporary disturbance and displacement from all treatments. Available undisturbed habitat occurs in the vicinity of the proposed area. Indirect effects of fall burning would reduce winter forage, which generally does not recover until the following spring green-up. Follow wildlife design features to mitigate impacts of fall burning by conducting a balance of spring and fall burns to establish a mixture of vegetation recovery.

Indirect effects to big game, associated with timber harvest and prescribed fire, chainsaw thinning and prescribed fire, mastication and prescribed fire, and pre-commercial thinning, would reduce hiding and thermal cover for big game. Indirect effects of prescribed fire would enhance big game forage habitat during the next growing season. This benefit would last up to 5-years providing an increase in nutritional forage. Vegetation treatments would not occur from June 1 to July 15 to protect big game calving and fawning periods. Travel corridors would be retained by following wildlife design features (defer treatments on either side of a ridge, saddle, or stream by 100 meters). The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features.

Upland Game Birds

Direct and indirect effects would occur. Direct effects associated with temporary disturbance from the proposal would have an unmeasurable affect to upland game birds. Game birds would move away from prescribed burning and other treatments to avoid impacts. Nests and young would be protected from June through mid-July. Indirect effects would be beneficial by retaining cover and enhancing forage for adults and young upland game birds. The effects of the proposed action, when combined with past, present, and reasonably foreseeable future actions, would not result in adverse cumulative effects. Follow wildlife design features.

NO ACTION

Direct, Indirect, and Cumulative Effects

Special Status Species

The project would not occur. Direct, indirect, and cumulative effects of the proposed action to threatened, endangered, and candidate species would not occur. Effects to grizzly bear, Canada lynx, Canada lynx critical habitat, and American wolverine would not occur. Direct, indirect, and cumulative effects to terrestrial sensitive species would not occur. Effects to bald eagle, golden eagle, black-backed woodpecker, Lewis's woodpecker, great gray owl, flammulated owl, and gray wolf would not occur. Positive and/or negative impacts to cover, snags, logs, and other existing habitat components important to special status species would not occur. Restoring vegetation for special status species, in terms of forest composition, structure, and function, would not occur. Modifying fuels to reduce the effects of catastrophic wildfire would not occur.

Other Wildlife

The project would not occur. Direct, indirect, and cumulative effects of the proposed action to migratory birds and big game would not occur. Effects to migratory birds, such as the brown creeper, mountain bluebird, and Audubon's warbler would not occur. Effects to big game, such as elk, moose, and mule deer, and upland game birds such as mountain grouse and wild turkey would not occur. This includes both positive and/or negative impacts to cover, forage, birthing and nesting habitat. Restoring vegetation for other wildlife, in terms of forest composition, structure, and function, would not occur. Modifying fuels to reduce the effects of catastrophic wildfire would not occur.

3.4 Rangeland Vegetation and Livestock Grazing

3.4.1 Affected Environment

Suitable rangeland for livestock grazing mainly consists of mountain parks and open grasslands. The majority of the parks contain rough fescue and bluebunch vegetation types. Open grasslands with southern or southwestern aspects are mainly dominated by bluebunch wheatgrass. Additional native grass species found within the planning area may include but not limited to: Idaho fescue, Sandberg bluegrass, Prairie Junegrass, needle-and-thread, green needlegrass, timber oatgrass, and threadleaf sedge.

The planning area contains non-native grass species, such as Timothy (*Phleum pretense*), smooth brome (*Bromus inermis*), and Orchard grass (*Dactylis glomerata*). These non-native species were probably introduced by various methods or during rehabilitation efforts following timber harvest and road bank stabilization. Both Timothy and smooth brome have colonized portions of the area and have become a naturalized component to the vegetative communities of which they occur. These exotic grasses "directly alter the distribution, abundance or composition of native species by out competing" natives for available resources (Osborn et al. 2002). Despite the competition with native plant species, both Timothy and smooth brome provide beneficial ecological functions. Timothy and smooth brome provide palatable forage to livestock and wildlife (Esser 1993, Howard 1996). Timothy and smooth brome also provide habitat benefits for small terrestrial and avian species (Esser 1993, Howard 1996). In addition, root systems of these introduced species provide soil stabilization. From a rangeland management perspective, non-native species are acceptable when contributing to proper ecosystem function.

One Daubenmire monitoring plot was established at Dunnigan Flats in 2003 located at T14N, R15W, section 19 west of Dunnigan Gulch road. Baseline data was collected in 2004 and the plot was read again in 2010. The current amount of data collected is inadequate to determine apparent trend for Dunnigan Flats. The 2010 data collection indicates needle-and-thread is dominant and bluebunch wheatgrass is codominant. To date, no additional permanent monitoring plots have been established on rangelands in the planning area.

Recent lands acquired by BLM under the Sunflower/Belmont Land Acquisition EA involve two active grazing leases on the north side of the Blackfoot river and includes TNC lands within their lease boundary (see Appendix G Map 7). These two leases shall be identified as Belmont and Black Canyon allotments for clarity purposes. Only lands within the planning area will be analyzed in this EA. Please note, BLM term grazing leases will be addressed in a separate EA and decision upon the expiration of existing TNC lease for lands recently acquired.

Livestock grazing is not authorized on BLM lands south of the Blackfoot river within the confines of the planning area. The Belmont grazing allotment #17127 prior to the 2016 land acquisition consisted of approximately 5,630 acres of BLM land and located within the planning area north of the Blackfoot river. The current BLM Belmont allotment term lease and Animal Unit Months (AUM) is listed in Table 8.

Table 8: BLM Belmont Term Lease

Livestock Number & Kind	Grazing Period	% Public Land	Type Use	AUMs
70 Cattle	06/01 – 09/30	100	Active	281

Historically, the grazing lessee has not used this allotment to the full capacity. The lessee generally grazes approximately 25 cow/calf pairs during the grazing season. In the last ten years, the lessee has taken non-use for three nonconsecutive seasons.

In August 2011, a rangeland health evaluation for the Belmont allotment was conducted by an interdisciplinary team of resource specialists. The preliminary evaluation found the allotment meeting all five rangeland health standards. However, the term lease was not analyzed in accordance with NEPA, therefore no determination was completed. The term grazing lease was issued under the authority of Section 411, PL 113-76 which contained the same terms and conditions as the previous lease.

During the fall of 2016, BLM acquired approximately 5,080 additional acres within the BLM/TNC Belmont allotment boundary with 18 AUMs assigned to the property. BLM also acquired approximately 652 acres within

the TNC Black Canyon allotment boundary with an assigned 25 AUMs. In accordance to Title 43 CFR 4110.1-1, "Where lands have been acquired by the Bureau of Land Management through purchase, exchange, Act of Congress or Executive Order, and an agreement or the terms of the act or Executive Order provide that the Bureau of Land Management shall honor existing grazing permits or leases, such permittees or lessees are governed by the terms and conditions in effect at the time of acquisition by the Bureau of Land Management, and are not subject to the requirements of CFR 4110.1." (USDI-BLM 2006). Therefore, these acquired lands shall be authorized to graze under the existing lease until expiration on May 31, 2019. As mentioned above, term grazing leases will be analyzed in a separate EA upon the TNC lease expiration.

3.4.2 Environmental Effects (Proposed Action and No Action)

PROPOSED ACTION

Direct/Indirect Effects

The proposed forestry projects and treatments would be implemented over a period of years throughout the planning area. Forestry operations with machinery will have a direct effect on understory vegetation with surface ground disturbance. The effects of this disturbance is expected to be short term to each treatment area where implemented. Prescribed fire treatments would remove under story plants, however these fire treatments will be implemented under pre-planned conditions resulting in low to moderate severity.

Livestock grazing can have negative impacts to vegetation in post burn areas. In areas accessible by livestock, lessees will be instructed to herd livestock away from these areas. Salt blocks would not be placed within ½ mile of recently burned areas. In some cases it may be necessary to construct temporary fencing to prevent livestock grazing in post burn areas.

Mechanical treatments with machinery may temporarily displace livestock movement during the grazing season. The Belmont allotment will be affected the most however, the grazing lessee does not run more than 25 cow/calf pairs each grazing season and occasionally request non-use. Mechanical treatments are expected to have minimal effect on livestock operations. Livestock grazing is not authorized south of the river, therefore projects implemented in this area would not have any effects on livestock operations.

Cumulative Effects

Prescribed fire along with mechanical treatments would open tree canopies improving photosynthesis for understory grass species. Forage production and quality for wildlife and livestock would improve for the next several years.

NO ACTION

Direct/Indirect Effects

The No Action alternative would allow continued conifer encroachment and closed forest canopies resulting in the deterioration of understory grass species.

Cumulative Effects

Under the No Action the prescribed burns and forestry projects would not occur. Cumulative effects would allow continued conifer encroachment in meadows and increased conifer canopy which would reduce palatable understory grass species in the foreseeable future. The decline in production of rangeland vegetation would reduce forage production and quality for livestock and wildlife.

3.5 Noxious Weeds

3.5.1 Affected Environment

A plant species is considered an invasive plant if it meets two criteria: 1) it is nonnative to the ecosystem under consideration, and 2) its introduction causes, or is likely to cause, economic or environmental harm or harm to human health (Executive Order 13112 1999). Non-native invasive plants include exotic plants and noxious weeds. Exotic plants are species that have been introduced inadvertently or intentionally to an area, usually from a different continent; however, not all exotic species are invasive species.

The term noxious weed is a legal designation and is defined by Montana Code Annotated (MCA 7-22-2101 2014) as, "any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities." While invasive plants are often adapted to habitats where they are not native, they lack the natural controls (insects, disease) they may have evolved within their native ranges. As a result, they tend to spread aggressively and reduce overall native community diversity, and generally disrupt the natural processes of the environment. They displace native plants or reduce forage for some animal species, degrade natural communities, change hydrology, change microclimatic features, increase soil erosion, alter wildfire intensity and frequency, and cost millions of dollars in treatments and fire suppression to land management agencies and governments.

The current distribution of noxious weeds in the planning area is largely associated with timber management activities in the past 20-30 years. Infestations are commonly within 10 meters of a road or other disturbed sites such as landings or camp areas. Infestations found well away from roads are likely due to wildlife and recreational use. This includes weed, seed, and plant parts adhering to human clothes and weed, seeds, and parts adhering to animal hair and passing through their digestive system. These observations are consistent with Bryson and Carter (2004). Roadside infestations in the planning area prior to recent land acquisition have been reduced by current management actions. Recently acquired lands (formerly Plum Creek Timber Company), will be managed under the Missoula Field Office Integrated Weed Management Environmental Assessment (USDI-BLM 2009a). See Appendix B for MiFO Noxious Weed Groups and Priorities.

Plant communities within the planning area are susceptible to invasion by noxious weeds because forest over story cover is not sufficiently dense to shade out invasive weeds and the bunchgrass component does not compete well with weeds because of the prevalence of un-vegetated areas among the relatively evenly dispersed bunchgrass clumps. Several habitat types in the planning area have been identified as being highly susceptible to noxious weed invasion.

Table 9: Highly Susceptible Habitat Types

Habitat Type Code	Abbreviation	Common Name
210	PSME/AGSP	Douglas-fir/bluebunch wheatgrass
230	PSME/FESC	Douglas-fir/rough fescue

311	PSMA/SYAL-AGSP	Douglas-fir/snowberry-bluebunch wheatgrass phase
321	PSMA/CARU-AGSP	Douglas-fir/pinegrass-bluebunch wheatgrass phase
350	PSMA/ARUV	Douglas-fir/kinnikinnick
340	PSMA/SPBE	Douglas-fir/white spirea
220	PSME/FEID	Douglas-fir/Idaho fescue

Approximately 12,761 acres (62%) of the Lower Blackfoot planning area have a high potential for weed infestation, whereas approximately 2353 acres (11.5%) of Lower Blackfoot planning area are nearly weed free or have low potential for infestation (e.g. higher elevations and/or northerly aspects). Where infestations have high risk potential, management will be more difficult and costly where infestation having a lower risk potential, management would have a higher rate of success and less cost. Based on current data approximately 68% of the roads in the planning area have some level of infestation and are in areas of highly susceptible habitat types.

The noxious weeds of concern to the Missoula Field Office are divided into four groups based on the amount of acreage infested, as well as potential for invasion. This grouping is intended to help prioritize weeds for treatment, and will be updated as inventory data and monitoring results help define the present situation. Currently the management of noxious weeds on BLM-administered lands is guided by the Missoula Field Office Integrated Weed Management Plan (USDI-BLM 2003), and a Decision Record issued in 2004. Public lands within the planning area have been treated with approved herbicides using ground-based and aerial equipment. Treatment acreages vary by year. Biological control agents, re-vegetation and prevention measures are being used to manage noxious weeds under the 2004 decision.

Table 10: Noxious Weed Species in Planning area

Noxious Weed Species	BLM MiFO Group	State of Montana priority	BLM MiFO Priority
Spotted knapweed *Centaurea stoebe* L	Group 1	2B	Priority 5
Sulfur cinquefoil *Potentilla recta*	Group 2	2B	Priority 2
Musk thistle *Carduus nutans.*	Group 2	2B	Priority 2
Oxeye daisy *Chrysanthemum leucanthemum*	Group 2	2B	Priority 2
Yellow toadflax *Linaria vulgaris*	Group 3	2B	Priority 1
Hounds tongue *Cynoglossum officinale*	Group 2	2B	Priority 2
Leafy spurge *Euphorbia esula*	Group 2	2B	Priority 2
Dalmatian toadflax *Linaria dalmatica*	Group 3	2B	Priority 3
Canada thistle *Cirsium arvense*	Group 2	2B	Priority 5
St. Johnswort *Hypericum perforatum*	Group 3	2B	Priority 1
Common tansy *Tanacetum vulgare*	Group 2	2B	Priority 5
Cheat grass *Bromus tectorum*	Group 1	3	Priority 5

- **Spotted knapweed** (*Centaurea stoebe*) is found throughout the planning area and has invaded virtually all habitat types and has formed dense stands in the road right of way, landings, skid roads and burn piles. Spotted knapweed prefers south aspects, open habitats, and is not commonly found in shaded habitats. Most of the habitats present in the planning area are open and south facing with high road density. Many areas have dense roadside infestation as well as landings, skid roads and burn piles, but as distance from roadside increases density of spotted knapweed decreases (Mortensen et al. 2009). Areas with high percentage of tree canopy cover have none to very little spotted knapweed present. Biological control agents for spotted knapweed are present throughout the planning area and are reducing the density in some areas. Dense infestations were found on the recently acquired lands (formerly Plum Creek Timber Company), which added to the MiFO weed inventory.
- **Sulfur cinquefoil** (*Potentilla recta*) is scattered and patchy in the planning area with dense infestations found along the Blackfoot River adjacent to the old railroad bed. Sulfur cinquefoil has characteristics for wide spread infestation and can dominate invaded habitats. Sulfur cinquefoil is found in association with spotted knapweed and can be managed with the same herbicides.
- **Musk thistle** (*Carduus nutans*) is a highly competitive weed, which invades disturbed areas, pasture, rangeland, forest land, cropland, and waste areas throughout most of the United States. Musk thistle has rapid wide spread dispersal characteristics making management difficult and forms extensive stands, which force out desirable vegetation, but does not have the potential for wide spread dominance of

invaded habitats. Musk thistle may produce allelopathic chemicals that inhibit desirable plants. Musk thistle is a prolific seed producer. Average productivity is approximately 10,000 seeds/plant, however, a single plant can produce up to 100,000 seeds Musk thistle is wide spread in the planning area and found in all habitat types.

- **Oxeye Daisy** (*Leucanthemum vulgare*) is found scattered along roadsides and disturbed areas but is not widespread in the lower Blackfoot River area. Oxeye daisy has high potential for wide spread infestation and can dominate invaded habitats once established. Control is moderately difficult once established.
- **Yellow toadflax** (*Linaria vulgaris*) is found in scattered patches throughout the planning area along roads and sites that have been disturbed. This species does not have characteristics for wide spread infestation but can dominate a site once established. Yellow toadflax is very difficult to control once established. Herbicide treatments can be effective with proper timing and long term monitoring. Herbicides used and rates needed to be effective often cause significant damage to non-target vegetation. Biological control can be very effective if proper conditions exist.
- **Hounds tongue** (*Cynoglossum officinale*) occurs throughout the planning area and is found along roads and areas with ground disturbance. Hounds tongue spreads by seed; mature plants can produce up to 2,000 seeds and remain on the parent plant and may remain viable for 2-3 years. Buried seed rarely survive more than one year. Seeds are easily spread by wildlife, livestock and people.
- **Leafy spurge** (*Euphorbia esula*) is not wide spread on BLM lands in the LBC but is found along the Blackfoot River. Infestations are generally small less than 50 sq. meters; proximity to the river make treatments difficult because of limited herbicides that can be used. More inventories will be needed to determine if the newly acquired lands have leafy spurge present in the upland areas.
- **Dalmatian toadflax** (*Linaria dalmatica*) is not wide spread in planning area but has the potential to spread to most of the habitat types present. Dalmatian toadflax is very similar to Yellow toadflax in that once established is very difficult to control.
- **Canada thistle** (*Cirsium arvense*) is found throughout the planning area in open areas with moderate moisture conditions. It is found most frequently along roadside stream banks and riparian areas. Areas that have enough moisture and with ground disturbance can be very dense with rapid spread.
- **St Johnswort** (*Hypericum perforatum*) is found in several sites in the lower Blackfoot River area. Though not wide spread, it does have the potential to rapidly spread from these sites, this makes St Johnswort a high priority for further management.
- **Common tansy** (*Tanacetum vulgare*) is not wide spread in the planning area but found primarily along streams and in riparian areas. Common tansy does not spread rapidly but once established can be very difficult to control. Most of the Common tansy in the planning area is located along lower Belmont Creek with small isolated patches along the Blackfoot River. Sometimes found as single plants in the roadside where moisture is high enough for seeds to germinate, these plants are usually easy to control.
- **Cheatgrass** (*Bromus tectorum*) is wide spread in the planning area. Sites with past ground disturbing activities have the highest densities of cheatgrass. Areas with little ground disturbance and intact vegetation communities or high percentage canopy cover as well as north aspects have none to very little cheatgrass.

3.5.2 Environmental Effects (Proposed Action and No Action)

PROPOSED ACTION

Direct and Indirect Effects

Direct effects of the Proposed Action would consist of the potential introduction of new weed species into the planning area or the spread/expansion of existing species. Weeds can be introduced or spread when vehicles or mechanized equipment travel from infested areas, carrying the seeds of noxious weeds. The risk of direct effects from the Proposed Action is primarily due to the use of both on- and off-road harvest and transportation equipment. This risk would be minimized through the design features described in the previous section. Moderate-intensity prescribed fire would decrease litter depth and stimulate native understory vegetation (grasses/forbs). Fuel augmentation would open the forest canopy and stimulate understory vegetation. Stimulation of these native species should help combat weed infestation in the long-term (>5 years). High severity wildfire in the planning area would be expected to create favorable conditions for weed propagation. Some of the sparse herbaceous understory plants present on the site would probably be damaged by a high-severity fire. The resultant bare ground would be susceptible to weed establishment.

Although some residual risk of weed introduction into areas that are currently weed free remains, the design features proposed in this EA would reduce the risk of new infestations. For example, travel corridors associated with the project would be treated for weeds before initiation of the work in order to reduce the seed source available for transport. Equipment being used in the project would be power-washed prior to entering the Lower Blackfoot River planning area in order to reduce the likelihood of weed introduction. Additionally, the area would be actively monitored for several years following the project in order to provide rapid response to any new infestations that may occur.

Soil disturbance and removal of native vegetation indirectly affect noxious weed populations by creating an environment suitable for weed seed germination (disturbed soils and removal of native vegetation, which formerly resisted weed establishment). Furthermore, the introduction and spread of noxious weeds because of the proposed project can indirectly affect native vegetative communities and habitat for animals that depend on these communities. The ecosystem-level effects of noxious weed establishment have been well described elsewhere (Pimental et al. 2000). Although the proposed project contains design features specifically to prevent the introduction of new weeds or the expansion of existing weed populations, there is a risk that weeds will become established in areas where they are not now present (e.g., when roads are constructed in weed-free areas such as cool, mesic, high-elevation sites).

Cumulative Effects

Ongoing weed treatment efforts from prior decisions will continue to have an impact on noxious weed populations. These ongoing treatments combined with the additional weed treatments proposed in this project would reduce the likelihood of weed introduction or spread in the planning area. Furthermore, cooperative efforts with counties and private landowners in the planning area have reduced overall noxious weed populations or have contained existing populations. Thus, the overall cumulative effect caused by the Proposed Actions with the design features will be minimal.

NO ACTION

Direct, Indirect, and Cumulative Effects

In the short term (3-5 years), the areas of proposed treatment would have no direct, indirect, or cumulative effects on weed populations because no work would be done. Noxious weeds would continue to be managed on BLM-administered lands guided by the *Missoula Field Office Integrated Weed Management Plan (USDI-BLM 2003),* and a Decision Record (DR) issued in 2004.

The No Action alternative does not involve any active management strategies and the landscape would remain highly vulnerable to stressors coupled with a changing climate. Proposed Actions designed to increase stand vigor and long-term resistance to unnatural fire and insect and disease damage would be deferred, increasing 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 over time (Hood et al. 2016, Byler 1990, Carlson 1989, Fiedler et al. 2004, Graham et al. 1999). The No Action alternative would allow understory vegetation to continue to develop, intensifying ladder fuel accumulations. Wildfire occurrence could result in rapidly spreading high intensity crown fires due to sapling and pole thickets beneath the main canopy (Fischer and Bradley 1987). This type of fire is likely to result in high levels of mortality in the understory and overstory. Given the noxious weed populations and highly susceptible habitat types in the planning area, a large scale, high severity fire would increase noxious weed populations in the planning area.

3.6 Aquatic Species and Habitat

3.6.1 Affected Environment

1. Background information

Glaciation strongly influenced the current sub basin landscape and deposited broad expanses of flat glacial outwash. The Blackfoot Valley was further shaped by the repeated filling and catastrophic draining of Glacial Lake Missoula, a massive lake formed by a series of ice dams that impounded the Clark Fork River downstream of Missoula. In the Blackfoot Valley, Glacial Lake Missoula extended upstream as far as Clearwater Junction As a result of these glacial deposits many streams or stream reaches are intermittent by nature. Streams are usually perennial in confined valley types but have intermittent reaches when the valley widens or enters a larger valley. This often constrains the seasonal period during which migratory fish have access to upstream reaches of tributaries. These types of environments often provide ideal spawning habitat near the lower end of the streams intermittent reach. As the water "resurfaces" or "upwells" it is often clean and cold which are key criteria for spawning sites (USDA-FS 2013). Furthermore, connectivity of the larger river system has been re-established with the removal of Milltown Dam just below the mouth of the Blackfoot River. This represents the first time in nearly 100 years fish have free flowing access from the Clark Fork River into the Blackfoot River.

Land ownership patterns in the Blackfoot Sub basin have changed in recent years due to large-scale transfers of Plum Creek Timber Company (PCTC) lands. Since 2000, through efforts such as the Lower Blackfoot River Assembled Land Exchange, Blackfoot Community Project, Montana Legacy Project, and Clearwater Blackfoot Project, all PCTC lands from the Blackfoot River head waters near Rogers Pass to the confluence with the Clark Fork River have changed ownership. Approximately 75% of the lands have been or will be transferred into federal or state ownership and 25% into private ownership. Land management and use have changed and are expected to change as a result.

2. Aquatic Species Presence

Bull trout

Bull trout have a connected and widespread distribution across the Blackfoot River basin, albeit at low levels. There are six designated bull trout local populations in the basin, and five other streams that contribute to the core area. While some may consist of resident fish isolated from one another by habitat degradation, dewatering, and other passage barriers, the majority are made up of fluvial fish dependent on connectivity with the Blackfoot River (Pierce and Podner 2016). Overall, the present distribution of bull trout is reduced from historic levels, but the migratory life form still exists (USDA-FS 2013).

The Bull Trout Recovery Plan (USDI-FWS 2015) delineates the Blackfoot River drainage as a core area within the Upper Clark Fork Geographic Region within the Columbia Headwaters Recovery Unit. Six local bull trout populations are designated within the Blackfoot River core area. Two of the six local populations – the Belmont and Gold Creek populations – occur in the vicinity of the planning area. While not designated as a local

population, the Blackfoot River is used as a migration corridor for a few adult bull trout that may or may not enter the Gold and Belmont drainages to spawn.

Though the Blackfoot River provides feeding, a migratory route, and overwintering habitat, the few bull trout that occur in the Blackfoot River are not designated as a local population. In the vicinity of the proposed treatment areas, bull trout densities are low, probably in the range of 10 individuals per mile, with most of those being adults (Pierce and Podner 2016). In the Johnsrud section of the Montana Fish Wildlife and Parks annual electrofishing sampling, bull trout occur as a relatively small percentage of the trout species in the fish community. Rainbow trout generally make up over 60% of trout over 6 inches in length with westslope cutthroat trout at roughly 20%. Brown trout are nearly 10% while bull trout are less than 5% of the trout species composition (Pierce and Podner 2016). While rainbow and cutthroat trout composition has fluctuated some over the years, the bull trout composition appears low but stable between the years of 1989 to 2014 in this sampling reach.

Additionally, there is some seasonality to when bull trout are expected to occupy this part of the mainstem Blackfoot River. In general, the river is considered migratory habitat used primarily when bull trout are ascending the system in search of spawning habitat and thermal refuge offered by tributary streams. Swanberg (1997) and Schmetterling (2003) describe a general pattern of bull trout migrating up the Blackfoot River during the falling limb of the hydrograph in the spring and early summer. These migrating fish then entered tributary systems in late June and early July. They typically stay in the cooler tributaries through the spawning period and into October before re-entering and descending the mainstem Blackfoot River.

Bull trout still occupy most of their historic habitat in the Blackfoot River drainage, but at reduced densities. The total size of the Blackfoot River core area bull trout population is estimated to be well below historic numbers, but trending slightly upward. Bull trout redd counts from the three primary spawning tributaries indicates this slight upward trend from 1989 through 2010 (USDA-FS 2013). While some of these primary local populations show promise, other local populations, such as Belmont Creek and Gold Creek, are in steep decline and appear to be at risk of extirpation (USDA-FS 2013).

Bull trout critical habitat

Bull trout critical habitat occurs within the planning area. The 2010 final rule for the designation of critical habitat for the Columbia River population of bull trout (USDI-FWS 2010) designated the entire lengths of the Blackfoot River and portions of Gold and Belmont creeks as critical habitat. Blackfoot River is listed as a critical habitat subunit of the Clark Fork River critical habitat unit. Portions of Gold and Belmont creeks were excluded from critical habitat as they were covered by habitat conservation plans with Plum Creek Timber and Stimson Lumber companies.

Plum Creek Timber Company initiated an effort in 1997 to develop a conservation strategy for native salmonids (including bull trout), occurring on Plum Creek's Timberlands in Montana, Idaho, and Washington to include portions of Gold and Belmont creeks. The stated purpose of the Plum Creek Native Fish Habitat Conservation Plan (NFHCP) was to help conserve native salmonids and their ecosystems, while allowing Plum Creek to continue to conduct commercial timber harvest within a framework of long-term regulatory certainty and flexibility. The Stimson Lumber NFHCP was created when the Stimson Lumber Company acquired certain lands previously owned by Plum Creek and assumed all of the Plum Creek NFHCP commitments.

In 2003, the Blackfoot Challenge and The Nature Conservancy initiated the Blackfoot Community Project, which involved the purchase and re-sale of some PCTC lands. The habitat conservation plan did not transfer over to The Nature Conservancy. Subsequently the BLM has acquired additional reaches of Belmont Creek. To approach this matter conservatively, this analysis treats all of Belmont Creek in the planning area as bull trout critical habitat. The reach of Gold Creek within the planning area is bull trout critical habitat in entirety.

Westslope cutthroat trout

Westslope cutthroat trout have a basin-wide distribution in the Blackfoot and are the most abundant salmonid in the upper reaches of the tributary system. Their abundance decreases in lower reaches of the tributary system due to habitat impairments and interactions with nonnative trout. Westslope cutthroat trout occupy much of their historic habitat in the Blackfoot River drainage, with healthy populations in larger tributaries numbering in the hundreds to several thousand adult fish. Many of the smaller tributaries with suitable gradients also contain westslope cutthroat trout populations (Pierce and Podner 2016).

These fish exhibit fluvial life histories as they migrate up the mainstem Blackfoot River system and spawn and rear in tributary streams. The westslope cutthroat trout population in the Blackfoot River drainage consists of a mix of migratory (adults coming from the Blackfoot River and Clark Fork River) and resident fish. Schmetterling (2003) identified the Gold Creek and Monture Creek drainages as key spawning drainages for migratory adult cutthroat with fish migrating to spawn in the drainage from as far away as Milltown Dam (i.e. about 50 river miles downstream from their spawning site).

Some genetic testing of westslope cutthroat trout has occurred in the Blackfoot River drainage. In the mainstem system used by migratory fish from widespread tributaries throughout the system, the genetics are likely to be equally wide ranging. Fish could range from genetically pure cutthroat to genetically pure rainbow and anywhere in between.

In the Johnsrud section of the Montana Fish Wildlife and Parks annual electrofishing sampling, rainbow trout generally make up over 60% of trout over 6 inches in length with westslope cutthroat trout at roughly 20%. Brown trout are nearly 10% while bull trout are less than 5% of the trout species composition (Pierce and Podner 2016). While rainbow and cutthroat trout composition has fluctuated some over the years, the cutthroat trout composition appears low but generally increasing between the years of 1989 to 2014 in this sampling reach.

Western pearlshell mussel

According to the Montana Natural Heritage MapViewer website (MNHP 2016), mussel surveys were conducted in the Blackfoot River in 2007 and 2009. No mussels were observed in the surveys in the general vicinity of the planning area. In 2016, an angler found a live western pearlshell mussel in the Blackfoot River near the Interstate bridge, which is near river mile 0.3. This has been the only sighting of a live mussel or mussel shells in or along the edges of this portion of the Blackfoot River. For that reason, although mussels have not been found, this analysis will assume that mussels may be present in the areas that could be affected by this project.

Western toad

According to the Montana Natural Heritage MapViewer website (MNHP 2016), western toads have been observed in the planning area and are considered present. Their occurrence has been documented as part of structured surveys as well as incidental observations. Adults and larvae have been observed indicating that toads are at least sometimes successfully breeding in the area. While the aquatic habitat in the planning area is dominated by large riverine type habitat and not typically considered preferred breeding habitat by amphibians, western toads prove to be more gregarious when selecting breeding locations.

Northern leopard frog

According to the Montana Natural Heritage MapViewer website (MNHP 2016), northern leopard frogs have historically been observed in Lincoln and Flathead counties, but not in the vicinity of this project. Northern leopard frogs habitat include springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes; usually they are in or near permanent water with rooted aquatic vegetation. In summer, they commonly inhabit wet meadows and fields. The frogs take cover underwater, in damp niches, or in caves when inactive. Wintering sites are usually underwater, although some frogs may overwinter underground. Eggs are laid and larvae develop in shallow, still, permanent water (typically), generally in areas well exposed to sunlight where eggs are attached to vegetation just below the surface of the water. Metamorphosed frogs eat various small

invertebrates obtained along water's edge or in nearby meadows or fields; they rarely eat small vertebrates. Larvae eat algae, plant tissue, organic debris, and probably some small invertebrates.

The planning area does not offer a lot of habitat that would be considered optimal amphibian habitat and as such, northern leopard frogs are not expected to be present. Therefore, impacts are not expected to occur as a result of this project and this species will not be analyzed further in this document.

3. Aquatic condition of planning area streams

Belmont Creek

Belmont Creek is a second-order stream located 20 miles northeast of Missoula, Montana. It flows south for 11 miles before joining the Blackfoot River at river mile 21.9. Historically, the majority of the watershed was owned by Plum Creek Timber Company (92%) with small sections of private and public lands near the mouth and Lolo National Forest lands near the headwaters. The Belmont drainage was heavily managed with intensive timber harvest, cattle grazing, and road building. BLM acquired the lower portions of Belmont drainage in 1999 and current ownership is split between the Bureau of Land Management and The Nature Conservancy.

The trend of the Belmont local population appears to be declining. Though bull trout are still found in reduced densities, data suggests the fish likely occupy their entire historic habitat in Belmont creek. While there has not been a definitive structure or barrier identified blocking upstream migration beyond a certain point in the stream, the lack of non-native salmonids in the upper portion of Belmont Creek suggests such a barrier exists. The "canyon reach" between stream miles 1.7 and 4.5 likely divides Belmont Creek into a split system of the upper portion and the lower portion. The lower portion of Belmont Creek is accessible to migrating fish, including bull trout, from the Blackfoot River. The upper portion of Belmont Creek is most likely not accessible to migrating fish from the Blackfoot River and is occupied by resident populations of bull trout and westslope cutthroat trout as sampling has failed to show presence of non-native trout in this reach (Pierce et al. 1997, Pierce and Podner 2016).

A watershed analysis of Belmont Creek was completed by Plum Creek Timber Company (PCTC) in 1994. Investigations showed both resident and fluvial bull trout throughout Belmont creek with a variety of size classes present. The resident population was thought to be confined to the upper stretches of Belmont creek, above a high gradient canyon reach that occurs from stream miles 1.7 - 4.5. Fluvial bull trout were found to be using lower Belmont (stream miles 0-1.7) for spawning (Sugden 1994).

Montana Fish, Wildlife and Parks (MFWP) biologists have monitored fish populations in Belmont Creek at 5 locations since 1989. Four of the locations are in the lower reach and one is in the upper reach. While bull trout were present at all five locations in previous years, surveys from 2015 failed to capture bull trout in the lower reach. The most recent surveys also note an increase in brown trout in the lower reach (Pierce and Podner 2016).

While it has been documented that bull trout moving up the Blackfoot river to other spawning sites often stop and spend time in the cold-water plume at the confluence of Belmont creek (Pierce et al. 1997), red count surveys conducted in Belmont creek depict low and possibly declining spawning occurring in the lower portion of the stream. Further, bull trout redd counts conducted by PCTC, MFWP and the BLM have found no evidence of bull trout spawning in Belmont creek within the planning area since 2013.

The main limiting factors to the local population are: (1) displacement by non-native fish (brook trout *Salvelinus fontinalis* and brown trout *Salmo trutta*); and (2) shrinking suitable habitat due to water temperature increases from the warming climate; and (3) habitat alterations.

Mean-Maximum Water Temperature: Belmont Creek, Gold Creek and the Blackfoot River provide adult holding and migratory corridor habitat for bull trout and westslope cutthroat trout. Belmont Creek and Gold Creek also provide spawning and rearing habitat. The RMO is a mean-maximum temperature < 15° C during the warmest 7-

day period of the year within adult holding habitat and below 9° C during the warmest 7-day period of the year within spawning and rearing habitat.

In the lower Blackfoot Total Maximum Daily Load (TMDL) (MT-DEQ 2009), Montana DEQ determined that temperatures were not impaired in neither Belmont Creek nor the Blackfoot River. DEQ investigated temperature impairment to the mainstem Blackfoot River between Monture and Belmont creeks. They concluded the current woody bank line vegetation extent is not a source of significant thermal loading to this segment of stream. In effect, the water temperature from Nevada Creek is elevating the water temperature in this portion of stream and the conclusion is this reach of the mainstem Blackfoot River does not require a temperature TMDL.

Water temperature data has been collected at five sites along the stream from the headwaters down to the mouth of the stream since 1994. The lower 3 sites are on BLM and within this planning area. Belmont 3 is the upper most of the BLM sites, Belmont 4 is in the middle, and Belmont 5 is at the mouth of Belmont Creek. Data shows a dramatic increase in temperatures from site 3 to site 4 and then again, to site 5 pointing out that these two meadow reaches have very little canopy cover (Sugden 2016). This area was cleared of native shrubs when the sites were homesteaded in the early 1900s. Riparian conditions have improved over time with efforts by Plum Creek and BLM. Most sites have been largely static over the years on Belmont Creek, but the lower site shows a suggestion of a decreasing trend, cooling about 2 degrees C over the years.

Large Woody Debris: Belmont Creek alternates between steep canyon reaches of boulder rapids dominated by scour pools and low gradient, unconfined meadow reaches. In 2003, the BLM conducted a large woody debris restoration project in an unconfined meadow reach in the lower portion of Belmont Creek. This project placed approximately 80 large logs in and across the riparian area of about 1700 feet of Belmont Creek in order to re-establish this formative habitat feature. This reach of Belmont Creek was over simplified from the habitat perspective due to historic wood removal, haying, and over grazing by homesteaders in the area. Since the implementation of the project, the channel in this reach has regained some of its former complexity. It now has shading elements providing instream cover.

Upstream of this reach, in one of the steeper canyon reaches anecdotal surveys also found large downed wood to be plentiful. While we did not quantify the amount of LWD for any distance in the reach, we did note during bull trout spawning surveys that LWD was abundant.

As our spawning surveys took us upstream of BLM managed areas LWD abundance was still noteworthy. Again, we made no effort to quantify LWD presence during the spawning surveys due to a large amount of wood in the stream.

Sediment: To assess the reduction rate of sediment delivery from road systems in the management watersheds, Plum Creek Timber Company compared before and after road erosion control treatment. The Belmont Creek watershed had the greatest overall reduction in estimated sediment delivery (83%). At the time of the initial survey in 1994, few stream crossings had drainage features that limited sediment delivery. The original inventory estimated watershed-wide average annual road sediment delivery of 198 tons per year. Following this inventory, extensive BMP improvements were initiated in the watershed over the next several years. The 2010 survey estimated road sediment of 40 tons per year at 114 separate locations (an 80% reduction), and the 2010 reassessment estimated sediment delivery at 33 tons per year. In Belmont Creek, all necessary road upgrades have been completed on the 170 miles of road that Plum Creek had BMP responsibility for (Sugden 2011).

Montana DEQ considers Belmont Creek partially supporting of aquatic life and the cold-water fishery. Probable causes of impairment identified on the 2006 303(d) list consist of sedimentation/siltation, and the probable sources associated with that impairment are forest roads and riparian grazing. Two reaches on Belmont Creek were assessed in 2006. The uppermost reach is a B channel type that meets all target values with the exception of riffle substrate <6mm. Downstream is a C channel type that flows through an unconfined open meadow area.

Restoration activities in the reach included large woody debris placement by the BLM as well as 1995 grazing exclusion fencing and shrub and tree planting by PCTC. Although restoration has been implemented, Type I targets for McNeil Cores and residual pool depth are not met. However, Type I targets for pool frequency and percent fines in riffles are met, potentially indicating restoration-associated improvements in channel condition. Because of the evidence for accumulations of fine sediment above established target values for McNeil Core data in this lower reach of Belmont Creek, a sediment TMDL is warranted for the listed stream segment (MT-DEQ 2009).

Lower Gold Creek

Gold Creek is a spawning and rearing tributary to the lower Blackfoot River for westslope cutthroat trout, bull trout, rainbow trout and brown trout. Resident brook trout also inhabit the drainage. In 2015, MFWP sample fisheries at five sites in the Gold Creek drainage, including four mainstem sites and one site on the lower West Fork of Gold Creek. Two of the four mainstem Gold Creek sites are low enough in the drainage to occur within this planning area. None of the 2015 surveys detected bull trout where they have been present in prior surveys. Consistent with bull trout declines at all monitoring sites, redd counts conducted by Plum Creek Timber Company from 1998 through 2014 show a similar declining trend in bull trout. Along with longterm declines in bull trout, the surveys show increasing numbers of nonnative trout in the upstream direction (Pierce and Podner 2016).

Approximately 66% of the Gold Creek watershed was managed as industrial forest (Plum Creek Timber Company) prior to 2014 when these lands were purchased by TNC. Following the TNC acquisition, road inventories identified 330.5 miles of road in the entire watershed with a road density of 5.3 mi/mi2, which includes 5.4 miles of road within 50 feet of perennial streams (InRoads Consulting 2016).

InRoads Consulting (2016) also discusses issues with the road related infrastructure impacting the watersheds recently acquired by TNC. Identified issues include undersized and perched culverts, road-related sediment issues and failing log crossings. Additionally, these problems were exacerbated when a portion of the watershed burned in 2003 and was subsequently salvage-logged. In general, Gold Creek roads are in relatively good condition, and none of the "hot spots" nor culvert issues were located in the lower portion of Gold Creek within this planning area.

Prior watershed restoration actions include removal of several culverts at road/stream crossings and mechanical ripping of some roadbeds. There were also a number of sediment reduction measures associated with logging roads including the installation of rolling dips, and seeding and closing roads after logging was completed (Pierce and Podner 2016).

Past harvest of riparian conifers combined with the actual removal of large wood from the channel has also reduced habitat complexity on the lower three miles of Gold Creek. The result of this fish habitat simplification was low abundance of age 1 and older fish. To remedy this situation, in 1996, a MFWP-led, cooperative project installed 66 habitat structures made of native material (rock and wood) constructing 61 new pools in the three-mile section (Schmetterling and Pierce 1999). The following spring an estimated 50-year flood occurred and 85% of the structures remained intact.

Gold Creek is not listed in the TMDL as being impaired for sediment, water temperature, nor metals (MT-DEQ 2009).

Blackfoot River-Twin Creek

East Twin Creek is a spawning and rearing tributary to the lower Blackfoot River for westslope cutthroat trout, rainbow trout and brown trout. Resident brook trout also inhabit the drainage. Bull trout have been sampled in East Twin Creek on occasion. They are thought to use the stream for rearing and thermal refuge (MT-FWP 1999). This stream is not considered to be a bull trout core or nodal area in the Blackfoot River drainage (MBTSG 1995)

nor part of the core area as described by the Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (USDI-FWS 2015).

East Twin Creek is a small 2nd order tributary to the lower Blackfoot River. It flows approximately 5 miles through private land, except for a small parcel of public land in the headwaters. East Twin Creek ranks moderate on the Blackfoot Basin restoration priority list (Pierce et al. 2005), due to low potential for improving downstream water quality and increasing flows to the Blackfoot River, and a high ranking in native species value as it supports bull trout rearing and fluvial westslope cutthroat trout. In general, densities are low for all species in the lower to middle reaches. The only known problem for East Twin Creek is an undersized culvert, which contributes to localized channel instability (Pierce et al. 2005).

The only project related activities that would occur in this sub-watershed is log hauling. No vegetation manipulation would occur in this sub-watershed related to this project. As part of the haul route for timber harvested in the Gold Creek drainage, forest service road 126 parallels East Twin Creek for approximately one half mile before reaching Highway 200.

3.6.2 Environmental Effects (Proposed Action and No Action)

The synopsis of this analysis is that no detectable impacts are expected to occur to bull trout, bull trout critical habitat, westslope cutthroat trout, western toad, northern leopard frog, and western pearlshell mussel individuals, populations or habitat as a result of the vegetation manipulation that would occur in the lower Blackfoot corridor. The proposed federal activities are expected to maintain the current status and viability of the bull trout in the Blackfoot River core area and the Belmont and Gold creek local populations. Westslope cutthroat trout and western pearlshell mussel viability would also be maintained. Mortality is very unlikely to occur and there would be no measurable changes to habitat conditions.

The proposed weed management activities associated with this project would be conducted in a manner consistent with the Integrated Weed Management Environmental Analysis (EA). This EA was produced by the Missoula Field Office of the BLM in May of 2009. The EA proposes to control noxious and invasive weeds on BLM-managed lands within Granite, Missoula, and Powell counties. The BLM uses an Integrated Weed Management strategy that combines chemical, biological, and mechanical methods to control noxious and invasive plants. That analysis found no expected impacts to aquatic species and their habitat and resulted in a "may affect, not likely to adversely affect" call for bull trout. The design features in that document would be applied to this project as well where applicable. Since this proposed project represents a small subset of locations consistent with the larger analysis we expect impacts will be the same and will not discuss weed management further in this document.

PROPOSED ACTION

Direct and Indirect Effects

Amphibians

Removal of conifers in upland habitat for amphibians is considered largely inconsequential. Ground level cover from grass and shrubs is important to amphibians, as are moisture and humidity levels. Removal of conifers and related reductions in moisture and humidity levels on the ground, are likely minimal. While areas of shade continue to be provided by the grass and shrubs, we expect they provide favorable conditions for daytime migratory or other uses. As succession results in increased production of grasses, shrubs and seedling trees, suitability for amphibian use will continue.

Prescribed burning related changes in upland habitat for amphibians are considered to have a mix of possible consequences. Changes to the vegetation from fire may have positive or negative effects to amphibians. As a worst-case scenario, the desired outcome of broadcast prescribed burning is a mosaic of burned and unburned

vegetation. As a result, the burned areas will be microclimates of lower moisture and humidity levels on the ground, but also openings that allow more terrestrial amphibians to bask and forage. Minimal overall effect, either positive or negative, is expected with this Proposed Action.

Prescribed fire treatments are only implemented when conditions are within "prescription". This means they will occur only when environmental and fuel conditions allow accomplishment of objectives while minimizing risk of the fire escaping containment. Thus, the types and extent of effects seen with wildfire shouldn't occur. The environmental change from prescribed fire, most likely to negatively affect amphibians is the amount of vegetation remaining for cover. There could be confined areas where mineral soil is exposed until vegetation becomes reestablished. Because many burns are done in the spring, the time until re-vegetation occurs tends to be short. Soil erosion and resultant deposition of sediment into wetlands are possible, but likely limited in scope and confined to short periods.

Because changes in the indicators are predicted to be small, the intensity of impacts on amphibian habitat is small. While the scope of activity is moderate for the planning area, the impacts (i.e. change) relative to quantity and quality of habitat for amphibians is minimal. Thus, the scope of impact is small.

The greatest risk of vehicle or prescribed burning related mortality occurs when a road or burn unit is immediately adjacent to, a breeding area (an area of concentration from which dispersal of individuals occurs), and/or when a road separates a breeding site from other desirable habitat, traffic rates and vehicle speeds are high and coincide with the timing of adults congregating and/or juveniles dispersal.

Given the elevation of lands in the planning area, and life history of various native amphibians, concern for mortality is greatest for the western toad, a BLM sensitive species that can migrate greater distances overland than other native amphibians that tend to be aquatic obligates (Bartelt 2000).

Schmetterling and Young (2008) found that western toad migrations tended to be more common during the night or during rainstorms. This presumably is due to toads needing favorable ground level humidity levels to meet their physiological requirements. Humidity levels are higher during the night and after rainstorms when the soil is saturated.

Assuming vehicle activity will occur from late spring to fall season – May through November and will continue over several years, traffic from pickup trucks necessary to access daily work sites is approximately 2 trucks per day. Nearly all of the travel is likely to occur between late morning and late afternoon and likely limited traffic during wet periods or conditions. Existing roads in and around the planning area are gravel surfaced and exhibit vehicle use at relatively low intensities and low speeds. The increase in traffic due to this project will be very limited.

Western toads have been observed and reported to the Natural Heritage Map Viewer database in the planning area. These observations are associated with the mainstem Blackfoot River, and one has been identified as a breeding site. No harvest units or fire activity are proposed within 1000 feet. The breeding site is over a mile from the nearest prescribed burning unit. Project related traffic would occur in closer proximity as the Ninemile Prairie road is just under 150 feet away from the breeding site.

It is possible that prescribed burning in the spring overlaps the time of high amphibian activity. This activity is usually associated with movement toward breeding sites. Despite amphibian use of refugia such as burrows, there is at least some chance that individuals may be overcome by fire. The nearest unit to a known breeding site is well over a mile and burning activity is typically very brief. The likelihood of mortality related to prescribed burning is very low.

There is one known breeding site near existing roads. The estimated increase in daytime traffic from vehicles is predicted to be slight and it should not coincide with nighttime hours or wet periods when toads are more likely to migrate. Thus, vehicle related mortality to amphibians likely would not occur at all let al.one at levels creating negative trends in populations or place populations at risk.

Aquatic Species

Manipulating vegetation in the lower Blackfoot River corridor has the potential to impact bull trout, westslope cutthroat trout, and western pearlshell mussel habitat in five ways:

1. Reducing the future potential for large woody debris recruitment by removing trees that could eventually fall over and be recruited to stream channels;
2. Reducing the amount of shade on streams which could increase stream temperatures by increasing direct solar exposure;
3. Reducing shade within the 300-foot RHCAs (but not the shade that covers streams) which increases the ambient air temperature in the riparian area and potentially increases temperatures in nearby streams via conduction, convection, and heat exchange with the surrounding warmer air. This is known as microclimate alteration;
4. Adding sediment to streams via ground disturbance and erosion caused by logging equipment; and
5. Adding contaminants/toxins to streams via fuel spills.

The risk posed by each of these potential impacts is discussed in the following paragraphs.

Woody Debris Recruitment

Both live and dead trees are capable of providing woody debris recruitment to streams within the planning area. In this project, no felling, yarding, or manual thinning of trees would occur within 100 feet of the Blackfoot River, Belmont or Gold creeks, nor other perennial streams in the planning area. This distance represents one site potential tree height for the area. Those restrictions would ensure that woody debris recruitment potential would be fully protected, and all of the trees that could potentially be recruited as instream wood would be retained on site.

Stream Shading

Prohibiting felling, yarding, or manual thinning within 100 feet of the Blackfoot River, Belmont and Gold creeks, and other perennial streams in the planning area would preserve all of the existing stream shading. There would be no measurable increase in direct solar radiation or stream temperatures.

Riparian Microclimate Alteration

Thinning would occur outside of the 100-foot wide buffer on each side of the Blackfoot River, Belmont and Gold creeks, and other perennial streams in the planning area. The parts of the RHCA that would be thinned are dry pine flats. Thinning trees from the RHCAs is going to open up the stands and allow more solar radiation to penetrate the stands and warm the ambient air temperature and the soil. As an example, on your average hot and sunny summer afternoon, the ambient air temperature in a thinned RHCA is likely to be several degrees warmer than it would be if the stand were not thinned. Air temperatures are also likely to be a few degrees cooler at night. Wind speeds tend to be higher in thinned stands due to the reduced number of trees, and relative humidity is lower. This is known as microclimate alteration. If daytime increases in ambient air temperature are large enough, then the warmer ambient air can penetrate the riparian vegetation buffer and contribute to warming a stream via conduction, convection, or heat transfer (i.e. the cooler water of the stream absorbs some of the heat from the warmer air). The magnitude of air temperature warming that can occur depends on several site specific factors, including the distance between the trees, the aspect of the site, the amount of shade provided by local topography, and the elevation of the site.

Moore et al. (2005) summarized the literature addressing riparian microclimate alterations and stream temperatures responses from forest harvesting. They concluded that edge effects penetrating into a riparian vegetation buffer generally decline rapidly within about one tree length into the buffer. Solar radiation, soil temperature, and wind speed appear to adjust to forest conditions more rapidly than air temperature and relative humidity. Moore et al. (2005) concluded that a one-site potential tree length buffer on each side of a stream should be reasonably effective in reducing harvesting impacts on both riparian microclimate and stream temperature.

In this project, it is unlikely that changes in microclimate that occur as a result of thinning in the RHCAs would be large enough to measurably affect water temperatures in the Blackfoot River nor Belmont and Gold creeks. There are several reasons for this:

- A "no cutting" buffer of one site potential tree length (100 feet) would be retained along the Blackfoot River, Belmont and Gold creeks, and other perennial streams in the planning area;
- Where thinning occurs, sufficient tree cover would still be retained to maintain a forested stand;
- The amount of shade that currently exists within one site potential tree length of streams would not change;
- The streams that could potentially be affected by microclimate changes are large (Belmont Creek base flow discharge averages 10-12 cubic feet per second (cfs); Gold Creek averages a base flow of 20-25 cfs). The more water volume, the more resistant stream temperatures are to small increases in ambient air temperature.

For all of the reasons described above, we do not expect the microclimate changes that occur in the planning area after thinning to measurably affect stream temperatures in Gold and Belmont creeks nor the Blackfoot River.

Sediment

The project as proposed has a negligible risk of adding any sediment to streams. There are several reasons for this, including:

- The harvest acreage adjacent to RHCAs is relatively small. The amount of ground disturbance caused by the felling and yarding is expected to be minimal due to the flat terrain of the sites, and the existing roads to operate machinery on and for processing and decking.
- The logging equipment for processing and decking would mostly operate on or close to existing roads. Off-road excursions of logging equipment would be on flat terrain. Logging equipment would not operate off-road within 100 feet from the edge of water in this project.
- The haul routes proposed for this project are designed to avoid routes near streams and stream crossings to the extent possible. For the Gold Creek harvest, the haul route would be FSR 126, a relatively flat, well-graveled road that avoids crossing Gold and East Twin creeks. The segments of road that are located in the floodplain are graveled and flat. We expect negligible sediment delivery to Gold Creek and East Twin Creek from limited haul traffic over this route.
- The haul routes proposed for harvest east of Belmont Creek are high on the slope and away from the stream. A short length of road would be constructed linking existing roads and allowing the haul route to stay up out of the floodplain in the Belmont watershed. The road segments along the Blackfoot River and through Ninemile Prairie are generally flat and outside the floodplain and consist of graveled surface.
- The haul routes proposed for harvest between Gold and Belmont creeks are generally away from aquatic habitat until they reach the Blackfoot River corridor. This route also crosses the Blackfoot River at Whitaker Bridge. Because of its flat approaches on both sides, there is no significant sedimentation predicted to occur. The Johnsrud Road on the south side of the river heading south and west toward Highway 200 is relatively flat, graveled, and maintained during the late spring and summer as it receives a high volume of traffic related to recreational visitation. Portions of the road also encroach on the

Blackfoot River. Hauling would be restricted to times when the gravel surface are dry. Dust abatement will be used on sections of the haul route nearest the river when necessary. Hauling is not expected to add measurable quantities of sediment to the main stem Blackfoot River because the segments of road closest to those streams are graveled and have berms with negligible delivery potential.

Because of the factors listed above, it is very unlikely that this project would add sediment to streams, and if it does, those inputs would certainly be too small to be measured.

Fuel Spills/Water Contamination

INFISH standard RA-4 prohibits the storage of fuels and refueling of equipment in RHCAs. If there are no other alternatives, refueling of equipment can occur in RHCAs as long as the refueling site is approved by the BLM and has an approved spill containment plan. Implementing INFISH standard RA-4, along with the flat terrain in the treatment sites, makes the risk of water contamination low.

The ways that this project could potentially impact fish habitat and water quality are discussed above, along with the mitigating factors that would ameliorate those impacts. The expected outcome of this project is that there would be no detectable impacts to bull trout, westslope cutthroat trout, and western pearlshell mussel individuals, populations or habitat. Woody debris recruitment, stream shade cover, stream temperatures, and water quality would be maintained at its current condition.

Cumulative Effects

Cumulative effects in ESA are those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the Federal action subject to consultation. This definition applies only to ESA section 7 analyses and should not be confused with the broader use of this term in the National Environmental Policy Act or other environmental laws.

The fisheries cumulative effects planning area is the Blackfoot River drainage between Highway 200 at Ninemile Prairie and Highway 200 just downstream from Johnsrud Park including the Belmont and Gold creek drainages. This area was chosen because it includes the water bodies where bull trout, westslope cutthroat trout, and western pearlshell mussel individuals and habitat have the most potential to be affected by cumulative changes to water quality, most specifically water temperature increases due to reductions in shade, woody debris recruitment, and increases in sediment. In the lower Blackfoot TMDL (MT-DEQ 2009), Montana DEQ determined temperatures were not impaired in Belmont and Gold creeks nor the Blackfoot River. DEQ investigated temperature impairment to the mainstem Blackfoot River between Monture and Belmont creeks. In effect, the water temperature from Nevada Creek is elevating the water temperature in this portion of stream and the conclusion is this reach of the mainstem Blackfoot River does not require a temperature TMDL. Montana DEQ considers Belmont Creek partially supporting of aquatic life and the cold-water fishery. Restoration activities in the reach included large woody debris placement by the BLM as well as 1995 grazing exclusion fencing and shrub and tree planting by PCTC. Although restoration has been implemented, Type I targets for McNeil Cores and residual pool depth are not met. However, Type I targets for pool frequency and percent fines in riffles are met, potentially indicating restoration-associated improvements in channel condition. As a result, this lower reach of Belmont Creek, a sediment TMDL is warranted for the listed stream segment (MT- DEQ 2009).

The Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (USDI-FWS 2015) identified livestock grazing, forestry practices, the ongoing use and management of roads, dewatering, and the presence of non-native fish as the highest risks to bull trout in the Blackfoot River basin. Grazing, forestry and roads can be linked to causing riparian and instream degradation, loss of LWD, and pool reduction. Dewatering in the upper basin results in loss of habitat, barriers to movement, and elevated water temperatures. Non-native fish hybridize with, prey upon, and compete with native bull trout and westslope cutthroat trout. Rainbow, brown, and brook trout were widely stocked in the Blackfoot basin in the first half of the 1900's. Non-native trout are present

throughout the planning area and outnumber the native trout. The proposed project would have a neutral effect on the current grazing, dewatering and non-native fish situation in the planning area – it would not make the situation better or worse. The recent change in ownership from a private industrial timber company to a conservation minded owner for most of the basins in Gold and Belmont creeks takes the management emphasis of this land base away from forestry and extensive road use.

The potential to cause further degradation of the thermal and siltation impairments in the Blackfoot River and Belmont and Gold creeks is the biggest cumulative effect that could potentially result from this project. The Blackfoot River was formerly designated as impaired because of thermal modification (MT-DEQ 2009). In the lower Blackfoot TMDL (MT-DEQ 2009), Montana DEQ determined temperatures were not impaired in Belmont and Gold creeks nor the Blackfoot River. DEQ investigated temperature impairment to the mainstem Blackfoot River between Monture and Belmont creeks. They concluded the current woody bank line vegetation extent is not a source of significant thermal loading to this segment of stream. In effect, the water temperature from Nevada Creek is elevating the water temperature in this portion of stream and the conclusion is this reach of the mainstem Blackfoot River does not require a temperature TMDL.

Montana DEQ considers Belmont Creek partially supporting of aquatic life and the cold-water fishery. Probable causes of impairment identified on the 2006 303(d) List consist of sedimentation/siltation, and the probable sources associated with that impairment are forest roads and riparian grazing. Two reaches on Belmont Creek were assessed in 2006. The uppermost reach is a B channel type that meets all target values with the exception of riffle substrate <6mm. Downstream is a C channel type that flows through an unconfined open meadow area. Restoration activities in the reach included large woody debris placement by the BLM as well as 1995 grazing exclusion fencing and shrub and tree planting by PCTC. Although restoration has been implemented, Type I targets for McNeil Cores and residual pool depth are not met. However, Type I targets for pool frequency and percent fines in riffles are met, potentially indicating restoration-associated improvements in channel condition. Because of the evidence for accumulations of fine sediment above established target values for McNeil Core data in this lower reach of Belmont Creek, a sediment TMDL is warranted for the listed stream segment (MT-DEQ 2009).

Although this project would increase the spacing in the tree canopy in the RHCA in some units within the proposed planning area, sufficient tree cover would be retained on those acres to maintain a forested stand. At all sites, the amount of shade within one site potential tree length (about 100 feet) of the stream banks would not appreciably change. This would maintain the current levels of effective shade reported in the Lower Blackfoot TMDL. Finally, by not cutting any trees within one site potential tree length of streams, this project would be implemented in a manner that preserves stream shading and temperatures. The haul routes and complete avoidance of hauling over either of the spawning and rearing streams in the planning area has a negligible risk of adding sediment to streams. For those reasons, the proposed project is unlikely to cause further degradation of the existing thermal and siltation impairments, and is expected to have an insignificant cumulative effect on bull trout, westslope cutthroat trout, western toad and western pearlshell mussel individuals and habitat.

NO ACTION

Direct, Indirect, and Cumulative Effects

Under the No Action Alternative, there would be no vegetation treatments and no road treatments in the absence of hauling traffic. There would be no direct effects to aquatic species because no work would be done in aquatic habitats. 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, and streamside cover loss from the risk of a high severity wildfire. The extent and severity of these impacts would be speculative and highly dependent on the nature of a fire event.

3.7 Water Quality, Soils and Site Productivity, Riparian/Wetland Areas and Hydrology

3.7.1 Affected Environment

Water Quality

Existing Condition and Trend

The Montana DEQ determined the Blackfoot River and Belmont Creek have impaired water quality pursuant to Section 303d of the Federal Clean Water Act (MT-DEQ 2016a,b,c). Specific segment designations and status are summarized as follows:

MT76F001_032 Blackfoot River (Monture Creek to Belmont Creek) and MT76F001_033 Blackfoot River (Belmont Creek to Clark Fork River): Category 4A, meaning that all Total Maximum Daily Load (TMDLs) needed to rectify all identified threats or impairments have been completed and approved (MT-DEQ 2016b,c). The TMDL and Water Quality Improvement Plan (MT-DEQ 2013) stated that pollutant ammonia was no longer of concern, and may be "*addressed through the application of appropriate conservation measures on contributing tributaries*". The BLM will continue to implement BMPs as per the Memorandum of Understanding (USDI-BLM 2010) for the "probable sources" of sedimentation (forest road construction/use and riparian grazing) identified by the Montana DEQ.

MT76F006_070 Belmont Creek (headwaters to Blackfoot River): Category 3, meaning that there is insufficient data to assess the use support of any applicable beneficial use, so no use support determinations have been made (MT-DEQ 2016a). A nutrient TMDL was assessed in 2013 and determined to be not impaired (MT-DEQ 2013). The BLM will continue to implement BMPs addressing nutrient sources as per the Memorandum Understanding (USDI-BLM 2010).

Table 11: Belmont Creek Water Quality Summary

Water Quality Component	Limiting Factors/ Indicators	Suspected Sources	Applicable Treatments
Sediment	Excess Fine Sediment	Stream bank sediment (23.1 tons/yr)	Riparian Area BMPs
			Grazing BMPs
		Roads (72 tons/yr)	Roads BMPs
		Hillslope sediment (383 tons/yr)	Riparian Area BMPs
			Upland BMPs
Habitat	Fine sediment concentrations in pool tailouts, residual pool depths, woody debris aggregate extent	Excess fine sediment	See above
		Riparian Degradation	Riparian Area BMPs Grazing BMPs
Nutrients	None Identified	None Identified	Collect additional data as necessary
Temperature	None Identified	None Identified	Collect additional data as necessary
Metals	None Identified	None Identified	Collect additional data as necessary

The primary suspected sources of the water quality limitations on Belmont Creek include logging, road development, and riparian grazing. However, substantial efforts have been imparted to reduce sediment loading to the stream relative to historic levels. Results of the sediment source assessment indicate that the largest controllable source of sediment along the listed stream segment is upland areas. Roads and culvert crossings also constitute a significant portion of the total controllable load. Sediment control measures employed on Belmont Creek, including road closures and grazing BMPs, have evidently reduced sediment loading to the stream by a

significant margin. These BMPs should continue to be implemented where feasible, to further address the negative impacts of historic accelerated sediment loading to the system (MT-DEQ 2009).

The Lower Blackfoot TMDL called for fine sediment load reductions via implementation of BMPs for riparian areas, uplands, roads, and grazing. BMPs were implemented in 2001 at 38 sites for road drainage maintenance/improvement. Riparian area/grazing BMPs have been implemented annually via fenced riparian exclosures established in 2000 – 2005. Upland BMPs were implemented for silvicultural treatments in the early 2000's. Belmont Creek is currently on 303d list but with no threatened beneficial uses (MT-DEQ 2016a). As part of a Rangeland Health Assessment conducted in 2011, the water quality standard evaluation for Belmont Creek found no water quality concerns in consideration of recent road drainage maintenance and improvements. A road drainage evaluation was conducted in 2015 throughout the remainder of the Lower Blackfoot Corridor to identify any further maintenance needs.

Scope of Potential Impacts

The Proposed Action may have some degree of soil disturbance during the harvest and prescribed burning operations. Soils that become exposed or displaced by mechanical damage or burning may be subject to erosion from the site and delivery to waterways that may affect water quality.

There will be 2209 acres of mechanical equipment use consisting of log skidding with rubber-tired skidders, cable yarding, and mastication. Design features include BMPs to avoid soil compaction or displacement and minimize skid trails, as well as mitigating any resulting compaction or displacement. The BMPs follow those in the Montana Forestry Best Management Practices (MT-DNRC 2015), Montana Streamside Management Zone law (MT-DNRC 2006) and any site-specific Riparian Management Objectives developed during project layout.

Prescribed burning on 5,322 acres may affect soils if higher fire severity creates hydrophobic surface conditions. This may affect erosion, sediment delivery and water quality. Design features include prescriptive burning criteria that avoid higher fire severities. These measures may include moisture content criteria for fuels, duff, and soils. Prescribed burning conducted in the area in the 2000's had no fire severity levels that damaged soils or caused erosion and sediment delivery.

Approximately two miles of the roads that will be used for equipment/administrative access and timber haul are either close to, or define the edge of, an SMZs. Some road segments will require reconditioning which may affect sediment delivery and water quality where they are close to streams and have delivery pathways. There are 11 spots where these roads cross riparian areas. The design features include Best Management Practices for road drainage to avoid sediment delivery.

There will be 585 feet of new road construction. There are no water quality concerns since there are no nearby waterways or likely delivery paths.

Soils and Site Productivity

Existing Condition and Trend

The 2000 EA had areas with ground skidding, compacted skid trails, and weed infestations (USDI-BLM 2000a). 38 sites were addressed with erosion potential and compaction. A 2011 Rangeland Health Assessment revealed no problems with site productivity other than weeds (USDI-BLM 2011).

Thinning treatments and prescribed burns implemented in the early to mid-2000s revealed no post-treatment soil productivity issues (compaction, erosion, organic cover) because of BMP implementation and prescribed fire burn prescriptions.

Scope of Potential Impacts

The Proposed Action has the potential to affect soils and site productivity with ground disturbance from silvicultural and fuel treatments. Forest BMPs will minimize such impacts to retain soil and site productivity. Soil types on proposed treatment areas are predominantly gravelly-loams of the Bignell and Winkler series. The gravelly-loams are typically more resistant to compaction and erosion than the finer-textured soils (Shooflin and Half Moon series) found in smaller amounts in the planning area. Productivity attributes are organic matter, volcanic ash, nitrogen-fixing plants, and fungal decomposers (USDA-FS 1995a).

Specific BMP is timing activities with periods of either frozen ground, deeper snow (> 1 ft), or dry soil for reducing compaction potential. Using efficiently spaced designated skid trails that cover less than 15% of the total soil surface area limits the impact on tree growth to less than 2% (MT-DNRC 2015).

Soil disturbance has the potential for noxious weed spread (see 3.5 Noxious Weed section) which can reduce site productivity for native vegetation.

Riparian/wetland areas and hydrology

Existing Condition and Trend

Riparian areas were first inventoried and assessed for health rating in 1998-1999 under the Montana Wetland Riparian Association methodology. In 2014, riparian areas were reinventoried to capture areas missed in earlier inventories. A health rating using the BLM Technical Reference 1737-15 (USDI-BLM 1998) was conducted on Belmont, Gold, Sheep Flats, and Dunnigan in 2011. All sites were meeting Proper Functioning Condition (USDI-BLM 2011). There are 24.7 miles of inventoried riparian habitat in the activity area. Riparian habitats include larger lotic systems such as the Blackfoot River, Belmont Creek, and Gold Creek, to smaller lotic tributaries, lentic seeps and slope wetlands.

Scope of Potential Impacts

Riparian areas in the planning area are predominantly high-gradient intermittent tributaries with varying degrees of lotic and non-lotic (seeps, slope wetlands) flow character. Belmont Creek is the largest stream with riparian area widths of 20 to 220 feet in both depositional meadow areas and narrow erosional, armored valley bottom segments. The Proposed Action is unlikely to impact riparian/wetland areas and streams. SMZ Law will be followed, RMOs will be established for important habitat elements, and Forestry BMPs will be used. There are approximately 9 to 10 miles of valley-bottom areas in the lands recently acquired from TNC that have not been inventoried, but none of these areas are proposed for harvest or mastication and so SMZ delineation would not be necessary.

Indirect impacts are likely small and may result in a small increase in water supply and hydrograph characteristics toward the natural range of variation (NRV) (reducing areal evapotranspiration (ET) levels to within the natural range of variation). Excessive areal extent of high-ET dense tree regeneration is likely reducing streamflows below the natural range of variation levels. The premise of restoring the NRV to upland forests would also restore the resulting ET and hydrologic influence of the upland vegetation. Increasing flow in springs/seeps, or baseflow to streams may enhance riparian vegetation growth and vigor, enhancing riparian function and habitat.

3.7.2 Environmental Effects (Proposed Action and No Action)

<u>Assumptions for impact analysis</u>
Pre-commercial thinning and planting actions do not change Water Erosion Prediction Project (WEPP) soil cover.

Pre-commercial thinning and planting actions may affect water tables on mineral or organic wetland sites but these would be very small sites in the activity area (toe slope seeps, wallows, floodplain sloughs).
Planting will increase evapotranspiration to formerly forested lands.
Pre-commercial thinning lowers ET for a period of years, with ET likely increasing as thinned stands release with higher growth and vigor.
Machine use (mastication, tractor skidding, cable yarding) on snow-covered frozen soils, or over slash cover greatly reduces hazard for compaction, displacement, and erosion of soils.
All harvest is moving from over-dense forest (more than the the natural range of variation) to a lower density within the natural range of variation, which also normalizes hydrologic conditions to within the natural range of variation.
Prescribed burning would be conducted such that fire severity is kept low enough so as to not create the level of soil heating that would cause hydrophobic conditions, soil sterilization, or over-consumption of organic matter.

Water Quality

Effects of No Action

If wildfire severity hazard continues or worsens, there is an increased potential for soil erosion and sediment delivery in the event that severities exceed the magnitude or areal extent than what is normal in the NRV.

Effects of Proposed Action

The WEPP model (Elliot and Hall 2010) was used to characterize potential sediment delivery. WEPP predicted sediment delivery from four treatment polygons. Two of the polygons have no receiving water present and have .0001 - .0013 tons/acre predicted delivery. Two of the polygons have potential receiving water that are small perennial systems with no fish presence, no water quality 303d listing, and no downstream surface water connection. These have a predicted delivery of .0001 - .0015 tons/acre. The probability of delivery is 10% in the first year after treatment, given a 10% storm event (a 10-year event). The model runs assumed no special mitigations such as BMPs for limiting soil disturbance (skidding over slash or snow cover). With the application of BMPs, the 10% probability is likely reduced and the predicted impact to water quality is negligible.

Cumulative Effects

Past actions which have had some influence on water quality but are difficult to quantify include; early 20th century logging and log drives in the river, fire suppression, heavy livestock grazing, recreation, and homesteading.

More recent actions include extensive timber harvest when the lands were owned by Anaconda Company, Champion International, and Plum Creek, with clearcutting, roading, skidding down draw bottoms, and noxious weed introduction and spread.

Recent corrective actions to improve water quality were being undertaken as early as the 1990s;

- Plum Creek's improvement to the road drainage system as part of their Habitat Conservation Plan (USDI-FWS 2000b) in the early 2000's.

- BLM fuel and vegetation treatments to improve stand composition and density and reduce fuel loading action (early 2000's) with implementation of BMPs (USDI-BLM 2000a).

- BLM improvement and restoration of boat launches and recreational trails (2000 to present).

- BLM improvement to road drainage BMPs to reduce erosion hazards (USDI-BLM 2000a).

- Ongoing livestock use in the Belmont Allotment has been light, with several years of no use. The riparian exclosure has reduced livestock impacts over the past ten years (USDI-BLM 2011).

With the negligible impacts of the Proposed Action, combined with recent year's activities that reduce sediment delivery, the resulting cumulative effects to water quality are negligible.

Soils and Site Productivity

Effects of No Action

If wildfire severity hazard continues or worsens, there is an increased potential for soil erosion in the event that severities exceed the magnitude or areal extent than what is normal in the NRV.

Effects of Proposed Action

The WEPP model (Elliot and Hall 2010) was used to characterize potential erosion. As described in the water quality impacts, the WEPP runs generated a 10% chance of erosion on 12 of the 24 treatment units (.01-.02 tons/acre) for the first year after low severity fire treatment for worst-case 50% soil exposure. For predicted treatment soil exposures of 10% to 20%, no erosion was predicted.

Given that these burns are often done in the spring, there is typically substantial regrowth of shrubs, forbs, and grasses due to the nutrient boost. This would reduce the chance of a 10% storm event occurring on uncovered soils to a month or less, rather than a full year as used in the model run.

Given that, the likelihood of soil erosion occurring at something less than 10% chance, the impact to soils is negligible.

Cumulative Effects

Past actions which have had some influence on soil productivity but are difficult to quantify include; early 20th century logging, fire suppression, heavy livestock grazing, recreation, and homesteading.

More recent actions include extensive timber harvest when the lands were owned by Anaconda Company, Champion International, and Plum Creek, with log skidding, skidding down draw bottoms, and noxious weed introduction and spread.

Recent corrective actions to soil productivity were being undertaken as early as the 1990s;

- BLM fuel and vegetation treatments to improve stand composition and density and reduce fuel loading.action (early 2000's) with implementation of BMPs (USDI-BLM 2000a).

- BLM improvement and restoration of boat launches and recreational trails (2000 to present) to reduce soil erosion and establish vegetation.

- Ongoing livestock use in the Belmont Allotment has been light, with several years of no use. The riparian exclosure has reduced livestock impacts over the past ten years (USDI-BLM 2011).

- Ongoing noxious weed treatments to arrest or limit the spread and infestation.

With the negligible impacts of the Proposed Action, combined with recent activities that protect or improve soil productivity, the resulting cumulative effects to soils are negligible.

Riparian/wetland areas and hydrology

Effects of No Action

Potentially impacted in the event of greater magnitude/extent of wildfire severities higher than the natural range of variation accelerating runoff and peak flows from burned areas.

Stand densities and evapotranspiration higher than the natural range of variation could reduce water availability for streams and riparian/wetlands.

Effects of Proposed Action

The WEPP model (Elliot and Hall 2010) was used to characterize potential runoff. Under no WEPP run was runoff generated for a 10-year storm event in the first year after treatment (10% chance) for any treatment area.

Although not detectable as modelled at the hillslope scale, site hydrology at both the hillslope scale, basin, and riparian reach would likely move more closely toward the NRV as vegetation conditions are likewise moved in that direction.

Hydrologic aspect not analyzed in detail since vegetation restoration assumed to restore hydrology within the natural range of variation. This analysis addresses the more direct impacts to riparian/wetlands that may alter function via soil or vegetation.

Cumulative Effects

Past actions which may have had some influence on riparian areas and hydrology but are difficult to quantify include; early 20th century logging, fire suppression, heavy livestock grazing, recreation, and homesteading.

More recent actions include extensive timber harvest when the lands were owned by Anaconda Company, Champion International, and Plum Creek, with clearcutting, roading, skidding down draw bottoms, and noxious weed introduction and spread. Reach-scale hydrologic disruptions are not evident. Steeper reaches are well-armored and bedrock-controlled, and lower gradient reaches are dominated by dense shrub and tree growth and beaver activity in Belmont Creek.

Recent corrective actions to improve riparian areas and hydrologic conditions were being undertaken as early as the 1990s;

- Plum Creek's improvement to the road drainage system as part of their Habitat Conservation Plan (USDI-FWS 2000b) in the early 2000's.

- BLM fuel and vegetation treatments to improve stand composition and density and reduce fuel loading.action (early 2000's) with implementation of BMPs (USDI-BLM 2000a)

- BLM improvement and restoration of boat launches and recreational trails (2000 to present)

- BLM improvement to road drainage BMPs to reduce runoff rerouting, and decompaction of skid trails in ephemeral drainageways (USDI-BLM 2000a)

- Ongoing livestock use in the Belmont Allotment has been light, with several years of no use. The riparian exclosure has reduced livestock impacts over the past ten years (USDI-BLM 2011).

With the negligible impacts of the Proposed Action, combined with recent year's activities that reduce impacts to riparian areas and restore stand and road conditions to lessen hydrologic impact, the resulting cumulative effects to riparian areas and hydrology are negligible.

Table 12: Summary of Impacts: Water Quality, Soils, and Riparian and Hydrology

	No Action	Proposed Action
Water Quality	Potentially impacted in the event of greater magnitude/extent of wildfire severities higher than the natural range of variation accelerating soil erosion and sediment delivery from burn areas.	Road drainage BMPs will reduce risk. Veg. treatments will likely be negligible.
Soils	Potentially impacted in the event of greater magnitude/extent of wildfire severities higher than the natural range of variation accelerating soil erosion in burned areas.	Veg. treatments will likely be negligible. Any post-treatment impacts would be mitigated.
Riparian & Hydrology	Potentially impacted in the event of greater magnitude/extent of wildfire severities higher than the natural range of variation accelerating runoff and peak flows from burned areas. Stand densities and evapotranspiration higher than the natural range of variation could reduce water availability for streams and riparian/wetlands.	Veg. treatments will move hydrology toward the natural range of variation, and no runoff impacts resulted from modelling. Road drainage BMPs will reduce risk. Riparian areas would be avoided.

3.8 Recreation and Visuals

3.8.1 Affected Environment

Recreational use in the Lower Blackfoot Corridor (LBC) primarily consists of river users – floating, fishing, camping, swimming, and picnicking. Developed recreation facilities within the corridor on BLM administered lands include seven day use sites, one campground, one boat launch, and a hiking/biking trail. Use of the area is heaviest June through August. Visitation during those months ranges from 7000 to 10,000 people per month with July being the busiest. The spring and fall bring approximately 3000 visitors per month in May, September and October. The main road through the LBC is open year round, however it is not plowed in the winter and becomes inaccessible to motor vehicles. In 2016, an average of 5.9 vehicles per hour drove on the road near Johnsurd Park, with a maximum of 13.5 cars per hour, and an average of 3.5 vehicles per hour drove on the road near Ninemile Prairie, with a maximum of 7.9 cars per hour. The heaviest vehicle traffic occurs between 10:00 am and 7:00 pm. The busiest days are on the weekends and holidays.

Other recreation activities in the corridor include hunting, and limited hiking and biking. Based on FWP reports and hunters, the hunting opportunities in this area are rated as good to excellent. This may be due to the proximity to Missoula and the road closure program which is in place, in part, to provide for big game security. Some of the lands within the LBC are part of the Morrison Peak Block Management Area (BMA). This area became a walk-in hunting area in 1978 with year round road closures. This program was well received by the public and continues to be a popular hunting area. Morrison Peak remains the second oldest walk-in hunting area in the state. Because access to the BMA is walk-in only, hunters are not required to sign-in, making usage numbers more difficult to track. FWP access technicians monitor the walk-in hunting areas and record when they see people. In the past 5 years, FWP has recorded seeing an average of 654 hunters in this BMA. Usage numbers are likely higher. Another recreational opportunity within the LBC is the Road to the Buffalo trail. This non-motorized trail consists of the abandoned railroad grade along the north side of the river and runs through the entire corridor. The main access points for the trail are at Whitaker Bridge Day Use and the Red Rock Parking area. The section of trail between Red Rock Parking area and Red Rock is the heaviest used section.

The Blackfoot River Corridor is categorized as a visually sensitive scenic corridor and is to be managed as a VRM Class II or III. Class II requires that management activities be designed and located to blend into the natural landscape and not be visually apparent to the casual visitor. Class III supports a range of management activities while recognizing the scenic value of these lands as visual background. Contrasts to the basic elements (form, line, color, texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape.

3.8.2 Environmental Effects (Proposed Action and No Action)

PROPOSED ACTION

Direct Effects

Under the Proposed Action, river recreationists would be affected by logging trucks hauling through the Whitaker Bridge boat launch/day use site/parking area diminishing the recreational experience as well as possibly creating safety conflicts. Restricting hauling to weekdays and attempting to avoid the busiest times of the day from Memorial Day through Labor Day could reduce some of the impacts. There would be very little to no impact to hikers and bikers on the trail as the portion east of Whitaker Bridge will not be used for hauling. Hunters would experience short term impacts while the project was implemented.

Several of proposed treatment areas are within the scenic corridor – which is to be managed as a VRM Class II or Class III. The proposed activities aim to increase the acreage of forest communities in the natural range of variability (NRV), dominated by large and very large ponderosa pine and western larch where these communities are now shifting toward relatively small diameter and densely stocked Douglas-fir trees. The goal of returning large pine to this area is consistent with the RMP objective of improving scenic quality if operational restrictions are implemented.

Indirect Effects

Indirectly, there could be effects to recreationists due to logging traffic driving the main road through the Corridor. The main road and especially the section between Belmont Creek and Ninemile Prairie is very narrow in places with few turnouts and many visitors in the summer months tow rafts. Restricting hauling to weekdays and having a road safety plan would reduce the potential for conflicts.

Cumulative Effects

There are no known cumulative effects.

NO ACTION

Direct, Indirect, and Cumulative Effects

Under this alternative, proposed vegetation treatments would not occur and there would be no impacts to recreationists from timber harvest traffic. Hunting opportunities would be reduced due to loss of quality wildlife forage. In addition, opportunities to restore stands of large ponderosa pine and western larch would be gone. Although the landscape and scenery would not be changed, the visual scenery would change from historic conditions of open pine stands to more densely packed Douglas-fir stands. In addition, the risk of a historically uncharacteristic wildfire would increase and if this type of wildfire occurred, it would cause unwanted changes in the landscapes appearance. This would negatively impact visual quality and associated recreation opportunities.

3.9 Cultural Resources

3.9.1 Affected Environment

A literature search revealed several previous inventories and sites recorded within the planning area. Some of these sites fall within a polygon in which a treatment is planned. These projects will either be redesigned or mitigated to decrease any adverse effects to cultural resources. Both treatment polygons and newly built haul routes will be surveyed at a Class III level. Previously recorded sites will be re-located and considered into project design where needed.

A cultural resource inventory will not be fully conducted prior to the completion of this EA but all project polygons will be inventoried prior to project implementation. The proposed project is planned to be implemented over many years and annually priority projects will be inventoried first.

The planning area has both prehistoric and historic archaeological sites present. For example, prehistoric campsites, lithic scatters, hearths, trails, culturally modified trees (CMTs), etc. Historic sites in the planning area consist of early logging campsites, cabins, railroad, homesteads, etc.

The Cokahlarishkit Trail (Road to the Buffalo) is present in the planning area. The Cokahlarishkit Trail generally follows along north of the Blackfoot River and provided a known route for local Native Americans to travel from Idaho to the Sun River valley near present day Great Falls to hunt buffalo. There are several off-shoots of the main route heading north. This route had been utilized by Native Americans for thousands of years. This route was also used by Meriwether Lewis and his men to traverse from present day Lolo to the Marias River on the Expedition's return trip in early July 1806.

The Lewis and Clark National Historic Trail is located in the planning area. On July 4th, 5th, 6th and 7th Meriwether Lewis and a party of nine men split from Clark and his group. They traveled up the Blackfoot River documenting many different species, stopping for lunch and camping along the way. Lewis and/or Gass journal along the way describing many spots along the way such as the confluence of the Blackfoot and Clark's Fork Rivers, Ninemile Prairie, Monture Creek, North Fork of the Blackfoot River and Nevada Valley. By July 7th the group were headed north up Alice Creek toward Marias River.

The first large scale logging started in the Blackfoot River valley in 1885 (Bateman 1976). The Big Blackfoot Milling Company in Bonner needed plenty of wood to supply to the Butte Copper Mines so much so that Marcus Daly, Butte Copper magnate and his Anaconda Copper Mining Company purchased the mill in 1898. A railroad was constructed following the river and would be built up to a logging area. When that logging area was finished then the railroad was extended to the next logging area. The Milwaukie Railroad purchased the Big Blackfoot Railroad in 1910 as a spur line. As logging trucks became the more effective way to remove logs to the mills the railroad was eliminated in 1957 (Bateman 1976). The railroad grade from the Big Blackfoot Railroad is present throughout the planning area and in some areas it is used as a road.

The northern most lands in the planning area were privately owned until recently, thus no cultural inventories have been conducted on these sections. It is unknown what if any cultural resources are present in these sections as the area has been previously logged for many decades.

Although little is known about the on-the-ground cultural resources, the use of the river corridor by Native Americans, the Lewis and Clark Expedition, and the timber industry is documented. Also, certain inferences can be made on the nature of the early environments and prehistoric lifeways in the study area based upon research conducted in adjacent areas. More detailed information can be found in Chapter 4 of the Lower Blackfoot Corridor Analysis (USDI-BLM 1999).

3.9.2 Environmental Effects (Proposed Action and No Action)

PROPOSED ACTION

Direct and Indirect Effects

Efforts to eliminate or decrease impacts to cultural resources will be achieved by project abandonment, re-design or mitigation. Other options may be available to mitigate the adverse effects on important cultural properties through consultation with the State Historic Preservation Officer and the appropriate Native American tribes. However, abandonment and/or re-design will be the desired method of mitigation for these projects.

Cumulative Effects

There are approximately 1100 acres of known timber harvest and/or fuels treatments proposed on The Nature Conservancy (TNC), Department of Natural Resources Conservation (DNRC) and private lands. These projects will not get a Class III Cultural Resource Inventory to locate cultural sites. Given the known number of sites already recorded in the area it is assumed that some sites will be lost to those projects. It is not planned that cultural sites will be damaged and/or destroyed by the projects proposed on BLM lands. Instead, every effort will be made to re-design the project to eliminate adverse effects to cultural sites. However, overall, in this general area with the projects proposed on other lands the cumulative effects to unknown cultural resources could be adverse.

NO ACTION

Direct, Indirect, and Cumulative Effects

Same as above, except that wildfires and fire suppression activities have the potential to damage or destroy cultural properties that have not yet been discovered on BLM lands.

3.10 The Lewis and Clark National Historic Trail

3.10.1 Affected Environment

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.

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 (USDI-NPS 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 2 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 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).

3.10.2 Environmental Effects (Proposed Action and No Action)

PROPOSED ACTION

Direct, Indirect, and Cumulative Effects

See section 3.9, Cultural Resources, page 61 and section 3.8 Recreation and Visuals, page 59 for effects on these resources and the trail. Restoring the vegetation to more natural conditions positively effects the trail.

NO ACTION

Direct, Indirect, and Cumulative Effects

See section 3.9, Cultural Resources, page 61 and section 3.8 Recreation and Visuals, page 59 for effects on these resources and the trail.

3.11 Mitigation measures

No additional measures have been identified other than those incorporated into the Proposed Action and design features in section 2.4.

3.12 Monitoring and 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.

Noxious weed monitoring for compliance of Proposed Actions on commercial and non-commercial vegetation treatments will follow guidelines and actions as specified in the Missoula Field Office *Integrated Weed Management Plan 2003* (USDI-BLM 2003).

The BLM would conduct baseline monitoring for cultural resources 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 CONSULTATION & COORDINATION

The issue identification section 1.6 identifies those issues analyzed in detail in Chapter 3. Section 1.7 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 1.8.

4.1 Persons, Groups, & Agencies Consulted

Table 13: List of all Persons, Agencies, and Organizations Consulted

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 4.1.1
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.
Confederated 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 the Confederated Salish and Kootenai tribes on two separate occasions to discuss the proposed action on March 31, 2016 and March 21, 2017. No issues or concerns were brought forward in those discussions.
USFS	Jurisdictional agency within the planning area.	Discussed with and met with District Ranger, Fuels staff, and ID Team throughout planning phase.
The Nature Conservancy	Large adjacent landowner	Discussed and met with TNC staff on many occasions throughout planning process.

4.1.1 Consultation and Coordination with USFWS on Threatened and Endangered Species

Dan Downing finalized the aquatic specialist report on March 23, 2017, and sent it to the USFWS on May 15, 2017. The report determined that the Proposed Action may affect, but is not likely to adversely affect bull trout and bull trout critical habitat. During consultation with the USFWS, the Proposed Action, potential effects, Section 7 consultation, and determinations were discussed. The USFWS reviewed the aquatic specialist report and concurred with determinations on June 16, 2017.

Jim Sparks prepared the biological assessment on May 14, 2017, and sent to the USFWS on May 15, 2017. The report determined that the Proposed Action may affect, but would not likely adversely affect Canada lynx and Canada lynx critical habitat, may affect, but not likely to adversely affect the grizzly bear and its habitat, and is not likely to jeopardize the continued existence of the wolverine. During consultation with the USFWS, the

Proposed Action, potential effects, Section 7 consultation, and determinations were discussed. The USFWS reviewed the biological assessment and concurred with determinations on June 16, 2017.

4.2 List of Preparers

Table 14: BLM staff involved with preparation of this EA

Name	Title	Responsible for the Following Section(s) of this EA
Michael Albritton	Fuels Specialist	ID Team Leader
Dan Downing	Fisheries Biologist	Aquatic Species and Habitat
Maria Craig	Outdoor Recreation Planner	Recreation, Visuals
James Sparks	Wildlife Biologist	Wildlife and Wildlife Habitat
Steve Hancock	Fire Management Specialist	Fuels Management
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Lester Maas	GIS Specialist	GIS analysis
Jody Miller	Archaeologist	Cultural Resources
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Kyle Johnson	Forester	Timber sales and haul routes
Michael Walton	Forester	Timber sales and haul routes
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Lonna Sandau	Realty Specialist	Land status, roads
Maggie Ward	Planning Coordinator	Document Review

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6.0 APPENDICES

Appendix A - INFISH Compliance

In the Garnet Resource Area Resource Management Plan (USDI 1986), the goals, objectives, and standards for fisheries are contained in two documents:

- The Garnet Resource Area Resource Management Plan (USDI 1986)
- The INFISH Decision Notice (USDA 1995a)

The parts of the Resource Management Plan and INFISH pertinent to this project are discussed below, with a short summary of how they are addressed in this project. It is clear that INFISH, with their discussions of riparian habitat conservation areas and timber harvest in riparian areas, take a strong and consistent view that vegetation management impacts should be minimized in riparian areas, and where those activities do occur, they must be designed to maintain water quality and meet fisheries objectives.

1986 Resource Management Plan

The applicable parts of the 1986 Resource Management Plan are summarized below.

Applicable Resource area management goals for riparian protection zones are to:

1. Manage riparian areas to maintain or enhance their value for wildlife, recreation, fishery, and aquatic habitat.
2. Provide opportunities to improve wildlife and fisheries habitat through specifically prescribed vegetative manipulation.
3. Maintain or enhance site productivity, water quality, and stream stability.

This project is consistent with the Resource area goals.

Applicable Resource area management goals for riparian multiple use zones are to:

1. Manage riparian areas to maintain or enhance their value for wildlife, recreation, fishery, and aquatic habitat.
2. Under the principles of sustained yield, manage suitable and available commercial forest land with operational restrictions that maintain or improve riparian zone values.
3. Maintain or enhance site productivity, water quality, and stream stability.

This project is consistent with the Resource area goals.

INFISH

INFISH (USDA Forest Service, 1995a) amended the Garnet Resource Area Resource Management Plan in August, 1995. The INFISH amendment to the Resource Area Plan established more detailed standards that regulate activities in riparian areas. A completed listing of the INFISH standards can be found on pages A-6 to A-13 of the INFISH Decision Notice (USDA Forest Service, 1995a). The INFISH standards that are most relevant to this project are:

TM-1b Apply silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on inland native fish.

INFISH standard TM-1b allows vegetation manipulation projects such as this one to occur in RHCAs where it is needed to protect mature trees from undesirable disturbance from insect, disease and wildfire. Due to past management activities, upland forest communities have shifted away from fire tolerant, open stands dominated by ponderosa pine toward less fire tolerant stands dominated by smaller, more densely spaced Douglas-fir. Thinning is needed to create more open stands, which are less vulnerable to beetle attack than the existing stands which are

more densely stocked and shadier. Failure to thin the planning area may lead to the eventual death of many of the mature conifers in the sites. Those mature trees help to maintain RMOs by providing shade on streams and recruitment of large wood. This project is consistent with INFISH standard TM-1b because the vegetation management prescriptions would be applied in a manner that maintains the RMOs (large wood recruitment potential, shade, and stream temperatures), and avoids adverse effects on inland native fish.

RF-2b Minimize road and landing locations in RHCAs.

This project is consistent with INFISH standard RF-2b. There would be no road construction in RHCAs. Existing roads and campsite spurs would be used for logging equipment access. Log landings would be minimal and small, and located outside RHCAs.

RA-2 Trees may be felled in RHCAs where they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

This project is consistent with INFISH standard RA-2. Trees that are deemed a safety hazard would be directionally felled towards streams and left on site if they are close enough to streams for any part of their bole to fall within the bankfull channel. If they are too far away from the stream to fall within the bankfull channel, hazard trees could be felled and removed.

RA-4 Prohibit storage of fuels and other toxicants within RHCAs. Prohibit refueling within RHCAs unless there are no other alternatives. Refueling sites within RHCAs must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.

This project is consistent with INFISH standard RA-4. Fuels and other toxicants would not be stored within RHCAs. Whenever possible, refueling of equipment would occur outside of RHCAs. Any refueling that does occur within RHCAs must first be approved by the BLM and must have an approved spill containment plan.

To summarize, this project is consistent with the goals, objectives and standards of the Resource Area Plan as amended by INFISH.

Appendix B - MiFO Noxious Weed Groups and Priorities

Missoula Field Office Groups:

Group 1 - Noxious weeds that infest over 50% of their potential range on lands administered by MFO. Spotted knapweed is currently alone in this group.

Group 2 - Noxious weeds which are now well established on BLM lands, but which occur on less than 10% of their potential range. Canada thistle, Sulfur cinquefoil, musk thistle, hounds tongue, and leafy spurge fall into this group.

Group 3 - Noxious weeds now becoming established on BLM lands, but occupying less than 1% of their potential range. Dalmatian toadflax, yellow toadflax, common tansy and St. Johnswort are in this group.

Group 4 - Noxious weeds not currently reported on BLM lands, but occurring in adjacent areas and posing a threat. This group includes the remaining "dirty dozen" and the 32 species on the "alert list" published by Peter Rice, et al. The following priorities have been established with regard to these groups.

Missoula Field Office Noxious Weed Management Priorities:

Priority 1) Prevent the establishment of Group 3 and Group 4 weeds through education, early detection, and immediate eradication of all new infestations.

Priority 2) Control or, if possible, eradicate leafy spurge (Group 2 weed) on river-associated sites.

Priority 3) Control all established stands of leafy spurge and Dalmatian toadflax (Groups 2 & 3 weeds) which appear on upland sites. Attempt to eradicate all new stands.

Priority 4) Eradicate new or small stands (less than 5 acres) of Group 1 & 2 plants.

Priority 5) Control or contain large stands of all Group 1 & 2 plants.

Appendix C - Past and Reasonable Foreseeable Future Actions

Table 15: Past and Reasonable Foreseeable Future Actions

LBC Reasonable Foreseeable Future Actions					
Who	Where	What	Acres	When	Comments
TNC	T14N R17W sec 2	Harvest	35	2017	commercial thin near Primm Meadow
	T14N R16W sec 6	Harvest	25	2017	commercial thin
	T13N R17W sec 2,3	Harvest	323	2017	Forest in focus fuels reduction adjacent to on on private land
DNRC	T13N R15W sec 14	Prescribed fire	40	2017-2018	
	T13N R15W sec 16	Prescribed fire	320	2017-2018	burning piles from fuels reduction cut-pile-burn project
	T13N R15W sec 16	Pre-commercial thinning	40	2017-2018	fuels reduction cut-pile-burn
	T13N R17W sec 15, 16	Harvest	203	2017-2018	south of river
	T15N R16W sec 16	Harvest	149	2017-2018	upper Belmont, hauling out of Placid
	T15N R16W sec 16	Pre-commercial thinning	106	2017-2018	upper Belmont
Lubrecht	T14N R15W sec 34 and 25	Harvest	350	2017	commercial thin
	T14N R15W sec 31	Harvest	100	2017/2018	north face of morrison mtn
	T13N R15W sec 5	Harvest	60	2017	
Private	T14N R17W sec 24	Pre-commercial thin/CPB	54	2017	PCT plus pile/burn Vandermeer

Summary	
Harvest	1245
PCT	200
Prescribed Fire	414

LBC Past Actions					
Who	Where	What	Acres	When	Comments
TNC	T14N R17W sec 2	Pre-commercial thinning	15	done	in Primm Meadow
DNRC	T15N R16W sec 16	Harvest	307	2015	upper Belmont, hauled out of Placid
TNC	T14N R16W sec 34, 35	Harvest	2000	2011	morrison mtn acquired lands
BLM	T14N R16W	Harvest	661	2003	first decade treatments
BLM	T14N R16W	Prescribed fire	906	2003-2005	first decade treatments
BLM	T14N R16W	Planting	177	2003-2005	first decade treatments
BLM	T14N R16W	Pre-commercial thinning	1568	2003-2005	first decade treatments
BLM	T14N R16W	Chipping/Mastication	115	2003-2005	first decade treatments

Summary	
Harvest	2968
PCT	1583
Prescribed Fire	906
Planting	177
Chipping/Mastication	115

Appendix D - Lower Blackfoot Corridor Habitat Type Groups

Habitat Type Group 1 (HTG-1); Warm Dry; 5725 acres

PIPO/AGSP	130
PIPO/FEID	140
PIPO/FEID-FEID	141
PIPO/SYAL	170
PSME/AGSP	210
PSME/FIED	220
PSME/FESC	230
PSME/SYAL-AGSP	311
PSME/CARU-AGSP	321
PSME/CARU-CARU	323
PSME/CAGE	330

Habitat Type Group 2 (HTG-2); Moderately Dry and Warm; 9890 acres

PSME/CARU	320
PSME/CARU-PIPO	324
PSME/SYAL	310
PSME/SYAL-CARU	312
PSME/SYAL-SYAL	313
PSME/PHMA-CARU	262
PSME/PHMA-PHMA	261

HABITAT Type Group 3 (HTG-3); Moderately Moist and Cool; 3223 acres

PSME/CARU-ARUV	322
PSME/VAGL	280
PSME/VAGL-VAGL	281
PSME/VAGL-ARUV	282
PSME/VAGL-XETE	283
PSME/VACA	250
PSME/PHMA	260
PSME/LIBO	290
PSME/LIBO-SYAL	291
PSME/LIBO-CARU	292
PSME/LIBO-VAGL	293
PSME/SPBE	340
PSME/ARUV	350

Habitat Type Group 4 (HTG-4); Cool Moist; 298 acres

ABLA/LIBO-LIBO	661
ABLA/LIBO-XETE	662
ABLA/CLUN-MEFE	625
ABLA/XETE-VAGL	691

RIPARIAN 436 acres

Riparian with trees	963
Riparian meadow-no trees	980

OTHER 509 acres

Scree or non-forested	010

No Data 428 acres

Appendix E - LBC Habitat Type Group NRV/Existing/Desired Condition Tables

Table 16: HTG 1 – WARM DRY DOUGLAS-FIR SERIES

Historic Cover Type : PP and PP (DF) Fire Group 4 : Nonlethal Fire Regime 5725 Acres, 28%	**Natural Variability1**	**Current Condition**	**Desired Condition**
Mean Disturbance Interval (yrs) 2 Nonlethal severity	5-25 years	> 50 years	10-30 years
Primary Structural Component: % total acres, and density (average % canopy coverage)			
Grass/Forb/Shrub	5-10	2	5-10
Seedling-Sapling (0-5" dbh)	5-15	3	5-10
Pole (5-9" dbh)	5-15 (15-35)	15 (25)	5-15 (15-35)
Medium (9-15" dbh)	15-25 (15-65)	28 (25)	15-25 (15-65)
Large (15-21" dbh)	25-35 (15-65)	37 (30)	25+ (15-65)
Very Large (> 21" dbh)	25-35 (15-65)	14 (30)	40+ (15-65)
Cover Type : Dominant Species % total acres (dominant-co-dominant or subordinant component in mixed-species stands)			
Ponderosa Pine (PP) cover type total PP (PP-DF)	**>80**	**76** 29 (47)	**>80**
Douglas-fir (DF) cover type total DF (DF-PP)	**<20**	**24** 6 (18)	**<20**

1 Natural variability is based upon the context of historic vegetation conditions described in Losensky, 1997.

2 Mean Disturbance Interval:

Natural- historic mean fire frequency which maintained vegetation composition, structure and pattern prior to Euro-American settlement

Current- current mean disturbance-free interval (disturbance can be human-induced but must emulate natural fire severity)

Desired- disturbance mean interval necessary to maintain the desired vegetation condition (disturbance: silvicultural treatment including RX fire)

Disturbance Severity:

Nonlethal- < 20% mortality in the dominant overstory tree canopy layer

Lethal- > 80% mortality in the dominant overstory tree canopy layer

Mixed- Intermediate severity disturbance which commonly alternates between nonlethal and lethal severity events

Table 17: HTG 2 - MODERATELY WARM AND DRY DOUGLAS-FIR SERIES

Historic Cover Type: PP (DF) or WL (DF) Fire Groups 4 and 6: Nonlethal 9890 Acres, 48%	Natural Variability	Current Condition	Desired Condition
Mean Disturbance Interval (yrs) 1/ Nonlethal severity Mixed severity	 5-25 years 10-50 years	 > 50 years > 50 years	 10-20 years 10-30 years
Primary Structural Component: % total acres, and Density (average % canopy coverage)			
Grass/Forb/Shrub	5-10	1	5-10
Seedling-Sapling (0-5" dbh)	5-15	7	5-10
Pole (5-9" dbh)	5-15 (15-35)	18 (40)	5-15 (15-35)
Medium (9-15" dbh)	15-25 (15-65)	27 (35)	15-25 (15-65)
Large (15-21" dbh)	25-35 (15-65)	38 (40)	15-25 (15-65)
Very Large (> 21" dbh)	25-35 (15-65)	11 (40)	50+ (15-65)
Cover Type : Dominant Species % total acres (dominant-co-dominant or subordinant component in mixed-species stands)			
PP or WL Dominant (PP or WL - DF codominant)	≥75	48 (40)	≥75
DF (DF-PP codominant) (DF-WL codominant)	≤25	52 (28) (16)	≤25

1 Mean Disturbance Interval:
Natural- historic mean fire frequency which maintained vegetation composition, structure and pattern prior to Euro-American settlement
Current- current mean disturbance-free interval (disturbance can be human-induced but must emulate natural fire severity)
Desired- disturbance mean interval necessary to maintain the desired vegetation condition (disturbance: silvicultural treatment including RX fire)
Disturbance Severity:
Nonlethal- < 20% mortality in the dominant overstory tree canopy layer
Lethal- > 80% mortality in the dominant overstory tree canopy layer
Mixed- Intermediate severity disturbance which commonly alternates between nonlethal and lethal severity events

Table 18: HTG 3 - MODERATELY COOL AND DRY DOUGLAS-FIR SERIES

Historic Cover Type : DF and WL Fire Group 6: Mixed Fire Regime 3223 Acres, 16%	Natural Variability	Current Condition	Desired Condition
Mean Disturbance Interval (yrs) 1/ Mixed Severity	10-50 years	> 50 years	10-50 years
Primary Structural Component: % total acres, and Density (average % canopy coverage)			
Grass/Forb/Shrub	5-10	0	5-10
Seedling-Sapling (0-5" dbh)	5-15	10	5-15
Pole (5-9" dbh)	5-15 (15-35)	38 (45)	5-15 (15-35)
Medium (9-15" dbh)	30-40 (35-65)	31 (45)	30-40 (35-65)
Large (15-21" dbh)	15-25 (35-65)	10 (45)	15-25 (35-65)
Very Large (> 21" dbh)	0-5 (35-65)	11 (30)	0-5 (35-65)
Cover Type : Dominant Species % total acres (dominant-co-dominant or subordinant component in mixed-species stands)			
WL Dominant DF or Lodgepole (LP) or PP codominant	>50	26	>50
DF Dominant WL or LP or PP codominant	<50	74	<50

1 Mean Disturbance Interval:
Natural- historic mean fire frequency which maintained vegetation composition, structure and pattern prior to Euro-American settlement
Current- current mean disturbance-free interval (disturbance can be human-induced but must emulate natural fire severity)
Desired- disturbance mean interval necessary to maintain the desired vegetation condition (disturbance: silvicultural treatment including RX fire)
Disturbance Severity:
Nonlethal- < 20% mortality in the dominant overstory tree canopy layer
Lethal- > 80% mortality in the dominant overstory tree canopy layer
Mixed- Intermediate severity disturbance which commonly alternates between nonlethal and lethal severity events

Table 19: HTG 4 - COOL AND MOIST SUBALPINE FIR SERIES

Historic Cover Type: DF (LP or AF) Fire Group 9: Lethal and Mixed Fire Regimes 298 Acres, 1%	Natural Variability	Current Condition	Desired Condition
Mean Disturbance Interval (yrs) 1/ Mixed Severity Lethal Severity	 50-100 years 100-200 years	 > 75 years < 75 years	 75-125 years
Primary Structural Component: % total acres, and Density (average % canopy coverage)			
Grass/Forb/Shrub	5-10	0	5-10
Seedling-Sapling (0-5" dbh)	15-25 (0-35)	0	15-25 (0-35)
Pole (5-9" dbh)	25-45 (35-75)	74 (50)	25-45 (35-75)
Medium (9-15" dbh)	20-35 (55-75)	26 (40)	20-35 (55-75)
Large (15-21" dbh)	10-15 (55-75+)	0	10-15 (55-75+)
Very Large (> 21" dbh)	0-5 (55-75+)	0	0-5 (55-75+)
Cover Type : Dominant Species % total acres (dominant-co-dominant or subordinant component in mixed-species stands)			
DF Dominant WL or subalpine fir (AF) or lodgepole (LP) codominant	>50	60	50 40

1 Mean Disturbance Interval:
Natural- historic mean fire frequency which maintained vegetation composition, structure and pattern prior to Euro-American settlement
Current- current mean disturbance-free interval (disturbance can be human-induced but must emulate natural fire severity)
Desired- disturbance mean interval necessary to maintain the desired vegetation condition (disturbance: silvicultural treatment including RX fire)
Disturbance Severity:
Nonlethal- < 20% mortality in the dominant overstory tree canopy layer
Lethal- > 80% mortality in the dominant overstory tree canopy layer
Mixed- Intermediate severity disturbance which commonly alternates between nonlethal and lethal severity events

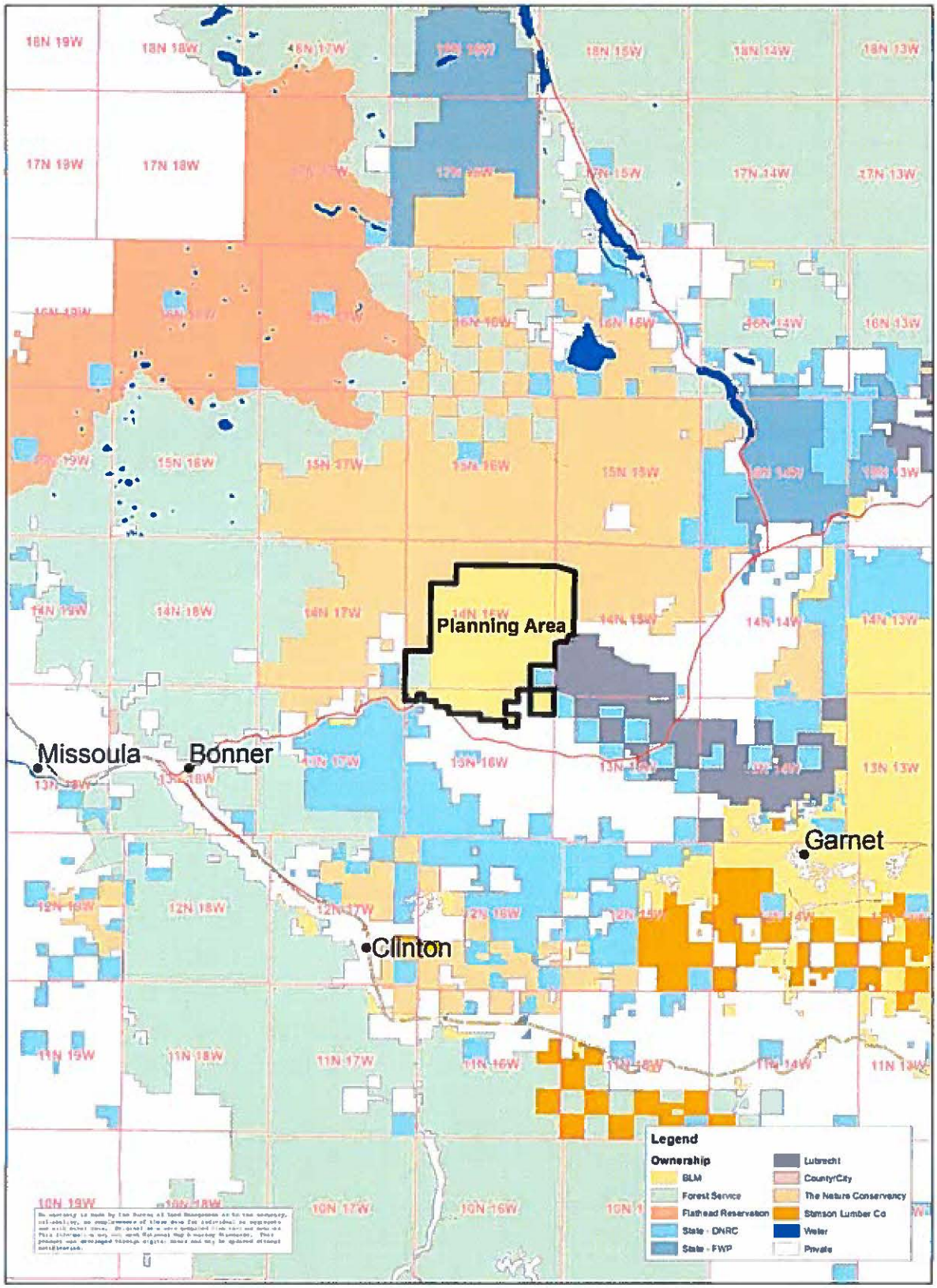
Appendix F - Treatment name and acres

Table 20: Treatment Type with Name and Acres

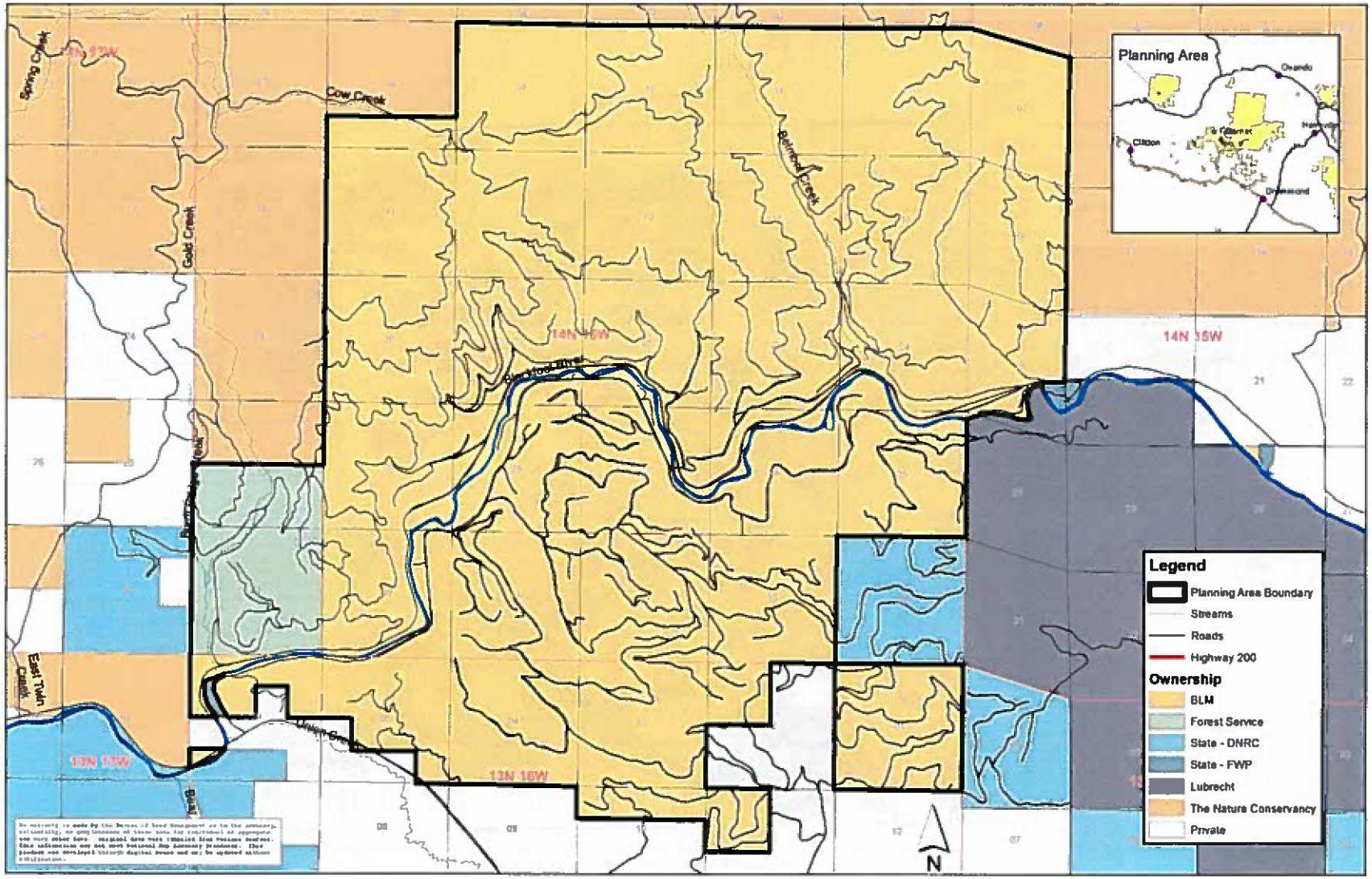
LBC Ecosystem Maintenance, Forest Restoration and Fuels Reduction Unit Names and Acres													
Prescribed Fire with Chainsaw Fuel Augmentation		Timber Harvest and Prescribed Fire		Mastication with Prescribed Fire or Cut Pile-Burn		Planting		Chainsaw Thinning and Prescribed Fire		Chainsaw Thinning			
Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
F1	44	HF1	24	M1	363	P1	333	TF1	73	T1	162	T30	139
F2	44	HF2	173	M2	10	P2	29	TF2	52	T2	60	T31	86
F3	174	HF3	518	M3	127	P3	45	TF3	75	T3	33	T32	51
F4	46	HF4	129	M4	21	P4		TF4	17	T4	30	T33	25
F5	78	HF5	74	M5	26	P4	194	TF5	70	T5	26	T34	9
F6	166	HF6	25	M6	46	P5	233	TF6	34	T6	33	T35	59
F7	365	HF7	55	M7	23	P6	16	TF7	33	T7	60	T36	59
F8	127	HF8	189	M8	47	P7	74	TF8	95	T8	84	T37	62
F9	72	HF9	59	total	663	total	924	TF9	26	T9	23	T38	127
F10	31	HF10	234					TF10	57	T10	87	T39	145
F11	167	HF11	66					TF11	20	T11	21	T41	441
F12	124	total	1546					TF12	25	T12	62	T42	84
F13	113							TF13	15	T13	84	T43	18
F14	43							TF14	49	T14	71	T44	28
F15	43							total	641	T15	68	T45	23
F16	96									T16	682	T46	36
F17	75									T17	173	T47	176
F18	24									T18	7	total	4964
F19	15									T19	241		
F20	15									T20	28		
F21	63									T21	5		
F22	159									T22	334		
F23	34									T23	186		
F24	18									T24	284		
F25	110									T25	354		
F26	104									T26	11		
F27	93									T27	17		
F28	29									T28	33		
total	2472									T29	137		

Appendix G - Maps

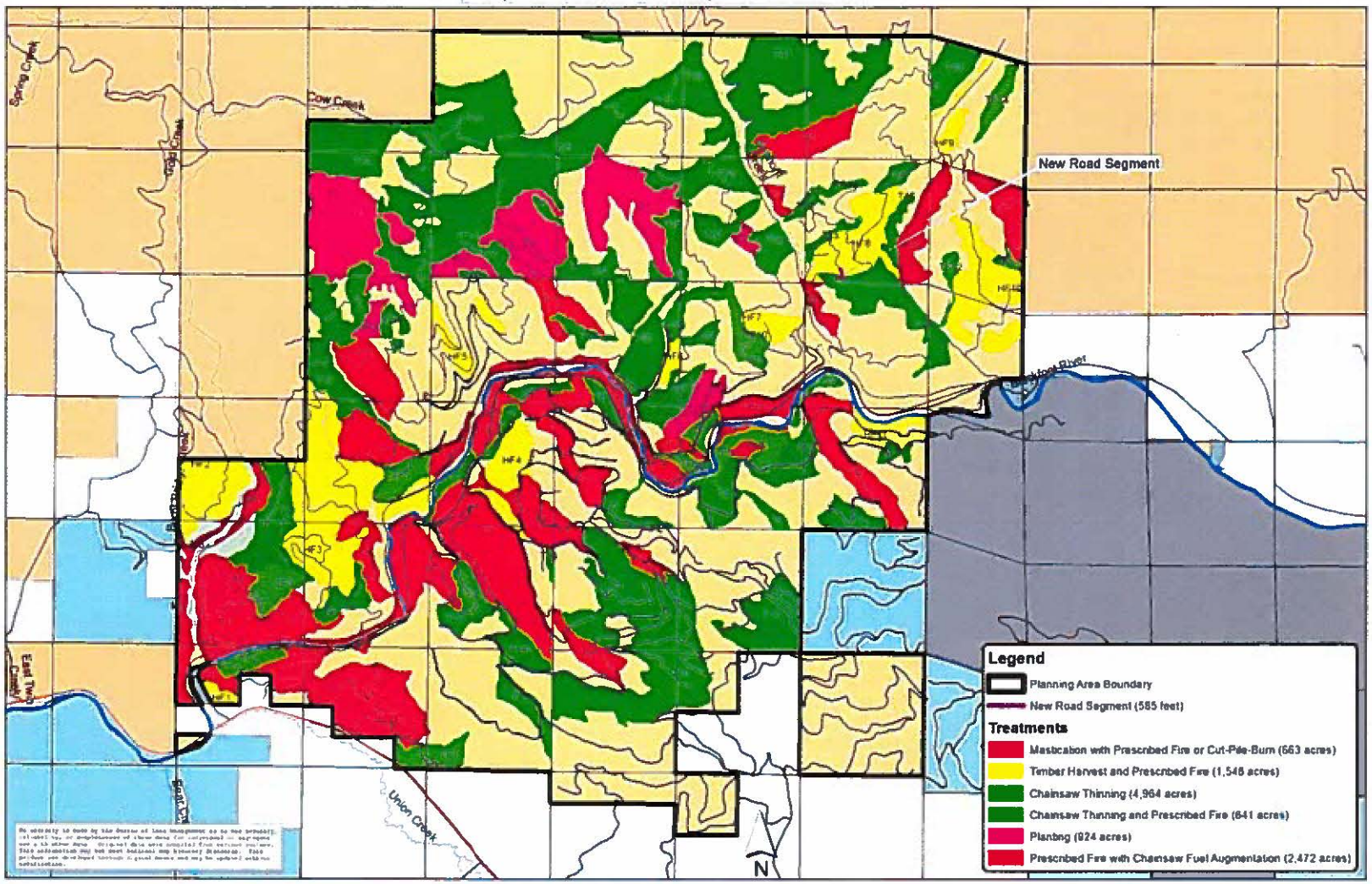
Map 1 - LBC EA Vicinity



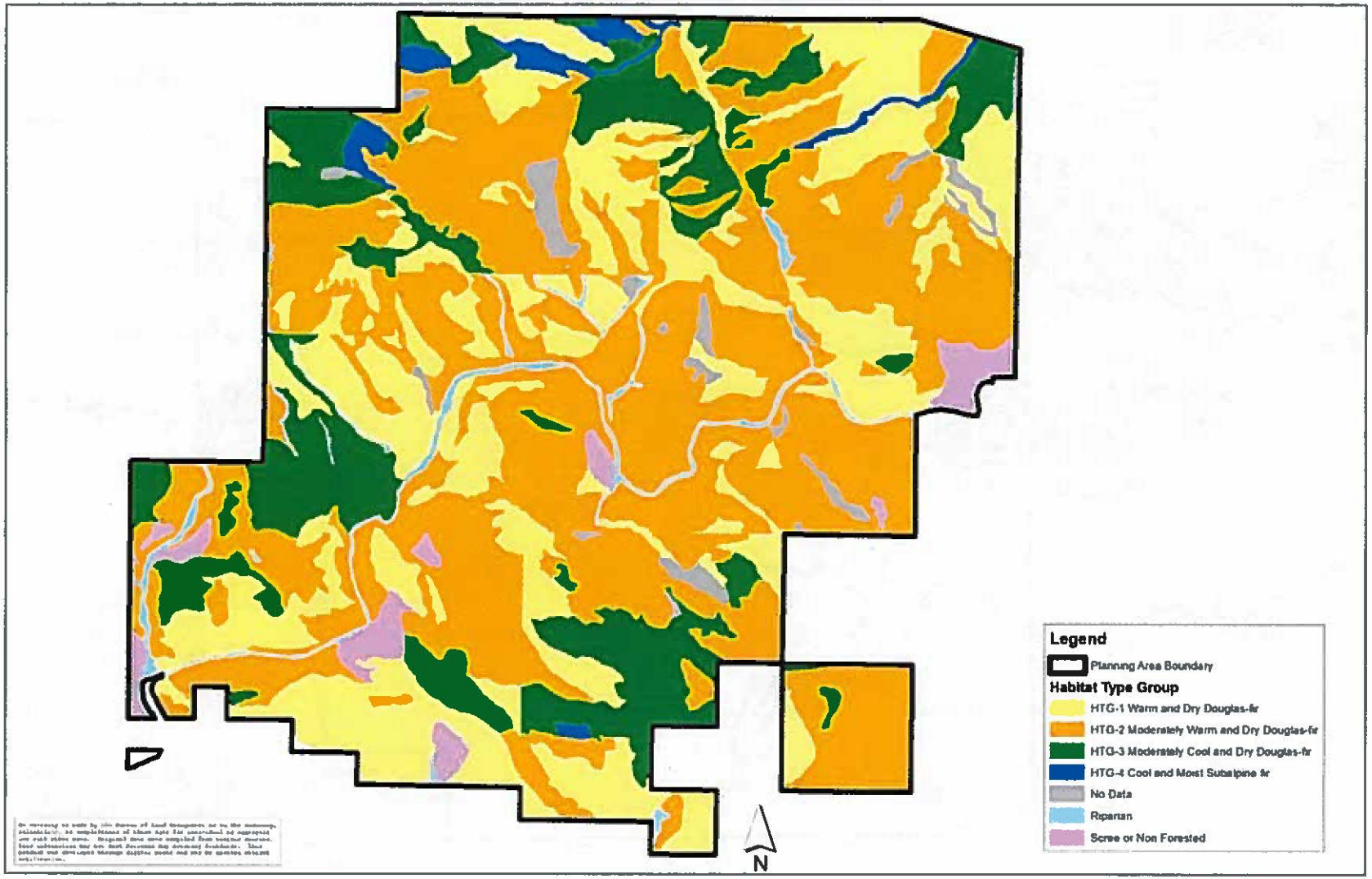
Map 2 - LBC EA Ownership



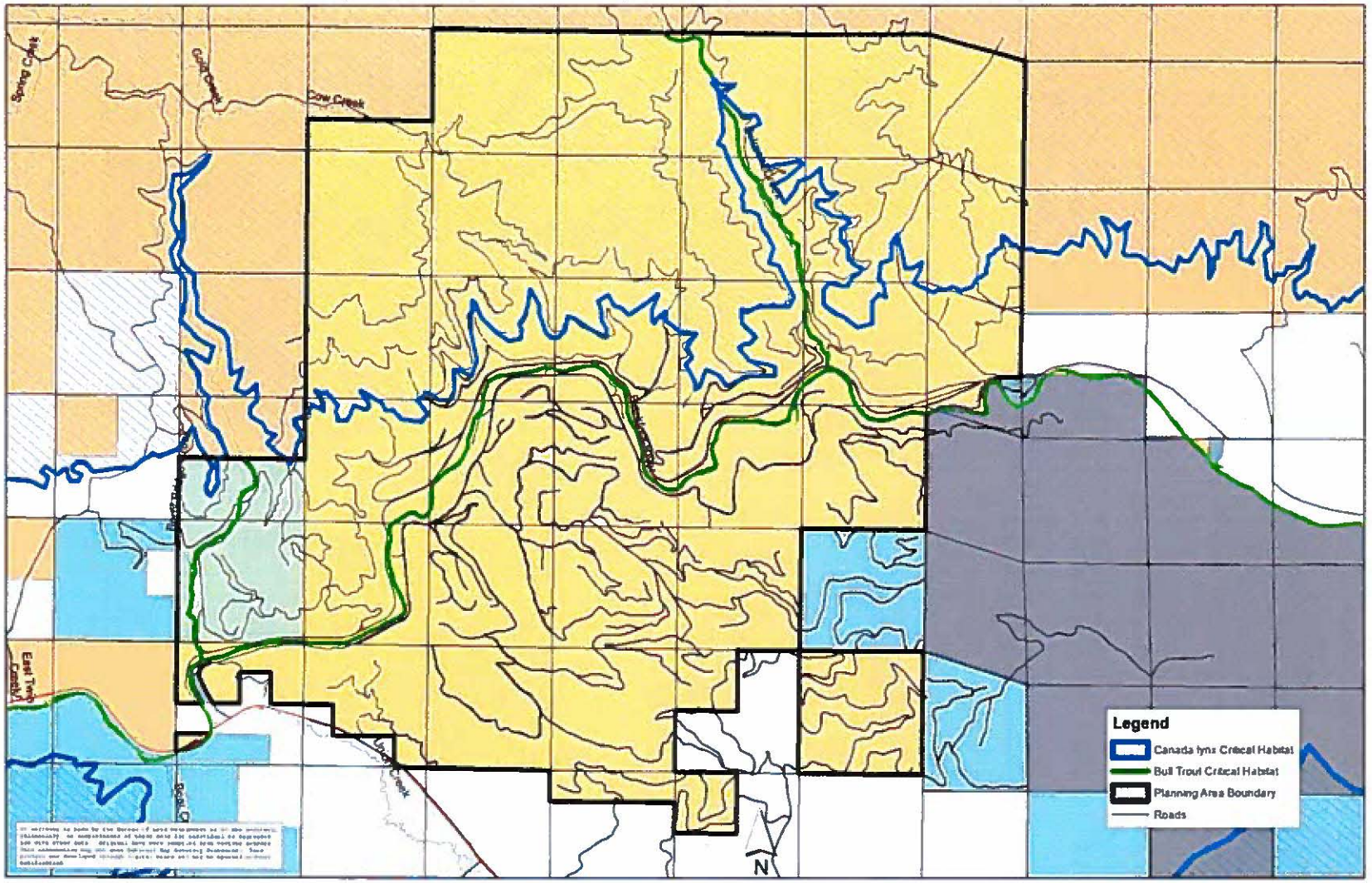
Map 3 - LBC EA Proposed Action



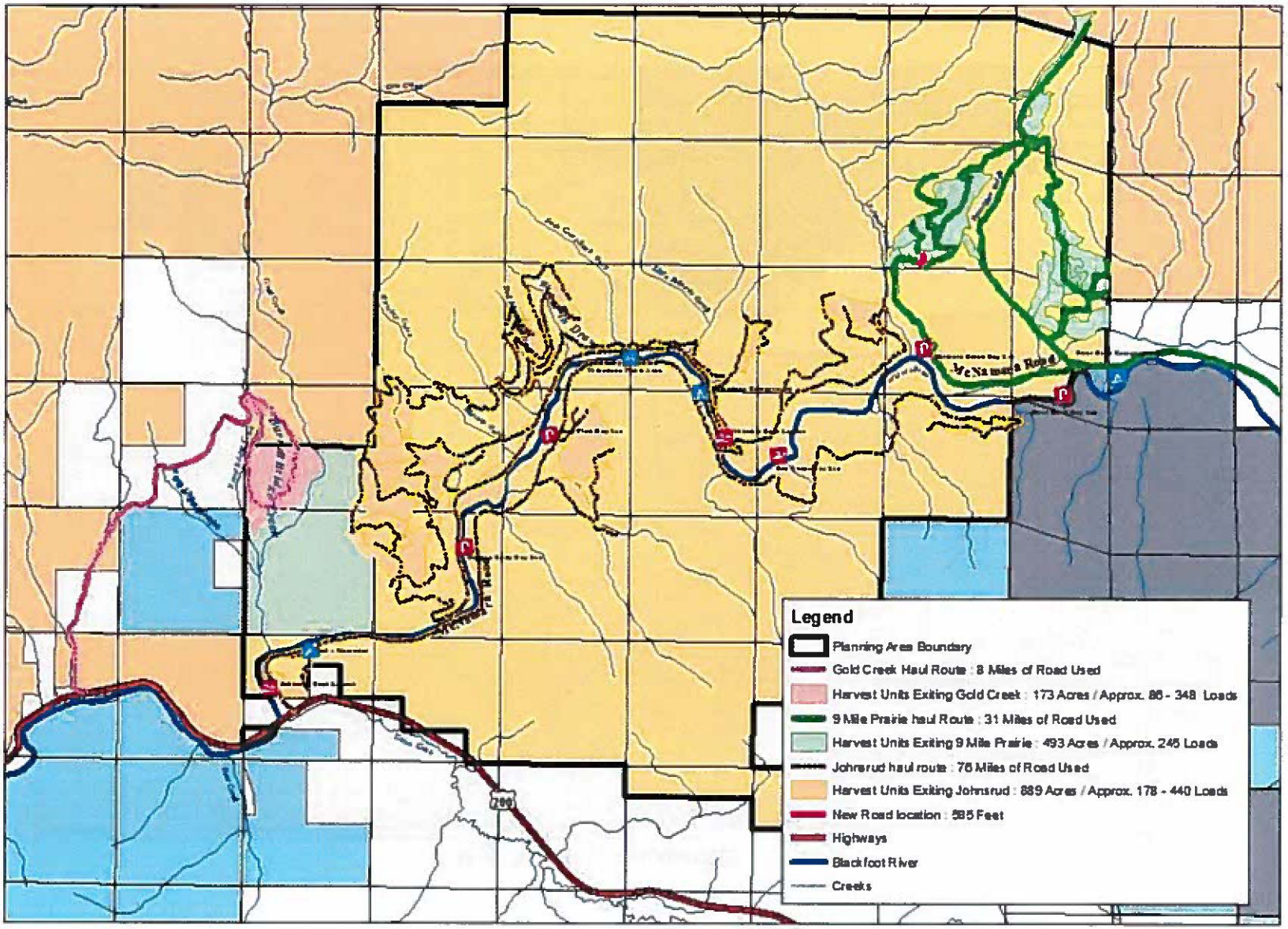
Map 4 - LBC EA Habitat Type Groups



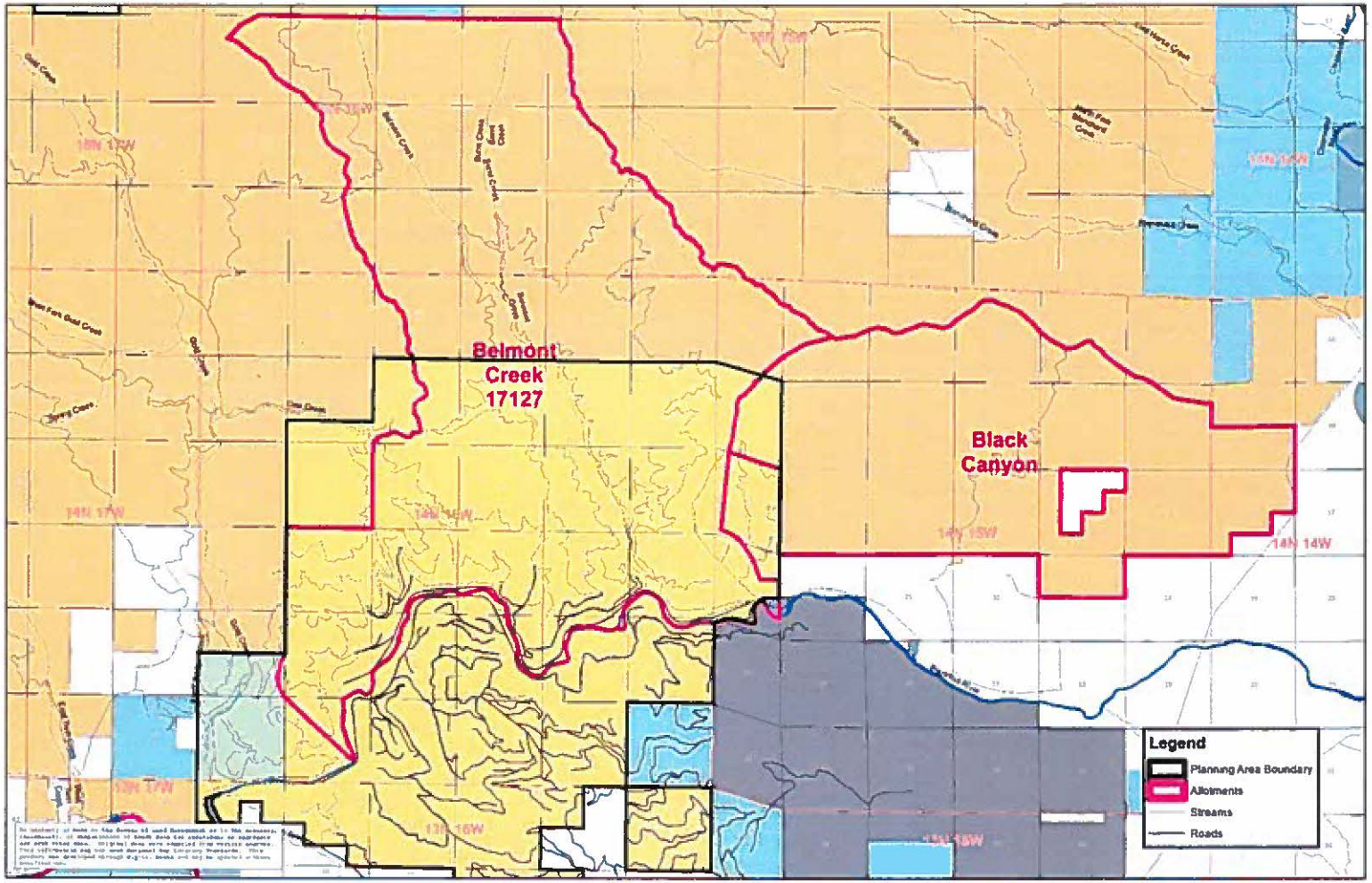
Map 5 - LBC EA Canada Lynx and Bull Trout Critical Habitat



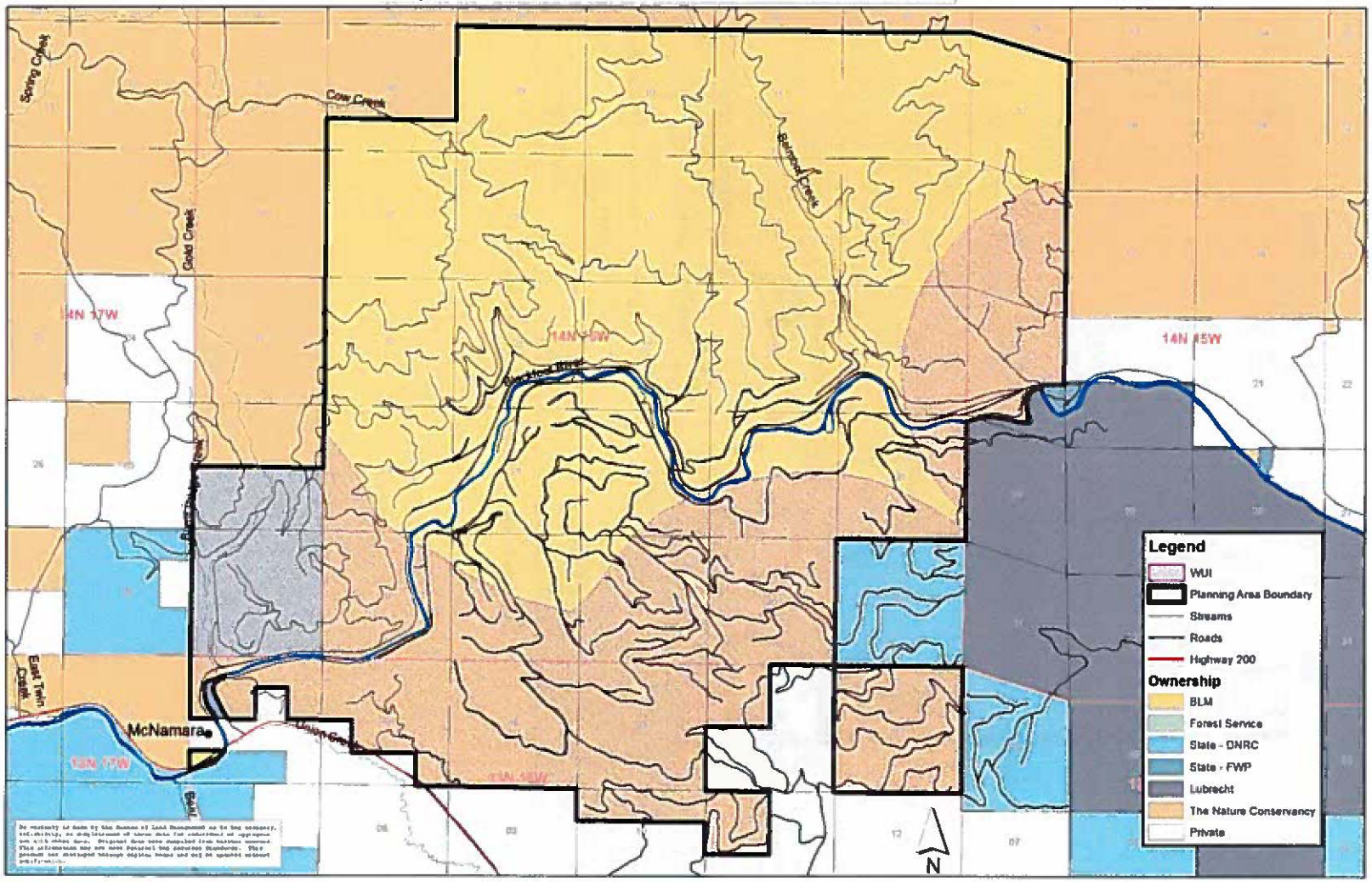
Map 6 - LBC EA Harvest Units, Haul Routes, Approximate Load Counts, and Recreation Sites



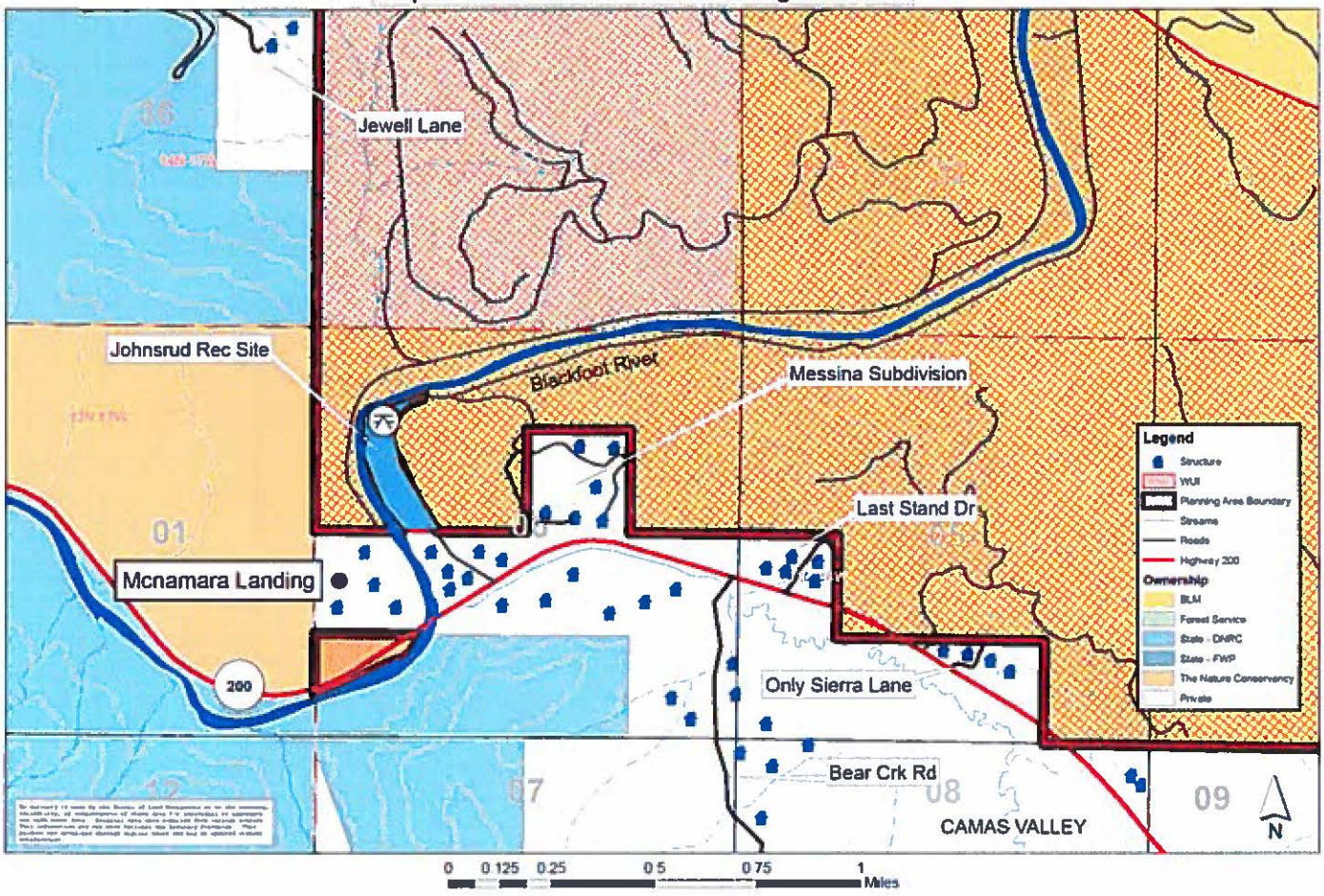
Map 7 - LBC EA Allotments



Map 8 - LBC EA Wildland Urban Interface Areas



Map 9 - LBC EA Mcnamara Landing WUI Area



Map 10 - LBC EA Management Areas