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Environmental Assessment

CLEAR CREEK PROJECT

Plains/Thompson Falls Ranger District, Lolo National Forest
Sanders County, Montana

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UPDATES TO THE ENVIRONMENTAL ASSESSMENT

This Environmental Assessment has been updated to reply to the Regional Forester's instructions, address new information, incorporate minor changes to the proposed action based on additional field review, respond to public comments received on the original EA and during the Objection period, and incorporate findings by the U.S. Fish and Wildlife Service based on their review of the project's effects on threatened species.

Regional Forester's Instructions

The Clear Creek Environmental Assessment (EA) was first published in August 2012 and public comments were accepted for 60 days. The draft Decision Notice (DN) was published in December 2013, which was followed by a 45-day Objection period. One objection was received.

On March 7, 2014, the Regional Forester determined the project is in compliance with all laws, regulations, policies and the Forest Plan and that most of the Objector's issues/contentions and suggested remedies did not require further discussion or instructions to the Responsible Official for one or more of the following reasons:

1) The proposed actions are compliant with applicable regional guidelines, the Forest Plan and/or law, regulation and policy as supported by adequate analysis and rationale made available in the EA and draft DN and information in the project file;

2) No actions are proposed in the habitat types alleged by the objector to be affected;

3) The appropriate models, methodology and/or science were applied;

4) Species raised by the objector are not listed as endangered or threatened under the Endangered Species Act and therefore there is no requirement to consult with U.S. Fish & Wildlife Service;

5) The Forest already provided an adequate and thorough response to the issue in the Response to Comments section in the Draft DN; and

6) The objector failed to raise the issue in comments previously submitted during a public comment period and the issue is not based on new information (36 CFR 218.8(c)).

In her determination, the Regional Forester instructed the Forest to address the following items prior to signing a final Decision Notice:

1) better articulate the purpose and need for vegetation treatments; and

2) include the wolverine analysis and determination of effect from the wildlife report in a Biological Assessment. (Note that on February 4, 2013, after publication of the original Clear Creek EA, the U.S. Fish and Wildlife Service issued a proposed rule to list the wolverine as a threatened species under the Endangered Species Act (Federal Register Vol. 78, No. 23 7874-7887). On August 13, 2014, the USFWS withdrew the proposed listing rule.)

New Information

New information addressed in this EA includes:

1) the proposed rule to list the wolverine as a threatened species (February 2013), which was withdrawn on August 13, 2014 (79 FR 47522);

2) the most recent scientific literature regarding Canada lynx;

3) the most recent fish surveys conducted in Prospect and Clear Creeks (Moran and Storaasli 2013);

4) authorization and implementation of the road realignment work on the Clear Creek Road #153, which was proposed and analyzed in the original Clear Creek EA.

   To take advantage of a partnership agreement and available funding, and to expedite the most important road/stream restoration work of the project, a separate Decision Notice *(Clear Creek Road/Stream Interface Rehabilitation Decision Notice)* was signed on September 13, 2013 to authorize realignment of four segments (about 1200 feet) of National Forest System Road (NFSR) #153 adjacent to Clear Creek. In scoping and comment, the public made no adverse comments to these actions.

   Activities included moving and elevating the road further away from the creek, constructing a vegetated floodplain that separates the road from the creek, and planting riparian vegetation. Gravel surfacing was applied to these and other road segments to reduce sediment delivery potential and improve the driving surface. The Decision Notice considered the potential effects of these activities as evaluated in the original Clear Creek EA.

Minor Changes to the Proposed Action

Several minor changes to the Proposed Action (as first scoped) were discussed in the draft Decision Notice published and made available for public comment in December 2013. This EA includes these changes as the Modified Proposed Action – Alternative 2 (see Chapter 2) as follows:

1) Minor modifications were made to the vegetation treatment unit boundaries and treatment types to better fit on-site conditions. These modifications reduced vegetation treatments by approximately 24 acres (see Table 1).

Table 1: Comparison of Vegetation Treatment Acres between Original EA and this Updated EA

Proposed Treatments	Original EA (acres)	Updated EA (acres)
Commercial Thin	886	904
Shelterwood Cut followed by prescribed burning	258	247
Non-commercial Thin	68	68
Prescribed Burning	710	679
Watershed Improvement	198	198
TOTAL	2120	2096

2) After additional field review, minor modifications were made to the road management proposals. Although the overall miles of road decommissioning and storage remain about the same, specific treatments for some individual roads have been modified to better fit long-term management objectives (see Tables 2 and 3). There would be no net change in the miles of road that can be legally and physically driven by the public (see the Transportation section in Chapter 3 for more information).

Table 2: Comparison of Road Treatments between Original EA and this Updated EA

	Original EA (Miles)	Updated EA (miles)
New Construction		
Long-term Specified; store following use for this project	0.25	0.25
Temporary (multiple segments)	2.5	3
Road Treatments		
Road Maintenance	33	33
Decommission	32	31
Long-term Storage	43	43
Reconstruction (Road #35230)	0.5	0.5

Table 3: Comparison of Proposed Road Closure Treatments between Original EA and this Updated EA

Road Closure Treatment Type	Original EA (Miles)	Updated EA (miles)
Decommission		
Physical Treatment	6	5
Administrative Closure – No treatment[1]	26	26
TOTAL	32	31
Long-term Storage		
Physical treatment	25	23
Administrative Closure – No treatment[1]	18	20
TOTAL	43	43

[1]Roads are naturally revegetated and stabilized. No physical treatment is needed and roads would be administratively closed.

3) Approximately 0.5 miles of temporary road was added to the proposal presented in the original EA. This additional temporary road would be needed to access vegetation treatment unit 16C (see Map 2 in Appendix A). Slope analysis conducted on the ground indicated that skyline yarding Unit 16C from Road 17084 was not

feasible due to a break in the topography. All temporary roads would be recontoured following use. The additional temporary road would be located at mid-slope and would not cross any water.

Forest Service resource specialists reviewed the potential effects of these project modifications and determined they are within the scope of effects documented in the original Clear Creek Environmental Assessment and specialist reports in the Project File. Their effects analysis is documented in Chapter 3.

Addition of a gravel stockpile site

The original EA identified the Quail Gulch gravel pit as being depleted (original EA, page 65). However, further investigation by engineering consultants has indicated a considerable amount of gravel material remains at the site. Therefore, this pit would be used as a gravel source for the proposed authorized heavy maintenance work on the Clear Creek Road #153. Removal and processing of gravel from this pit on National Forest System lands would be nearly half the cost of buying and hauling gravel from a commercial source. These cost savings mean that more of the road maintenance work would likely be implemented sooner than expected.

Because there is insufficient space at the pit location for both the processing and stockpiling of gravel, a gravel stockpile site has been identified just off the Clear Creek road, about one mile east of the pit (see Map 2 in Appendix A). The stockpile site is on flat terrain and would be rehabilitated after use (see Resource Protection Measure #23 in Chapter 2). Forest Service resource specialists evaluated the site and determined that there would be no effect to aquatics or other resources from this activity.

Road 18758 that accesses the Quail Gulch pit was identified in the original EA for decommissioning. However, because the pit contains ample gravel reserves, the proposed travel restriction for the road has been changed from decommission to a yearlong gated closure. This change in road management would restrict public access but allow for future administrative use of the pit. Following use for this project, appropriate drainage would be left in place and the road would be grass-seeded.

Forest openings greater than 40 acres

The original EA (page 10) identified two areas where vegetation treatments (Unit 30 and combined Units 31/31A) would exceed the Regional 40-acre opening size limitation due to existing root disease and ongoing tree mortality. To exceed this size, Regional Forester approval is required with some exceptions. After further review following publication of the original EA, it has been determined that these two identified areas would not exceed the Regional opening size limitation.

According to Forest Service Manual (FSM) 2470, Section 2471.1 Region 1 Supplement 2400-2001-2, the size limitation applies to openings created by even-aged silvicultural treatments and does not include openings created by existing roads. Unit 30 is estimated from the map to be approximately 45 acres. However, the unit contains about 5 acres of roads (most of which would be placed into storage by this project) within the proposed

treatment unit boundary. Thus, the authorized shelterwood harvest would not exceed 40 acres and Regional Forester approval is not required.

In addition, after further field review of combined Units 31/31A, the Regional pathologist and the project silviculturist determined that root disease was not as extensive in this area as previously estimated. Therefore, the prescription has been modified to include commercial thinning in disease-free areas (see Map 2 in Appendix A). Within combined Units 31/31A, shelterwood harvest was reduced from 77 acres down to approximately 25 acres, well below the Regional 40-acre opening size limitation.

Consultation with U.S. Fish and Wildlife Service (USFWS)

The U.S. Fish and Wildlife Service has completed their review of the potential effects of the Clear Creek project on threatened (bull trout, Canada lynx, grizzly bear) and proposed threatened (wolverine) species. The results of this consultation have been included in the EA as follows:

1) **Lynx and grizzly bear**: The Forest Service determined the project will have no effect on lynx or grizzly bears for the reasons listed in Chapter 3 and shared their findings with the U.S. Fish and Wildlife Service. The USFWS concluded that formal or informal consultation was not necessary (June 4, 2014).

2) **Wolverine**: The Forest Service completed a Biological Assessment, which determined the project will not jeopardize the wolverine for the reasons listed in Chapter 3. The agency submitted this Biological Assessment to the USFWS for their review. The USFWS concurred with this finding and concluded that conferencing was not necessary (May 30, 2014). On August 13, 2014, the USFWS withdrew its proposal to list the wolverine as threatened. In the Forest Service Northern Region, the wolverine will remain identified as a sensitive species.

3) **Bull trout**: In October 2012, the Forest Service completed a Biological Assessment, which determined the project may adversely affect bull trout and designated critical habitat due to project-generated sediment. The agency submitted this Biological Assessment to the USFWS for their review. The U.S. Fish and Wildlife Service issued a Biological Opinion (September 9, 2013) that concluded any impacts to bull trout that may be present would likely be insignificant based on the relatively small amount of sediment that may reach Clear Creek and the timing of delivery during high spring flows. They do not anticipate the Clear Creek project will incidentally take[1] bull trout because 1) bull trout are extremely rare in the project area; and 2) increased sediment effects will be diluted and/or limited. The USFWS also

[1] Take is defined as to harass, harm, hunt, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the U.S. Fish and Wildlife Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the U.S. Fish and Wildlife Service as actions that create the likelihood of injury to listed species to such and extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

determined that the project would not destroy or adversely modify critical habitat in Prospect Creek.

In August 2014, the Forest Service revised the Biological Assessment for bull trout because new information has increased the knowledge and understanding of the fisheries and habitat in Clear Creek. This new information includes updated fish population data (Moran and Storaasli 2013) and a clearer understanding of the significance of the intermittent section of Clear Creek as related to sediment transport. In addition, the Forest has already completed the relocation of four segments of the Clear Creek Road #153 away from the stream and applied gravel surfacing and heavy maintenance to the road, which will improve aquatic habitat and reduce sediment delivery from proposed log haul activities. Although the biological determination did not change, the Forest Service submitted this revised Biological Assessment to USFWS to further clarify potential effects of the project on bull trout and designated critical habitat. The USFWS concurred with the findings (letter dated August 13, 2014).

The modifications to this EA further clarify the original analysis and documentation of project effects and are not considered substantial. They do not result in a change to the Responsible Official's decision as it was presented in the draft Decision Notice published in December 2013, which began the 45-day Objection period.

CHAPTER 1: PURPOSE & NEED FOR ACTION

1.1 Introduction

This Environmental Assessment (EA) addresses the potential environmental effects of the Clear Creek Project. The Lolo National Forest is proposing the project to restore forest resiliency and increase tree and stand resistance to insects and disease; improve and maintain big game winter range; improve water quality, stream stability, and fish passage; and enhance recreation facilities. The project area covers approximately 18,223 acres in the Clear Creek drainage approximately two miles west of Thompson Falls, Montana. Clear Creek is a tributary to the Prospect Creek watershed which flows into the Clark Fork River immediately below the Thompson Falls dam (see Map 1 in Appendix A).

The Forest Service has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), the Lolo National Forest Plan, 40 CFR 1508.9, 36 CFR 220.7, and other relevant federal and State laws and regulations. This EA discloses the project's foreseeable environmental effects for consideration in determining whether or not to prepare an Environmental Impact Statement. The reports cited in this EA and additional project documentation can be obtained from the project file located at the Plains/Thompson Falls Ranger District office in Plains, Montana.

1.2 Collaborative Restoration Approach to Project Design

The Clear Creek Project was developed collaboratively with interested members of the public.

In May 2009, the Forest Service invited the public to participate in a collaborative process to help develop the proposed action for the project. A diverse group consisting of local residents, County commissioners, and representatives of environmental organizations and the timber industry worked with Forest Service personnel over several months to identify various management opportunities and needs in the area. This provided the foundation for the proposed action, which was further refined by Forest Service personnel into a site-specific proposal that was sent to the general public for comment in April 2010. Modifications were then made to the project based on public comments and additional field reconnaissance performed by Forest Service personnel.

Through the collaborative effort, the project was designed to be responsive to the 13 Restoration Principles developed by the Montana Forest Restoration Committee (MFRC).[2]

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[2] The MFRC is a non-profit, consensus-based collaborative group consisting of representatives of multiple conservation, industry, and user groups and state and federal land management agencies that found common ground in supporting restoration activities conducted to accelerate the recovery of ecological processes and to enhance societal and economic well-being. The 13 Restoration Principles include using adaptive management to restore ecosystems to achieve ecological integrity through recovery of wildlife, water, soil, habitats, and resilience (see Appendix D). These principles are consistent with the goals and standards of the Lolo Forest Plan and current Forest Service policy described in Forest Service Manual 2020, which directs the use of ecological restoration to manage National Forest System lands in a sustainable manner.

The principles helped to guide the type and extent of the project's activities (see Appendix D).

Those participating in the collaborative process recognized the benefits of past and ongoing forest management. By plan, they helped to design the project to build upon efforts by the Forest Service and other agencies and organizations to restore forest conditions and habitat for fish and wildlife in the Prospect Creek watershed. They felt the project's vegetation treatments would add to efforts by the Forest Service to restore forest health and fire adapted ecosystems in areas where natural fire has been (and will continue to be) suppressed to protect residential development and other resource values. The agency has conducted (or is conducting) like vegetation treatments in Shorty Gulch and Antimony Creek.

They also recognized that the project's road management and riparian/stream restoration treatments would add to efforts by the Forest Service, Montana Fish, Wildlife, and Parks, AVISTA Corp., and others to restore aquatic habitat connectivity and water quality in Prospect Creek and the lower Clark Fork River where human activities and large hydroelectric dams have impacted fisheries. Recent efforts of in-stream habitat improvements, culvert replacements, and road maintenance in Daisy Creek, Crow Creek, Cooper Gulch, and Prospect Creek mainstem have proven beneficial to both native cutthroat trout and bull trout. Efforts to remove non-native fish in Blossom Lake have also been effective in bolstering native fish populations.

Finally, they felt the project's weed spraying and big game winter range treatments would further efforts by the Forest Service and its partners (Rocky Mountain Elk Foundation and Wild Turkey Federation) to enhance wildlife habitat through prescribed burning and weed spraying. Efforts to improve big game winter range with prescribed burning and weed spraying have been effective in Dry, Antimony, Brush, Gilbert, Valentine, and other drainages in the Prospect watershed.

In design of the project, thirty Resource Protection Measures were used to avoid, minimize, or offset potential adverse effects of the project's activities, and monitoring was included to ensure project objectives would be met (see Chapter 2). In addition, portions of the project area would not be treated in order to protect riparian areas, maintain existing high quality wildlife habitat, and provide for landscape diversity. For example, untreated buffers would be left around wetlands and streams that provide habitat for aquatic species and wildlife such as fisher. No lynx habitat would be treated. And, treatment intensity would vary to maintain cover for wildlife and provide a mosaic of forest conditions that are important for foraging, nesting, and dispersal. Some dead and downed trees and coarse woody debris would be left in treated areas for wildlife habitat and to maintain nutrient cycling for soil productivity. Current travel restrictions for motorized vehicles would remain in place to provide for wildlife security. No timber harvest would occur in the Clear Creek Inventoried Roadless Area. Treatments would be arranged to appear natural, as though low- to mixed-severity wildfire had burned through the area leaving a mix of forest conditions.

Most vegetation management activities (timber harvest and haul) would generally occur during the summer to minimize disturbance to big game which winter in the area. Prescribed

burning would occur in the spring or late fall when conditions would allow the Forest Service to reintroduce low severity fire in a controlled manner. Road work, including replacement of culverts, would occur in late summer and early fall when the potential for sedimentation to nearby streams could be minimized. In-stream work in Clear Creek would occur in the summer when water flow is low and portions of the streambed are dry.

As a byproduct of the vegetation restoration treatments, commercial wood products (sawlogs and other materials) would be sold and removed from the area. Funding for some of the project's restoration activities would be obtained from receipt of the sold timber. Other funding would be provided by the Forest Service or through partnerships with other agencies, groups, and organizations interested in restoring watersheds and wildlife habitat in the Prospect Creek watershed.

Implementation of the project would begin in the summer of 2015. Depending on weather and other operating requirements, the project would take approximately five years to complete.

1.3 Proposed Action

To achieve project objectives, the Forest Service, with guidance from those participating in the collaborative process, initially identified a set of treatments for the area including:

- Approximately 774 acres of timber harvest, 273 acres of non-commercial thinning, and 940 acres of prescribed burning to restore forest health.
- Construction of 2 miles of temporary road consisting of multiple segments to access some of the proposed harvest units. Following use for this project, these roads would be decommissioned.
- Decommissioning of 31 miles of existing road determined to be unneeded for future forest management.
- Storing 32 miles of existing road determined to be needed in the long-term but not for the next several decades.
- Removing or re-sizing of 13 culverts to improve stream flow and fish passage. Culverts on roads to be decommissioned or stored would be removed. Undersized culverts on roads to be left in place would be replaced with larger ones.
- Enhancing stream function and riparian habitat in areas where roads are adjacent to streams by:
    - Establishing a floodplain and planting riparian vegetation.
    - Reinforcing streambanks with root wads, establishing a bankfull bench, and planting riparian vegetation.
    - Applying heavy maintenance and gravel surfacing to the Clear Creek Road (#153) where the road is adjacent to Clear Creek.
    - Relocating dispersed camping sites to places away from Clear Creek (to at least 125 feet) to protect stream stability.
- Constructing a recreational rental cabin on Driveway Peak to replace the original one that burned down in the early 1990s.
- Expanding the Clear Creek trailhead (Trail 627T) to provide for more parking and a trailer turnaround.

- Rerouting portions of the Clear Creek trail to avoid wet areas (about 100 feet immediately above the trailhead) and to reduce trail steepness (about 1000-2000 feet in the upper basin).
- Treating weeds using herbicides on roadsides and open, forested areas identified for prescribed burning. Roadsides would be sprayed with truck-mounted equipment. Herbicide spraying on open, forested areas would be applied aerially.

This proposed action served as a starting point for the Forest Service and gave the public and other agencies who did not participate in the collaborative effort information to comment on (see Public Involvement section 1.6).

1.4 Modified Proposed Action

In response to comments and more specific on-the-ground findings and updated information, the Forest Service modified the initial proposed action, which became the Modified Proposed Action (Alternative 2), as described in Chapter 2 of this document.

Modifications to the Proposed Action included:

- Construction of a recreation cabin on Driveway Peak was dropped from the project because construction and maintenance of new recreational facilities is not economically feasible due to declining budgets. If funding becomes available, proposals for new facilities would need to be considered on a Forest-wide basis to determine which one(s) would provide the most public benefit.
- The aerial application of herbicide to open, forested areas was dropped because after further review it was determined this activity would not be effective due to dense tree canopies. The relatively low effectiveness of the treatment did not warrant the expense. Ground-based application of herbicides on roads currently drivable was dropped from the Clear Creek project and has already been initiated as a separate project authorized under the 2007 Lolo National Forest Integrated Weed Management Environmental Impact Statement and Record of Decision. The reason for separating this activity is to reduce existing weed populations prior to the implementation of other project activities. There would still be a weed spraying component as part of the Clear Creek project which would include herbicide application on roads that are currently undrivable due to vegetation, but would be reopened to implement various project activities, including timber harvest and road decommissioning and storage.
- After further field review and in response to public comment, additional watershed improvement projects were included.
- Approximately 370 acres of timber harvest were added to treat root disease infected stands.
- Approximately 519 acres of prescribed burning (Units 86, 87, 92, 98, 99) were deleted in response to public and Agency concerns about exacerbating weeds and potential effects to identified sensitive plants. The boundaries of some of the remaining burn units were expanded to incorporate topographic breaks to better facilitate implementation.
- The valley bottom vegetation treatments (approximately 198 acres) were modified to address the existing thin soils and stream stability issues. The focus of the prescribed

work changed from non-commercial thinning to a more comprehensive watershed improvement treatment.

See Tables 1-3 in Updates to the Environmental Assessment section for comparison of Proposed Action and Modified Proposed Action.

1.5 Treatment Needs

Both natural events and past management have led to the current situation and therefore the need for the proposed activities.

Forest Health

One reason for proposing activities within the project area is to restore forest stand resistance and resilience to natural disturbances such as insects, disease, and wildfire.

Fire is the primary natural disturbance process that historically affected vegetation patterns in the project area. Field surveys indicate that the historic 1910 fire and earlier fires, which burned most of the Clear Creek drainage, left behind surviving groups and individual large ponderosa pine, Douglas-fir, and western larch trees creating a mosaic of forest conditions (Figure 1). Typical of forests burned by low and mixed severity fire, the 1910 and previous fires left openings, widely spaced individual and clumps of large, tall, fire-resistant trees that had high base heights dispersed throughout the landscape on the north side of the Clear Creek drainage (Larson and Churchill 2011).

Subsequent and ongoing fire suppression has removed the effects of natural fire from the landscape. In addition, timber harvest in the 1960s removed many of the survivor trees on the north side of the drainage. The effects of the interruption of normal fire cycles on mixed severity fire regimes has resulted in a loss of the mosaic patterns produced by the intermingling of low and high severity fire conditions and more uniformity in structure. Today, many stands in the project area are considered to be less structurally diverse and less diverse in the terms of patch size and patch shapes at the landscape level than what occurred historically (Figure 1).

The continuous uniform cover reflects the accumulation of fire-intolerant vegetation, dense forest canopies with large areas (hundreds of acres) of continuous composition and structure which has resulted in forests favoring crown fires rather than the historical mixed severity fires (Jain et al. 2012). The conditions are described by some as “uniformity in structure” (Mehl and Haufler, 2010), or “homogeneity in forest species composition and structure” by others (Jain et al. 2012). These conditions have increased the risk of extensive high severity fire and insect epidemics, providing less opportunity for a mosaic of conditions at the stand and landscape level.

Figures 2 and 3 depict how trees have filled the gaps between the clumps and individual trees that had survived past fires. As the vegetative profile in the project area now exists a similar pattern of surviving individual and clumps of trees is not expected as was the case 100 years ago, but rather a stand replacing event killing most trees within the project area. In addition, these dense stand conditions promote shade tolerant trees rather than shade intolerant trees,

such as ponderosa pine and western larch, by increasing competition for light, nutrients, and water. Due to these stresses, ongoing mortality of ponderosa pine trees from insects in these dense stand conditions is prevalent on the north side of the Clear Creek drainage leading to a loss of species diversity.

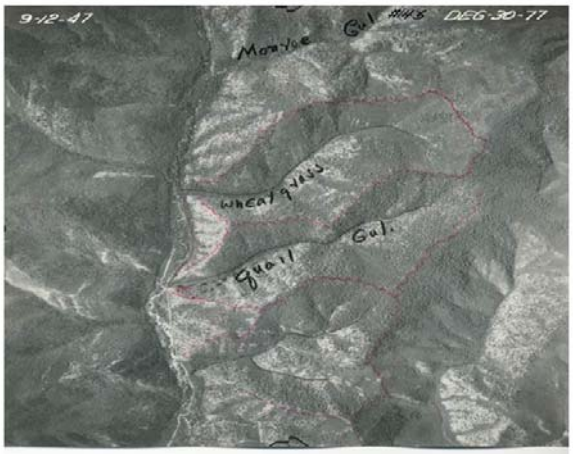

Figure 1: This 1947 photo shows the vegetative mosaic created by the 1910 and previous fires

Figure 2: Ponderosa pine survivors from the 1910 fire standing above the Douglas-fir that has developed over the past 100 years

Figure 3: Douglas-fir ingrowth where skips and gaps once occurred are now entwined with the crowns of past fire survivors.

To address changes that have occurred between the historical and current stand conditions, the Forest Service needs to use both timber harvest and prescribed burning to restore fire disturbance, reduce inter-tree competition, and maintain a mosaic of forest conditions. Disturbance-based forest management treatments like those proposed in this project have been recognized as an option for maintaining forest health, and for restoring vegetation species composition and structure (see Appendix E).

In recognition of the vegetative conditions that have evolved in the project area as a result of past timber harvest and fire suppression, those participating in the collaborative process reached agreement that it is necessary to treat the drier forest types on the north side of the

drainage where there is existing road access across most of the area. There was a greater concern that these drier sites are further outside their natural condition than the moister stands on the south side of Clear Creek and thus were considered a higher priority for treatment. In addition, many of the areas on the north side of Clear Creek serve as winter range for deer and elk. By focusing vegetation treatments on the north side of the drainage, the collaborative felt that it would better meet the project's purpose and need.

Focusing vegetation treatments in the mid- to low- elevation ponderosa pine, Douglas-fir, and western larch forests typified by low and mixed severity fire regimes is consistent with the agreements reached by the Montana Forest Restoration Committee that these forest types are the most likely, and appropriate candidates for, restoration activities (MFRC 2013, page 11)

Wildlife

A second reason for proposing activities within the project area is to improve and maintain big game winter range.

Wildlife is dependent upon a mix of vegetation conditions which provide for food and cover. Historically, a mosaic of plant communities and forest canopy structures provided niche and edge-effect habitat for various wildlife species (Hillis et al. 2000). This mosaic was maintained by low-, mixed-, and high severity fires. Typically, south and west aspects in the project area provided open forest conditions with understory forbs and brush. Groups and large individual trees provided scattered cover. North and east aspects provided denser forest conditions and thermal protection. As discussed above, past timber harvest and fire suppression have reduced structural diversity and niche wildlife habitat in the project area.

Generally, wildlife security remains high within the project area and is maintained with travel management restrictions on roads. However, field surveys indicate that the forage quality for big game species (i.e. deer and elk) is generally declining in the project area. The shrubs used as forage by big game are moderately browsed and are either stunted or have grown out of reach of the animals. In addition, weeds have colonized several winter range areas and are competing with native vegetation. Many of the more open, forested areas on the lower slopes within the project area are allocated in the Lolo National Forest Plan to be managed for big game winter range.

In western Montana, elk and deer foraging behaviors are highly weather dependent (Baty 1995). During mild, open winters with little snow, elk and mule deer forage heavily on grasses. During average severity winters, elk and deer forage heavily on shrubs since grasses are covered by deep snow. During period of extreme weather (characterized by deep, crusted snow, temperatures below -20 F, and wind), deer and elk limit foraging to tree lichens and/or conifers. Observations suggest strongly that shrubs provide the most critical biomass of the three forage groups (Hillis et al. 2000).

Tree thinning along with prescribed fire would improve big game habitat by stimulating browse and grass production in the project area. Shrub forage production is highly dependent on exposure to periodic fire (Gruell 1983; Makela et al. 1990). Studies indicate

that by reducing canopy cover and burning forage (brush and grass), production can be increased by as much as 2000 percent in areas where fire has been excluded (Hillis et al. 2000; Makela et al. 1990).

Watershed Health

A third reason for proposing activities within the project area is to improve water quality, stream stability, and fish passage.

Similar to many streams in the lower Clark Fork River basin, a portion of Clear Creek goes dry naturally for most of the year. About a five mile stretch of the middle reach is intermittent and typically only flows during spring runoff. When water does flow, it often overtops the streambanks and sometimes captures portions of the Clear Creek Road #153, which is located in the valley bottom. Bank erosion and paucity of streambank vegetation are significant factors affecting this stream. The stream channel's capacity to move water is compromised by aggradation of cobble-sized rocks in many areas, which is the result of high bedload and excessive bank erosion. In-channel wood is depleted leaving homogenous conditions, lacking the complex dynamic of energy dissipation, pools, and substrate sorting.

Factors that contribute to these conditions are both natural and human-caused. The headwaters and lower reaches of the stream have relatively narrow valley widths whereas the middle section is much wider. The lower valley acts as a constriction that over time has reduced the upstream gradient and induced bedload deposition. The intermittent section largely corresponds to wider valley widths and surface flow resumes where the valley is narrower.

Large fires burned within the watershed between 1880 and 1910. Following the 1910 fire, up to 13,000 sheep were grazed within Clear Creek, exploiting the new forage (USFS 1997). Timber harvest began around the beginning of the 20th century and was initially focused in the valley bottom. Historically, the average valley bottom vegetation condition would be a mixture of dense multi-aged trees, alder, and willow. By the 1940s, the riparian community inhabiting the lower Clear Creek valley bottom was characterized by mostly grass, some shrub, and scattered tree cover. This change in vegetation has likely contributed to the stream's unstable condition.

The Clear Creek Road #153, which was constructed in the 1940s, encroaches on the stream channel and floodplain in several places. In these encroachment areas, the road contributes to streambank instability and fine sediment delivery. In fall 2013/spring 2014, road realignment work was completed on the four most problematic sections (see page 2).

The State of Montana lists Clear Creek as water quality impaired due to sediment and streamside vegetation alteration, both of which are largely attributed to natural and human-induced streambank modifications/destabilization. Unpaved forest roads located in close proximity to streams and/or that cross streams are identified as another source of sediment. In addition, some forest roads contain undersized culverts which impede fish passage and

restrict stream flow. Within the Prospect Total Maximum Daily Load (TMDL)[3] and Water Quality Restoration Plan (2009), the State identifies several priority restoration activities for the Clear Creek drainage to reduce overall sediment including culvert replacements (upgrades), riparian revegetation and weed treatment, road decommissioning and closure, and road and trail maintenance and application of best management practices. The Clear Creek project proposes these actions, as well as in-stream woody debris placement, to improve watershed health and aquatic habitat.

Clear Creek is primarily inhabited by non-native fish species, except in the upper reaches above the intermittent section. Prior to the introduction of non-native fish in the 1950s and the installation of the hydroelectric dams on the lower Clark Fork River, bull trout (listed as a Threatened species under the Endangered Species Act) spawned in the lower reach of Clear Creek. Although this project would not remedy the migratory blockages caused by the Clark Fork River dams or address the non-native fish population (which falls under the jurisdiction of the State), it would improve overall fisheries habitat for native fish that currently inhabit or could inhabit Clear Creek in the future. The project would replace undersized culverts to provide for fish passage; apply Best Management Practices to reduce fine sediment delivery from roads; place woody debris in the stream to create pools and hiding cover when water is in the channel; and stabilize streambanks to reduce fine and coarse sediment delivery.

Recreation
A fourth reason for proposing activities within Clear Creek is to enhance recreation facilities.

The project area's close proximity to the community of Thompson Falls, makes it readily accessible and well-used for day-use recreation. The trailhead for the Clear Creek trail #627T does not have enough space to turn around stock trailers for equestrian users. The trail itself has some drainage issues in the lower end and steep grades in the upper basin of Clear Creek that do not meet standard trail specifications. Reconstructing the trailhead and relocating segments of the trail would make these sites more useable and enhance the recreational experience of forest visitors. In addition, these recreational improvements would address soil and water concerns.

1.6 Public Involvement

PreScoping
On April 1, 2009, the Forest Service issued a letter to notify the public that the agency was in the initial stages of developing a project for the Clear Creek area. This letter, which also served as an invitation to a public meeting, was sent to approximately 120 nearby landowners and individuals and groups who have previously requested to be notified of projects on the Lolo National Forest. Seventeen written responses were received. Most of these responses were requests to be kept informed of project developments and the rest provided management recommendations for the area.

[3] For waters identified as being impaired by a pollutant (e.g. sediment), the federal Clean Water Act requires that states develop a total maximum daily load (TMDL) for each pollutant. The TMDL sets the level by which to achieve water quality standards and protect beneficial uses.

On April 22, 2009, The Forest Service held a public meeting to share information about the project area and to encourage interested people to participate in a collaborative effort to help in the development of proposed actions for the Clear Creek project area. Approximately 16 people attended the meeting. A small, diverse group of people, consisting of local residents, County commissioners, and representatives of environmental organizations and the timber industry, stepped forward to participate in a collaborative process. They worked with Forest Service personnel over several months to identify various management opportunities and needs for the area.

Scoping

On April 6, 2010, scoping letters were mailed to 101 landowners, organizations, other agencies, and individuals who have previously requested notification about the types of activities included in this project. The scoping letter and associated maps were also posted on the Lolo National Forest website.

A project announcement and public meeting notice was published in the *Clark Fork Valley Press* and *Sanders County Ledger*, on April 21 and 22, 2010, respectively. A public meeting was held during the scoping period on April 26, 2010 to share information about the project and encourage public comment. Approximately 11 people attended the meeting.

At the completion of the scoping period, 9 letters had been received. Most of the letters were generally supportive of the overall proposal; however some had concerns regarding specific aspects of the project.

Environmental Assessment and Draft Decision Notice Comment

On September 4, 2012, copies of the Clear Creek Project Environmental Assessment and Draft Finding of No Significant Impact were mailed to individuals and organizations that had previously commented on or expressed interest in the project. The EA was also posted on the Lolo National Forest website. The 60-day comment period on the EA began with the publication of legal notice in the *Missoulian* newspaper on September 7, 2012. On September 12 and 13, legal notices announcing the availability of the EA and an upcoming public meeting were also published in the *Clark Fork Valley Press* and *Sanders County Ledger*, respectively. On September 27, 2012, the Forest Service held a public meeting to provide additional information about the project and answer questions. Three people attended the meeting. At the close of the comment period, five comment letters had been received. Three letters expressed support for the project and two letters raised various questions and concerns.

Clear Creek Road/Stream Interface Rehabilitation Decision Notice

On September 13, 2013, the road/stream interface watershed improvement work outlined in the Clear Creek EA was authorized under the Clear Creek Road/Stream Interface Rehabilitation Decision Notice. Copies of this document were mailed to individuals and organizations that had previously commented on or expressed interest in the project. A legal notice was published in the *Missoulian* newspaper on September 19, 2013. This Decision Notice authorized the realignment of four segments of Road 153 where it is immediately adjacent to Clear Creek.

Work authorized under this decision was initiated late September 2013 and completed July 2014. Activities included moving and elevating approximately 1200 feet of the road further away from the creek, constructing a vegetated floodplain that separates the road from the creek, and planting riparian vegetation. Gravel surfacing was applied to these road segments.

Objection
On December 2, 2013, a draft Decision Notice for the Clear Creek project was published. The draft DN included the Forest Service's response to public comments on the Clear Creek EA. The 45-day Objection period on the draft DN commenced with the publication of the legal notice in the *Missoulian* newspaper on December 6, 2013. The Alliance for the Wild Rockies filed the only objection which reiterated several issues they previously raised in their comments on the EA. These issues are addressed in the Issue Resolution section below. The Forest Service Reviewing Officer accepted the objection on January 24, 2014 and provided a written response to the objection on March 7, 2014 (see page 1 of this document).

1.7 Issue Resolution

Public and internal comments raised during the scoping period were reviewed to identify concerns and issues related to the proposed action. The Forest Service found no significant issues or unresolved conflicts concerning alternative uses of available resources. No additional issues were identified that would require another alternative to address them. These comments are briefly discussed below. Issues raised during the Objection Period on the draft Decision Notice are also addressed below.

Issues Raised in Scoping

Road Decommissioning
In response to scoping, various comments offered support for and opposition to proposed road decommissioning. Comments that were opposed cited concerns that these actions would reduce public and/or administrative access, increase sediment delivery to streams, and increase the potential for weed establishment and spread. Concerns were also raised that the agency would select and implement one decommissioning method (full recontouring) despite varying site conditions and needs resulting in a higher cost of implementation and greater resource damage.

The effects of road decommissioning and other proposed activities on access, weeds, and water quality were analyzed and are addressed in Chapter 3 of this document. To address public concerns, Forest Service personnel conducted field surveys on roads proposed for decommissioning to determine existing road conditions, identify resource concerns, and prescribe the appropriate treatments. Depending on site-specific conditions, the appropriate road closure treatments were proposed. For example, methods for decommissioning in the action alternatives vary from no physical treatment on roads that are heavily vegetated and contain no water or soil concerns (identified as "administrative closure"), to physical treatments that range from partial treatments to remove culverts and/or address site-specific concerns, to full recontouring of the prism (see Table 7 for a summary of miles of road proposed for administrative and physical closures).

Weeds
During project development, the Forest Service identified concerns about the existing weed conditions in the area and the potential for project activities, such as harvest and prescribed burning, to exacerbate these conditions. This issue was addressed through project modification, design, resource protection measures (see Chapter 2), and monitoring (see Chapter 2). For example, eight resource protection measures, including one that requires washing of equipment, were included in the action alternatives. Field reviews were conducted for weeds and sensitive plants. Approximately 519 acres of prescribed burning (Units 86, 87, 92, 98, 99) were dropped from the modified proposed action due to concerns about exacerbating weeds and potential effects to identified sensitive plants.

Issues Raised in Objection

Replacing culverts in the Clear Creek Inventoried Roadless Area is fiscally irresponsible and arbitrary.
In objection, the Objector advocated decommissioning all roads within the Inventoried Roadless Area (IRA) instead of replacing the culverts. The Objector further commented that since the 2001 Roadless Area Conservation Rule limits management within IRAs, there is no reasonably foreseeable need for the roads. The Objector raised these and similar comments during scoping and on the original Clear Creek Environmental Assessment.

The Forest Service addressed the Objector's recommendation to decommission all roads within the IRA by developing an alternative which was considered but eventually eliminated from detailed study because the 9 miles of existing roads within the Clear Creek Inventoried Roadless Area (IRA) are located within Forest Plan management areas that allow development (e.g. vegetation management and road access) (see Chapter 2, section 2.4 for more details). The Forest Service conducted a Travel Analysis for the project area to identify which roads were needed for future management as outlined by the Lolo Forest Plan and which roads were not. Since the IRA is designated as suitable for timber harvest, most existing roads were determined to be needed for future management. As part of the project, approximately 3.3 miles (37 percent) of existing road within the IRA are proposed for storage and 0.75 miles (8 percent) are proposed for decommissioning. Within Section 31, the cherry-stemmed exclusion within the IRA, 3.2 miles of road are proposed for either decommissioning (26 percent) or storage (74 percent). The 2001 Roadless Area Conservation Rule does not require the removal of existing roads within IRAs and allows land management actions under certain circumstances (36 CFR Subpart B 294.12 and 13).

The field inventories of roads within the IRA determined that they are in generally good condition and appropriately located on the terrain to minimize potential environmental effects. The roads are closed yearlong to wheeled public motorized travel. The replacement of three undersized culverts was identified as a deferred maintenance need on Road 7611 to ensure long-term protection of water quality and infrastructure. Although the culverts are undersized, they were identified as a low risk for potential failure.

Replacing culverts is a road maintenance item. The 2001 Roadless Rule allows maintenance of classified roads in Inventoried Roadless Areas (36 CFR Subpart B 294.12(c)). Road maintenance is defined in the 2001 Roadless Rule as the ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (36 CFR Subpart B 294.11). Replacement of undersized culverts with larger ones is also consistent with the Lolo Forest Plan (pages II-12, III-58). The replacement of the culverts within the IRA is not irreversible or irretrievable and does not preclude future management options such as decommissioning these roads.

The Forest Service believes the Forest Plan revision process is the most appropriate scale to re-evaluate IRAs, how they should be managed in the future, and if existing roads should remain or be removed from IRAs. The Forest Plan revision process will allow for consideration of all IRAs on the Lolo National Forest and for more effective and comprehensive public involvement regarding this controversial issue. Revision of the Lolo Forest Plan is expected to begin in 2016.

The Forest Service failed to properly analyze and disclose the minimum road system.
In objection, the Objector stated, "In short, the EA does not disclose if or how the agency will be able to afford to maintain the post-project road system, and the ecological impacts if it fails to do so. Alternative 2-modified would be inconsistent with 36 CFR 212." In the Objector's comment letter on the initial proposal during scoping, he requested an alternative be designed to complete all deferred or outstanding maintenance needs/BMP upgrades within the project area.

In response to this request, the Forest Service considered this alternative, but dropped it from detailed study because the remaining maintenance items not addressed in Alternative 2 are of low priority (primarily roadside brushing) and do not contribute to the purpose and need of the project (see Chapter 2, section 2.4 for more details).

The Clear Creek project area contains approximately 134 miles of roads under Forest Service jurisdiction. About 84 miles of these are system roads and 50 miles are undetermined roads. The Clear Creek project would treat approximately 107 miles or 80 percent of the road miles under Forest Service jurisdiction within the project area with decommissioning, storage, or maintenance. Undersized culverts would be replaced on the remaining 27 miles or 20 percent, otherwise they would remain untreated to minimize soil disturbance. These roads receive periodic maintenance on a priority basis. Of the 27 miles of roads left untreated by the project, only about 5 miles are open and drivable to public wheeled motorized travel for part of the year. The rest of the roads untreated by the project are closed yearlong to public wheeled motorized travel, which generally reduces the need for frequent maintenance.

Forest Service policy prescribes the travel analysis process at FSH 7709.55 for many purposes. Travel management decisions are to be "*informed by travel analysis, as applicable*" (FSM 7710.3). Travel management decisions are defined at FSM 7715. They "*include adding a route to or removing a route from the forest transportation system, constructing a NFS road or NFS trail, acquiring an NFS route through a land purchase or exchange, decommissioning a route, approving an area for motor vehicle use, or changing*

allowed motor vehicle classes or time of year for motor vehicle use." In these instances *"the responsible official has the discretion to determine whether travel analysis at a scale smaller than a ranger district or an administrative unit is needed and the amount of detail that is appropriate and practicable for travel analysis*" (FSM 7712.1 (3)).

Following policy, the Forest Service completed a project-specific travel analysis for the Clear Creek project area that examined all roads within the project area and documented the need for a short segment of new specified road construction, and identified some roads to be stored, some roads to be decommissioned, and some existing undetermined roads to be added to the specified road system. The recommendations identified in the Travel Analysis, with some minor modifications, were carried forward into the Clear Creek project EA and draft DN.

The Lolo National Forest is beginning an analysis of its Forest-wide minimum road system. This assessment is expected to be completed fall, 2015. The regulations at 36 CFR 212.5(b) (Subpart A), disclose requirements that the Forest Service incorporate a "science-based roads analysis" when identifying the minimum road system for each national forest. The travel analysis completed for the Clear Creek project was not designed to identify the minimum road system for the Lolo National Forest, although the work completed will be helpful to that broader effort.

The Clear Creek project does not assure viability for old growth associated Management Indicator Species (northern goshawk and pileated woodpecker)

In objection, the Objector stated, "Nothing about the Forest Service's response to our comments results in any more assurance of viability for old-growth associated wildlife species. Apparently there is no old growth in the project area, meaning that habitat for the old-growth Management Indicator Species is already not well-distributed as the National Forest Management Act requires. Regardless, the project would admittedly result in further habitat reduction for old-growth associated wildlife species."

As disclosed in the Vegetation section of this Environmental Assessment, there is existing old growth (as defined in Green et al. 1992, errata corrected 2005) within the Clear Creek project area, but no vegetation treatments are proposed within it. Habitat estimates for maintaining viable populations of pileated woodpecker and northern goshawk have been completed at the Regional and Forest scale (Samson 2006b). Comparison of habitat required for species-specific minimum viable populations to that available indicates well-distributed habitat far in excess of that need, given the natural distribution of species and their habitats. The amount of habitat within the Clear Creek project for the northern goshawk and pileated woodpecker is displayed in Chapter 3, Wildlife section.

<u>Pileated woodpecker</u>

Survey data collected from 1994 to 2006 across the Northern Region indicate that populations have remained fairly stable (Avian Science Center). Bird surveys have shown that pileated woodpeckers are common in most habitats on the Lolo National Forest. Pileated woodpeckers were observed in nearly all transects conducted in the area around Thompson Falls, close to the project area. In addition, foraging sign was identified within

the Clear Creek project area. The Clear Creek project would not affect species viability because:

- Vegetation treatments would retain larger overstory trees.
- Snags would be retained in accordance with Lolo National Forest guidelines.
- Average tree diameter of stands proposed for harvest would generally increase after treatment because smaller trees would be cut and/or removed.
- No activities are proposed within stands that meet the Regional definition for old growth (Green et al. 1992, errata corrected 2005). (see Chapter 3 Wildlife section for more details).

Northern goshawk

Based on recent broad-scale habitat inventory and monitoring assessments conducted in the Northern Region, breeding goshawks and associated habitats appear widely distributed and relatively abundant on National Forest System lands (Samson 2006a, 2006b; Canfield 2006, Kowalski 2006). The Clear Creek project would not affect species viability for northern goshawk because:

- Nesting habitat would remain abundant and well-distributed.
- Foraging habitat would remain within the ranges recommended in the scientific literature (Reynolds et al. 1992).
- No known nests would be disturbed or affected by proposed activities and any newly discovered nests would be protected.
- Habitat for goshawks is abundant and well-distributed across the Forest and Region - more than sufficient to sustain a viable population of goshawks (Samson 2006a, 2006b). (See Chapter 3, Wildlife section for more details).

The Clear Creek project does not assure viability for fishers.

In objection, the Objector also claimed that the project does not assure viability for fishers.

Habitat estimates for maintaining viable fisher populations have been completed at the Regional and Forest scale for fisher (Samson 2006b). Comparison of habitat required for a species specific minimum viable population to that available indicates well-distributed habitat far in excess to that needed, given the natural distribution of the species and habitat (refer to Chapter 3 Wildlife section and Wildlife Report for more information).

The Clear Creek project would not contribute to a loss of species viability because:

- The potential for effects to even one individual fisher is relatively low due to their naturally rare and wide distribution and the naturally limited amount and distribution of suitable habitat.
- The project proposes to commercially treat a modest 5.8 percent of suitable fisher habitat and 2.2 percent of potential[4] habitat distributed in small, disjunct patches across multiple treatment units. Impacts would be temporary in nature and small in scale.
- No activities would fragment wet forest types.

[4] Potential fisher habitat does not currently meet summer and winter habitat requirements but has the potential to grow into suitable fisher habitat in the future.

- Riparian forest areas would be maintained through the application of Riparian Habitat Conservation Areas (see Resource Protection Measures in Chapter 2).
- There would be no change to trapping pressure or effects to population linkages because drivable, open road density would remain unchanged.
- Coarse woody debris and snags would be retained consistent with Forest Plan Standards (see Resource Protection Measures in Chapter 2). No existing old growth would be affected (see Vegetation section).
- Fisher habitat is currently abundant and well-distributed on the Forest and Region to maintain viable fisher populations (Samson 2006b).

The Forest Service did not complete an adequate analysis of effects to black-backed woodpecker.

In objection, the Objector claimed the Forest Service did not complete an adequate analysis of effects to black-backed woodpecker.

Black-backed woodpeckers occupy forested habitats that contain high densities of recently dead and dying trees, which primarily wood borer beetles have colonized (Dixon and Saab 2000; Powell 2000). Large expanses of fire-killed trees are considered the most suitable habitat for this species in Montana (Hutto 1995). The Clear Creek project does not propose harvest activities within this habitat (burned or unburned). In addition, the Clear Creek project would not preclude the development of future habitat. Although proposed treatments would reduce the risk of high severity fire and insect and disease outbreaks within treated areas, they would not prevent natural disturbances (e.g. fire, insects, and disease) within these areas and subsequent tree mortality in the future. As discussed earlier, the project's vegetative treatments are proposed in an area historically characterized by low- and mixed-severity fires. The entire south side of Clear Creek, which contains forests that evolved in stand-replacement fire regimes, would remain unaffected by the project. Thus, the project was determined to have no impact on this species (refer to Chapter 3 Wildlife section and Wildlife Report for more information).

Vegetation treatments are proposed on approximately 12 percent of the 18,223-acre Clear Creek project area, primarily in the dry ponderosa pine/Douglas-fir forest types. Regional assessments (Samson 2006a, 2006b) indicate viability is not a concern for the black-backed woodpecker because:

- Black-backed woodpecker habitat in the Northern Region is abundant and well-distributed across the Region and Lolo National Forest. A comparison of habitat required for a minimum viable population to that available indicates well-distributed habitat far exceeds that needed, given the natural distribution of the species and their habitats as mapped and according to the scientific literature (Samson 2006b).
- Evidence suggests the black-backed woodpecker is increasing in numbers in the United States (as cited in Dixon and Saab 2000). No demographic information exists to suggest a decline in woodpecker numbers.
- Habitat for the black-backed woodpecker has recently increased and amounts are expected to increase as fires and bark beetle outbreaks continue to increase in size (Gallant et al. 2004, Hessberg and Agee 2003, Hessberg et al. 2004).

- The level of salvage timber harvest of the forest landscape in the Northern Region is insignificant (Samson 2006a).

The Clear Creek project does not assure the viability for flammulated owl.
In objection, the Objector claimed the project does not assure viability for flammulated owls.

Habitat estimates for maintaining viable populations have been completed at the Regional and Forest scale for flammulated owls (Samson 2006a, 2006b). Comparison of habitat required for a species-specific minimum viable population to that available indicates well-distributed habitat far in excess of that needed, given the natural distribution of the species and its habitat.

The Clear Creek project would not contribute to a loss of species viability or trend toward Federal listing for flammulated owl because:

- Flammulated owl habitat is abundant and well-distributed across the Region and Lolo National Forest.
- Suitable habitat would be maintained on all but 2.3 percent of the existing habitat on National Forest System lands within the project area and habitat is abundant across the Forest.
- The project would improve the quality of foraging habitat on about 14 percent of the existing flammulated owl habitat on National Forest System lands across the project area. (Refer to Chapter 3 Wildlife section and the Wildlife Report for more information)

The Clear Creek project does not assure the viability for wolverine.
In objection, the Objector claimed the project would not assure the viability of wolverine.

After publication of the original Clear Creek EA, the U.S. Fish and Wildlife Service listed the wolverine as a proposed threatened species (Federal Register 78:7864-7890, February 4, 2013). They concluded that while wolverines appear stable to expanding, the primary threats to the contiguous U.S. population is the risk of eventual habitat and range loss due to climate warming, with secondary threats from trapping/wolverine harvest, with potential threats from disturbance associated with human developments [e.g. houses and ski areas] and transportation corridors [e.g. interstate highways and high volume secondary highways], and loss of genetic stochasticity due to isolation between snowy habitats caused by climate change (Federal Register 78:7864-7890, 2013). The USFWS specifically mentions that forestry-related management practices are not likely a factor contributing to the decline (FR at 7879). Timber management, winter elk security, thermal cover, or over-the-snow uses managed by the Forest Service were not identified as threats to the U.S. population (FR at 7878-79).

On August 13, 2014, after considering the best available science, the USFWS declared that listing the wolverine as a threatened species was not warranted because they determined the effects of climate change are not likely to place the wolverine in danger of extinction now or in the foreseeable future (79 FR 47522). Although the USFWS acknowledged that climate change effects are expected to result in loss of some wolverine habitat, they noted that there

is no available data to inform whether or how these projected impacts may affect the viability of wolverine populations. Thus, the USFWS withdrew its proposed listing rule.

The Clear Creek project would not lead to a loss of species viability or contribute to a trend toward Federal listing because:

1) The project would not change the presence, absence, or abundance of snow remaining late into the spring.
2) No activities would occur within denning habitat.
3) The project would not increase human use or access to habitat areas of persistent snow.
4) Trapping access has been limited within the project area through travel management restrictions on roads. The Clear Creek project would not increase public motorized access. The wolverine trapping season has been suspended in Montana since November 2012 and remains closed.
5) The project activities are proposed primarily in areas (mid-elevation dry forest types) not specifically selected by wolverines for use. In addition, wolverines naturally occur in low densities. Thus, the potential for disturbing/displacing even one individual wolverine is low.
6) Proposed vegetation treatments would not affect wolverine movement or dispersal across the landscape.

Prior to the withdrawal of the proposed rule, the U.S. Fish and Wildlife Service concurred with the Forest Service's finding that the project would not jeopardize the Lower 48 population of the wolverine and determined a conference was not required (letter dated May 30, 2014). Refer to Chapter 3 Wildlife section and the Wildlife Report and Biological Assessment for more information.

Proposed management of winter hare habitat will not ensure viability of Canada lynx.
In objection, the Objector also claimed the Clear Creek project would affect winter hare habitat and not ensure viability of Canada lynx.

Squires et al. (2010) identified that during the winter, lynx preferentially forage in mature, multilayer forests with spruce and subalpine fir in the overstory and midstory. Forests used during the winter are typically composed of larger diameter trees with higher horizontal cover, more abundant hares, and deeper snows compared to random availability; multilayer, spruce-fir forests provide high horizontal cover with tree branching that touch the snow surface. The Clear Creek project does not propose any treatments within multilayer, spruce-fir forests. Proposed treatments are primarily in ponderosa pine and drier Douglas-fir forest types which are not suitable lynx habitat because they are too warm and dry to support the dense horizontal cover required by lynx (Squires et al. 2010).

The Forest Service determined that the project would have no effect on Canada lynx because:

- Proposed treatment units are not within, nor do they alter any lynx habitat.
- Surveys for lynx within the project area did not detect their presence.

- The project is consistent with all standards and guidelines for vegetation management projects as outlined in the Northern Rockies Lynx Management Direction (see Appendix F).
- The Clear Creek project area is not located within designated lynx critical habitat (74 FR 8616, February 25, 2009).
- A total of approximately 121 acres of treatment (18 acres of timber harvest and 103 acres of prescribed burning only) are proposed within a lynx analysis unit (LAU) (an approximate area used by an individual lynx and is the unit used to analyze effects to lynx (USDA-FS 2007)); however none of the treatments are within lynx habitat. These 121 acres comprise a very modest 0.4 percent of the 27,789-acre Upper Prospect LAU.
- The project would maintain all of the elements necessary for lynx to move across the landscape.

The Forest Service discussed the Clear Creek project and the findings for lynx with the U.S. Fish and Wildlife Service. The USFWS expressed no concerns regarding the project and determined that formal or informal consultation was not necessary (memo dated June 4, 2014).

Statements made in the original Clear Creek EA regarding fire suppression and wildland fire are contradictory.
The Objector commented, "*The EA states at p. 22, '…full suppression would be expected on most fires.' Yet on p. 27 under Effects Common to All Alternatives it also states, 'Within the Clear Creek project area, wildland fire will continue to serve as a natural disturbance factor.' The Forest Service needs to reconcile these two conflicting statements*."

The statements in the original EA that the Objector believed were contradictory are not. Despite fire suppression efforts, wildfires still occur as evidenced by the wildland fires that burn on the Lolo National Forest every year. Last year (2013), wildfires burned approximately 20,000 acres within and adjacent to the Lolo National Forest (http:/nciweb.nwcg.gov). One of the purposes of the vegetation treatments in the Clear Creek project is to restore stand structures and compositions more likely to support low- and mixed-severity wildfire which was historically characteristic of the dry ponderosa pine/Douglas-fir forest types proposed for treatment. Thus when a wildfire does burn at some time in the future, the potential severity would likely be lower within treated areas compared to what would happen today with the current stand conditions. This updated EA clarifies this point (pages 51-52, Fuels section 3.3).

Cumulative effects associated with fire suppression were not considered.
In objection, the Objector also claimed the cumulative effects analysis did not consider the effects of fire suppression.

The purpose and need for the project acknowledges the effects of fire suppression on vegetation condition and wildlife habitat. Past and ongoing fire suppression has modified vegetation conditions including an increase in fuel load, stand density, and risk to high-severity fire. Past and ongoing fire suppression has also modified big game winter range;

reducing forage for elk and deer. The project's proposed treatments would emulate the effects of low- and mixed-severity fire to increase forest resilience and maintain forage for big game. Following treatment, low- and mixed-severity wildfires would be more likely to occur; in line with the historical characteristics of the treated areas.

The effects of fire suppression are acknowledged in various resource reports in the project file: Wildlife Report (flammulated owl, Townsend's big-eared bat, black-backed woodpecker); Fire and Fuels Report; Vegetation Report; Soil Report; and Hydrology Report.

EA fails to disclose effects to soils

In objection, the Objector claimed the EA violates the National Environmental Policy Act because it fails to disclose effects to soils; methodology used to determine findings; soil mitigation and recovery assumptions and methodology; and impacts of noxious weed infestations on soil productivity.

The EA summarizes the soil analysis findings, which are fully disclosed in the Soil Report and associated soil assessment documents in the Project File. A display of the estimated soil disturbance caused by the project is contained within Appendix C of this document.

36 CFR 220.7(b)(3) states that "the EA shall briefly provide sufficient evidence and analysis, including the environmental impacts of the proposed action and alternative(s) to determine whether to prepare either an EIS or FONSI". The EA may incorporate by reference data, inventories, other information and analyses (36 CFR 220.7(b)(3)(v)). The original Clear Creek EA (page 23) states, "Further analysis and conclusion about the potential effects are available in reports for each resource and other documentation cited in those reports. These documents are contained within the project file, which is available at the Plains/Thompson Falls Ranger District office."

The purpose and need for vegetation treatments is not adequately supported. Because the need for vegetation treatments is not supported, the proposal to construct temporary roads to access the treatment areas is not justified.

The Objector purported the purpose and need for the project's vegetation treatments is not scientifically supported. In response to this objection, the Regional Forester instructed the Forest to provide additional rationale for the vegetation treatments.

The Forest Service has further clarified the vegetative purpose and need in this updated EA (see pages 11-13).

Approximately 3 miles of temporary road consisting of multiple segments would be constructed to access proposed harvest units. These temporary roads would be located within developed areas where topographic breaks in the slope limit the reach of yarding equipment from the existing roads. Following use, these roads would be decommissioned and the sites rehabilitated. Temporary roads would be located in mid to upper slope locations and not cross live water. Project design and resource protection measures outlined in Chapter 2 would minimize the potential for environmental effects.

Sediment effects and consistency with Clean Water Act
The Objector claimed the EA does not quantify sediment effects from project activities and thus does not demonstrate consistency with the Clean Water Act or address whether the project adequately responds to the Prospect Total Maximum Daily Load (TMDL) Plan (2009).

For the Clear Creek project, the Forest Service used the WEPP model to assess the potential sediment delivery from roads resulting from project activities. Modeled amounts of sediment are quantified in the Fisheries and Hydrology reports in the Project File and displayed in Figure 1 on page 37 of the original EA.

Model results should only be considered in trend and general magnitude comparisons and should not be considered absolute values. Use of the WEPP model is widely accepted and provides a reasonable interpretation and prediction tool in the dynamic forest environs. Similarly, the WEPP and XDRAIN models were used in the development of the Prospect TMDL to display road-related surface sediment production.

The Hydrology Report supports the findings presented in the original and this updated EA, which state that modeling indicates the Clear Creek project would achieve the TMDL loading allocation reduction from forest roads and culverts and contribute to the allocation reduction for human-influenced bank erosion.

Cumulative effects to bull trout.
In objection, the Objector claimed the Clear Creek EA did not adequately assess cumulative effects on bull trout.

The original EA (pages 43-45) addressed cumulative effects on bull trout within Clear Creek and the greater Prospect Creek watershed. This updated EA also discloses cumulative effects to bull trout (pages 72-74).

Lolo National Forest is required to consult with the USFWS regarding effects to bull trout critical habitat.
The Objector asserted that before the Clear Creek project can proceed, the Lolo National Forest is required to consult with the USFWS regarding effects to bull trout critical habitat.

There is no designated bull trout critical habitat within the Clear Creek watershed. However, Prospect Creek, into which Clear Creek flows, is designated critical habitat from its confluence with the Clark Fork River to its headwaters.

Critical habitat which may be affected by the project includes approximately two miles of Prospect Creek between its confluence with Clear Creek and the Clark Fork River. This section of Prospect Creek functions primarily as a migratory corridor for bull trout and does not contain spawning habitat due to the natural stream gradient and morphology. Sediment generated from road-related activities (maintenance, decommissioning, storage, and use) as part of the Clear Creek project was identified as having the potential to affect critical habitat downstream of the project area.

In accordance with Section 7 of the Endangered Species Act, the Forest Service consulted with the U.S. Fish and Wildlife Service regarding potential effects of the Clear Creek project on bull trout and designated critical habitat. The USFWS concluded that critical habitat will not be destroyed or adversely modified because project-generated sediment would be short-term and, over the long-term, project activities would result in a decrease in sediment delivery, improving critical habitat.

CHAPTER 2: ALTERNATIVES

Section 102(2)(E) of the National Environmental Policy Act (NEPA) requires the Forest Service to study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources. The Forest Service did this with the No Action and Proposed Action alternatives described below. Furthermore, the Modified Proposed Action addressed public comment and provided additional means to address the project's purpose and need. The project was designed to minimize effects to the environment; Resource Protection Measures were developed in a collaborative process early on to anticipate and reduce the effects of the proposed action on the environment and address and resolve the issues described in Chapter 1.

2.1 Description of the Alternatives

Alternative 1 (No Action)

This alternative provides a baseline for comparison of environmental consequences of Alternative 2 to the existing condition and is a management option that could be selected by the Responsible Official. The results of taking no action would be the current condition as it changes over time due to natural forces.

This alternative would continue the standard protection and recurrent maintenance activities such as access management and routine scheduled road maintenance that is currently ongoing in the project area. Ecosystem processes such as vegetation succession would continue their current trends (see Need for Treatment). This alternative proposes no actions that are contained in the modified proposed action (Alternative 2).

Alternative 2 (Modified Proposed Action) (see Map 2 in Appendix A)

This alternative is a modification of the original proposed action, described in Chapter 1, with adjustments made to address public comments and additional on-the-ground findings. Although some areas of vegetation treatment were added and others deleted, the overall total acres of vegetation treatment are very similar between the original proposed action and Alternative 2 (1987 acres vs. 2096 acres, respectively). In addition, the miles of proposed road treatments were slightly modified based on survey findings.

Alternative 2 includes the following treatments:

Vegetation Management Treatments
Since publication of the original EA, minor modifications have been made to vegetation treatment unit boundaries and treatment types to better fit on-site conditions. These modifications resulted in an approximate 24-acre decrease in vegetation treatment area (see Updates to the Environmental Assessment).

The Modified Proposed Action would manage vegetation using mechanical methods and/or prescribed burning on about 2096 acres to improve forest health and wildlife habitat. On approximately 1151 of those acres, timber harvest would be used as a tool to achieve vegetation objectives. Within these areas, trees cut as a by-product of forest health and wildlife habitat improvement activities would be removed and utilized as wood products. On the remaining 945 acres, non-commercial activities (e.g. prescribed burning, non-commercial thinning of small diameter trees) would be performed (see Table 5 for unit specific treatments).

Table 4: Summary of Proposed Vegetation Treatments

Proposed Treatments	Alternative 2 (acres)
Commercial Thin	904
Shelterwood Cut followed by prescribed burning	247
Non-commercial Thin	68
Prescribed Burning	679
Watershed Improvement	198
TOTAL	2096

Vegetation treatments would vary in intensity and appearance as follows:

- **Commercial Thinning:** Smaller trees would be selectively removed to leave primarily the largest and most healthy trees. Treated areas would appear forested but with a lower tree density. This reduced tree density would enhance the health of residual trees, reduce risk of high severity fire, and develop stands that are more resilient to wildfire, insects, disease, and drought. Commercial material would be hauled to an off-site, facility to be processed into various wood products (i.e. lumber, paper, biomass). Treatment areas would be underburned following harvest activities to remove residual debris.

- **Shelterwood Cutting:** This type of harvest treatment would occur in areas where the Douglas-fir trees are infected with root disease and tree mortality is occurring. This treatment would remove infected trees, favoring the retention of tree species (e.g. ponderosa pine, western larch, western white pine) that are resistant to the root disease found here. These treated areas would appear as open forests with approximately 20-50 trees per acre of the largest and healthiest trees left on site. The area would then be underburned and planted with root disease resistant tree species (e.g. western larch, ponderosa pine, and western white pine). Removed material would be hauled to an off-site, commercial facility to be processed into various wood

products (i.e. lumber, paper, biomass). Treatment areas would be underburned following harvest activities.

- **Non-commercial Thinning:** This activity would thin small trees generally less than 7 inches DBH to feature healthy trees of desired species. Trees would be cut by hand with chainsaws to reduce the existing density. Cut material would be lopped and scattered and left on the ground to decompose.

- **Prescribed Burning:** This activity would involve underburning with a low intensity surface fire under controlled conditions.

- **Watershed Improvement**: This treatment would be applied in units W1 and W2 located in the Clear Creek valley bottom to improve soil conditions and enhance the stability of the floodplain. Treatments would include weed spraying; individual tree thinning; planting of native grasses, shrubs, and trees; and soil decompaction (see the more complete description of the treatments for W1 and W2 below under the Watershed Improvement proposals).

Table 5: Detailed List of Proposed Vegetation Treatments by Unit (see Map 2 in Appendix A)

Unit #	Acres[1]	Logging System[2]	Proposed Treatment
1	8	Skyline	Commercial Thin
1A	9	Tractor	Commercial Thin
1B	10	Skyline	Shelterwood Cut
2	103	Skyline	Commercial Thin
3	37	Skyline	Commercial Thin
4	40	Skyline	Shelterwood Cut
5	47	Excaline/Skyline	Commercial Thin
6	71	Skyline	Commercial Thin
6A	12	Tractor	Commercial Thin
7	17	Tractor	Commercial Thin
8	9	Skyline	Commercial Thin
8A	5	Tractor	Commercial Thin
9	39	Skyline	Commercial Thin
11	24	Skyline	Shelterwood Cut
12A	8	Skyline	Commercial Thin
12B	12	Skyline	Commercial Thin
14	61	Skyline	Commercial Thin
15	60	Skyline	Commercial Thin
15A	9	Tractor	Commercial Thin
15B	45	Skyline	Commercial Thin
16A	33	Skyline	Commercial Thin

Unit #	Acres[1]	Logging System[2]	Proposed Treatment
16B	35	Skyline	Commercial Thin
16C	35	Skyline	Commercial Thin
16D	14	Skyline	Shelterwood Cut
16E	35	Skyline	Shelterwood Cut
27	26	Skyline	Commercial Thin
27A	6	Tractor	Shelterwood Cut
28	56	Skyline	Commercial Thin
29	16	Skyline	Shelterwood Cut
30	45	Skyline	Shelterwood Cut
31	27	Skyline	Commercial Thin
31A	25	Excaline	Commercial Thin
31B	7	Excaline	Shelterwood Cut
31C	18	Skyline	Shelterwood Cut
41	68	N/A	Non-commercial Thin
60	32	Skyline	Shelterwood Cut
61	45	Skyline	Commercial Thin
62	52	Skyline	Commercial Thin
62A	18	Tractor	Commercial Thin
80	46	N/A	Prescribed Burning
81	15	N/A	Prescribed Burning
82	20	N/A	Prescribed Burning
83	18	N/A	Prescribed Burning
84	88	N/A	Prescribed Burning
85	13	N/A	Prescribed Burning
88	36	N/A	Prescribed Burning
89	24	N/A	Prescribed Burning
90	46	N/A	Prescribed Burning
91	138	N/A	Prescribed Burning
93	32	N/A	Prescribed Burning
94	7	N/A	Prescribed Burning
95	92	N/A	Prescribed Burning
96	44	N/A	Prescribed Burning
97	50	N/A	Prescribed Burning
100	10	N/A	Prescribed Burning
W1	129	N/A	Watershed Improvement
W2	69	N/A	Watershed Improvement
TOTAL	2096		

[1]Acres are approximate

[2]An incidental amount of acres may use another yarding system than what is designated. For example, there may be incidental amounts of tractor skidding within skyline and excaline units.

Weed Management Treatments
The modified proposed action would treat weeds along roads and in the watershed improvement units as follows:

- Roadside herbicide spraying of weeds along approximately 15 miles of road (including new road construction and roads that are currently undrivable that would be reopened to access vegetation treatment units). These treatments would complement the already authorized ongoing weed treatment along approximately 40 miles of drivable road within the project area.

- Broadcast herbicide treatment on up to 198 acres within watershed improvement units W1 and W2 to reduce existing weed populations in the valley bottom adjacent to Clear Creek (see description of treatments for Units W1 and W2, below).

Recreation Facilities Improvements
Alternative 2 would improve recreation facilities in the area with the following activities:

- Expand the Clear Creek trailhead (Trail 627T) to provide for parking and a trailer turnaround.

- Reroute portions of the Clear Creek trail with hand tools to avoid wet areas (about 100 feet in the lower end) and reduce grade (about 1000-2000 feet) in the upper basin.

Watershed Improvement Treatments
Various treatments would occur to improve watershed conditions under the Modified Proposed Action. Both in-stream and streamside/crossing treatments would occur as follows:

- Decommission roads that were determined through the Travel Analysis Process to be unneeded for future management. Place other roads, determined to be needed in the long-term but not for the next several decades, into long-term storage (see Table 6 below).

- Replace 8 road culverts with larger structures to improve stream flow and/or fish passage. Remove 9 culverts on roads to be stored or decommissioned.

- Address road/stream interface issues in specific locations by:
  - Where problems exist, relocate dispersed camping sites adjacent to Clear Creek to new locations at least 125 feet from the bank edge to protect stream stability.
  - Relocate/realign the switchback at the end of Road #153 to move the road further away from Clear Creek. By realigning this road segment sufficient room for the Clear Creek trailhead (Trail #627T) would be provided to allow for parking and a trailer turn-around.

- Treatment Areas W1 and W2:

- Spray weeds with herbicide or use other mechanical treatments followed by introduction of approved biological control agents (insects).
- After weed treatment, prepare site for vegetation establishment which may include hand or machine decompaction and spreading organic materials from the adjacent forest floor.
- Seed and plant the area with a mix of forbs, grasses, shrubs, and trees.
- Cover any seeded/planted areas with slash or mulch 2-3 inches deep across 70 percent of the area (accomplished through on-site felling of trees to increase coarse woody debris, moving in slash from other areas, or through use of a portable shredder/mulcher to spread finer material across the ground.
- Place wood jams in the old flood channels as needed for flood water control and provide microsites for plant establishment – trees on site could be felled and used for this activity.
- Outside of stream buffers, incidental thinning of small trees would be completed to improve the health and vigor of the trees desired for retention.
- In addition, within W2, treatment would also include creating 5-10 small openings to be planted with trees to improve long-term site diversity. New openings would be created by patch cutting in non-commercial size-classes and suppressed Douglas-fir and lodgepole pine. New openings would be about ½ acre in size to create an adequate growing environment.

- Instream rehabilitation work within Clear Creek from the Clear Creek trailhead downstream to the private property boundary (approximately 5 miles). Work would vary in intensity and include: bank treatments (engineered log jams and soil lifts) along outside bends and occasionally in straight reaches. Although this segment of Clear Creek is intermittent, the purpose of the treatment is to stabilize the streambanks to keep the water within the channel during spring flows.

Road Management

Road management under Alternative 2 would include:

- Construct approximately 3.0 miles of temporary and 0.25 miles of long-term specified road consisting of multiple segments to access vegetation management areas (see Table 6).
  - Temporary roads would be constructed to a minimal standard to provide access for timber harvesting equipment and log trucks. These roads would be decommissioned following use for this project. Decommissioning of the road would include replacing overburden (excavated soils) back onto the road prism to return the ground to its natural contour, placing woody debris on the disturbed area, and seeding the disturbed soil.
  - The short segment of long-term specified road (0.25 miles) would be constructed to connect two existing road prisms together to allow for the decommissioning of approximately 2 miles of existing road because it would no longer be needed for access to this piece of ground. The new road segment, as well as two existing segments of road it would connect, would be placed into long-term storage following use for this project.

- Maintain approximately 33 miles of road. The intent of road maintenance is to bring the road into conformance with its assigned maintenance level and function, not to improve the road beyond its assigned standard. Because these roads are intended for long-term access, and in most cases would remain open to public travel, work would be performed to minimize environmental impacts and to provide a safe and stable road. Maintenance work would include surface blading, minor earth work (e.g. cut and fill reshaping), road surface reshaping, ditch cleaning and reshaping, roadside clearing and/or brushing, seeding disturbed areas, drain dip and cross drain cleaning and construction, culvert cleaning, armoring, and/or replacement, slash filter windrow and sediment trap construction near live water crossings.

- Decommission approximately 31 miles of road determined to not be needed for future use. Field surveys were conducted on these roads to determine their existing condition and identify appropriate closure treatment methods (see Table 7). Approximately 84 percent (26 miles) of these roads are mostly grown in with brush and trees and pose no aquatic or wildlife concerns. These roads would be administratively decommissioned, meaning that no physical activities would be completed on the ground to close them because they are essentially already naturally decommissioned. The intent of this treatment is to administratively decommission roads without re-disturbing the road surfaces that are already stable from natural processes. Re-disturbance of the road prism would create unnecessary impacts to wildlife, water quality, and increase the potential for weed spread on disturbed soils. On the remaining 5 miles (16 percent) of roads, various physical treatments would be performed to close the road. See Appendix B for more details.

- Store approximately 43 miles of road that are needed for long-term access, but not in the short-term. Storage treatments would maintain the road prism in a stabilized condition for future use. Approximately 47 percent (20 miles) of these roads are mostly grown in with brush and trees and pose no aquatic or wildlife concerns. These roads would be administratively stored, meaning that no physical activities would be completed on the ground to close them. On the remaining 23 miles (53 percent), various physical treatments would be performed to store the road. Treatment activities would include removal of stream crossing structures and restoring the stream crossings to natural contours, water bar installation at frequent intervals, grass-seeding, and entrance closure. Ripping (de-compaction) would occur where there is little to no existing vegetation on the road surface.

- Move the gate on Road #302, which is open seasonally from December 1 to October 15, approximately 500 feet up the road to a location just past the intersection with Road #16210 to allow for a vehicle turnaround. This gate relocation would require the installation of another gate on Road 16210 to maintain the existing seasonal closure of both roads.

- Add approximately 19 miles of existing undetermined roads to the National Forest System Road atlas (See Appendix B, Table B-1 for the listing of roads). Through the

project level Travel Analysis Process, these roads were determined to be needed for future management purposes or to allow public access for dispersed recreation. All of these roads (except for 0.8 miles for dispersed recreation) would be placed into long-term storage. Approximately 9 miles of these roads would be used to access proposed vegetation treatment areas for this project and physically stored following use. The other 9.2 miles would not be used for this project and would be administratively stored: no physical treatment needed due to their existing condition.

- Install a gate on Road #18758 (Quail Gulch) at the intersection with Road #153 to close the road to the gravel pit year round to public motorized travel. Following use of the gravel pit for this project, the road would be grass-seeded and have appropriate drainage left in place.

- Establish a temporary gravel stockpile site just off the Clear Creek road, about one mile east of the pit (see Map 2 in Appendix A). Site would be rehabilitated following use.

Table 6: Summary of Road Construction and Treatments (Specific treatments by road are described in Appendix B)

	Alternative 2 (Miles)
New Construction	
Long-term Specified; store following use for this project	0.25
Temporary (multiple segments)	3
Road Treatments	
Road Maintenance	33
Travel Management: Change from Open to Closed Yearlong with gate (Road #18758 to the gravel pit)	0.4
Decommission	31
Long-term Storage	43

There would be no net change in the miles of road that can be legally and physically driven by the public (see the Transportation section for more information).

Table 7: Road Closure Treatment Summary

Road Closure Treatment Type	**Alternative 2 (Miles)**
Decommission	
Physical Treatment	5
Administrative Closure – No treatment[1]	26
TOTAL	31
Long-term Storage	
Physical treatment	23
Administrative Closure – No treatment[1]	20
TOTAL	43

[1]Roads are naturally revegetated and stabilized. No physical treatment is needed and roads would be administratively closed.

2.2 Resource Protection Measures

In addition to designing the project for its specific restoration objectives, a variety of resource protection measures were incorporated into the action alternative to mitigate the potential to cause unintended harm to the environment.

The Lolo National Forest has developed standard operating procedures (SOPs), which include best management practices that have been determined to be effective at minimizing potential environmental effects. SOPs are applied to all projects. In addition, specific resource protection measures have been identified for the Clear Creek project. All the following resource protection measures have been incorporated into Alternative 2 and thus the environmental effects displayed in Chapter 3 reflect the implementation of these measures.

Table 8: Resource Protection Measures

Resource Protection Measure	Resource Objective	Description of Resource Protection Measure	Units/Location	Standard Operating Procedure (SOP), Project Specific Measure
Air Quality				
1	To ensure air quality standards are met	Prescribed burning would be conducted under the constraints set by the Montana Airshed Group. Prescribed burning would only be permitted when approved.	All units	SOP
2		Although burns would be planned and implemented to minimize smoke impacts, occasional pooling of smoke could be anticipated due to differences between predicted forecasts and actual weather. Should a situation like this occur, other restrictions on prescribed burning may be implemented by the Plains/Thompson Falls Ranger District in addition to those imposed by the State's smoke management unit until clearing occurs.	All units	SOP
Botany				
3	To protect sensitive plant populations	In Units 15B and 28, hill monkeyflower plant populations would be buffered from temporary road construction and logging activities.	Units 15B & 28	Project Specific
4		To ensure protection of whitebark pine outside the western end of Unit 84, prescribed burning would be done when the area to be protected is snow-covered or retains adequate fuel moisture to resist burning.	Unit 84	Project Specific
Soil				
5	To reduce potential soil disturbance and maintain soil productivity	Summer or dry season ground-based operations would be restricted to slopes less than 35 percent and dry soil conditions unless reviewed by the Forest soil scientist.	Tractor units (1A, 6A, 8A, 15A, 27A, 62A)	SOP
6		Skyline corridors would be approved by the Forest Service in advance of felling and provide for the suspension of the leading end of each log. Avoid designating a corridor within ephemeral draws.	Units to be skyline yarded	SOP
7		Restrict winter season ground-based operations to slopes less than 35 percent and frozen or snow-covered soil conditions **OR** Log Forward operations over a slash mat, dry soil conditions and slopes less than 35 percent unless reviewed by the Forest Soil Scientist.	Unit 7	SOP, Project Specific
8		To reduce the potential for soil erosion one of the following measures would be applied: 1) Slash would be left on skid trails that have exposed bare mineral soil. Slash would be placed over 65-70 percent of the skid trail to a depth of 2-3 inches in contact with the soil surface. This generally equates to 22-26 tons/acres. Slash would not be placed on units harvested in the winter or over frozen ground.	Units 1A, 6A, 7, 8A, 27A, 62A	Project Specific

Resource Protection Measure	Resource Objective	Description of Resource Protection Measure	Units/Location	Standard Operating Procedure (SOP), Project Specific Measure
		2) These units would be harvested in the winter or with a log forwarder over a slash mat.		
9		Where feasible, slash would be piled and burned where detrimental soil disturbance already exists, such as on old log landings, skid trails, and roads associated with past or current activity.	All units	SOP, Project Specific
10		Where feasible, handpiles would be no more than approximately 6 feet in diameter and 4 feet high.	All units	Project Specific, SOP
11		Where feasible, slash would be left through one winter after cutting to allow for initial decomposition and nutrient leaching. Units adjacent to private land may be piled and burned as soon as possible to reduce fire hazard.	All units	Project Specific, SOP
12	To reduce the potential for soil erosion	Upon completion of maintenance burning or other prescribed fire activities, bare mineral soil would not be exposed on more than 15% of the burn area. Effective ground cover includes vegetation, duff, litter, rock, moss, lichen, and wood.	Units where prescribed fire would be used	Project Specific, SOP
13		For temporary roads and excaline/constructed skid trails, In addition to timber sale contract provisions: 1) Upon construction, the forest floor and top soil would be stockpiled, windrowed, or bermed as feasible 2) Weeds would be treated with herbicide as needed. 3) The trail would be recontoured, scarified, and seeded. Any berms would be pulled back over the prism and large woody material scattered. 4) Slash would be placed over 65-70 percent of the trail to a depth of 2-3 inches and in direct contact with the soil surface. This generally equates to 22-26 tons/acre.	Unit 31A; All temporary roads and constructed skid trails	Project Specific
14	To maintain soil productivity	Down and live standing (for future recruitment) coarse woody debris would be left scattered through the unit, trending towards the maximum levels as identified in the Lolo National Forest Coarse Woody Material Guide. In Unit 7, leave all damaged trees.	Units W1, W2, 7	SOP, Project Specific
15		In Unit W1, the soil scientist, hydrologist, or fisheries biologist would work directly with the thinning crew to identify trees that can be cut outside the RHCA stream buffer. These trees would be left on site and would contribute to soil shading, soil moisture retention, and/or soil temperature moderation.	Unit W1	Project Specific
Weeds				
16	To reduce the potential	Pre-treat existing weed populations on roads, roadsides, obvious two-	Project Area	Project Specific, SOP

Resource Protection Measure	Resource Objective	Description of Resource Protection Measure	Units/Location	Standard Operating Procedure (SOP), Project Specific Measure
	for weed spread.	track roads, potential landings with herbicide prior to ground disturbing activities and prescribed burning that would occur near them. Subject to approval from the District Weed Coordinator, this requirement may be waived if timing of implementation is such that there is no effective spray season (i.e. spring, summer, or fall) prior to winter logging. Where possible, treat weeds at least one growing season prior to activities. This includes roads adjacent to or within prescribed burn units with existing weed populations on them.		
17	To reduce the potential effects of herbicide treatment on native vegetation	To protect native vegetation sites that are located away from the influence of roads, they shall not be broadcast treated with herbicide more than once every five years. Areas of heavy use (such as roads, landings, skid trails, etc.) where the vegetation consists of native and non-invasive, non-natives plants can be treated following the applicable herbicide label in reference to annual application limitations.	Project Area	Project Specific
18	To reduce the potential for weed spread.	Skid trails and landings would be approved prior to use. Where possible, locate landings and skid trails where there are no obvious standing weed infestations.	All units	Project Specific, SOP
19	To reduce the potential for the introduction and spread of weeds	As needed, seed disturbed sites (cuts/fills/running surfaces of roads, landings, skid trails, landing piles following burning, etc), created by project activities, with native seed mixtures or appropriate Lolo seed mixtures. Straw used for road stabilization and erosion control would be certified weed-free or weed seed-free.	Disturbed sites	SOP
20		If gravel or other material is hauled for road surfacing, it would be from a site (pit) that has been previously treated for weeds and is currently weed free.	Roads used for the project	Project Specific, SOP
21		During prescribed burning the duff layer should be near 100 percent water content, at least in the lower half of the duff layer.	Areas to be prescribed burned.	Project Specific
22		All off-road logging and construction equipment would be cleaned of soil and vegetative material prior to entering the project area.	All units	SOP
23		The stockpiled soil from the construction of the gravel storage site would be grass-seeded as soon as possible after site development. After the gravel is removed, the stockpile site would be rehabilitated by replacing the top soil, scattering slash across the site, and grass-seeding.	Gravel stockpile area	Project Specific
Wildlife				
24	To ensure sufficient snag habitat is retained for snag	Lolo National Forest Dead and Down Habitat Components Guidelines (June 1997) and Appendix N of the Lolo National Forest Plan (1996) would be followed in cutting units.	All Units	SOP

Resource Protection Measure	Resource Objective	Description of Resource Protection Measure	Units/Location	Standard Operating Procedure (SOP), Project Specific Measure
25	dependent species.	Unless specified for removal in the silvicultural prescription, snags shall remain within treatment areas. Snags that need to be cut for safety or operational reasons shall remain in the unit to provide coarse wood for wildlife and soils unless they interfere with the safe and efficient conduct of logging.	All Units	SOP
26	To ensure protection of threatened, endangered, and sensitive species.	If any specific wildlife features relating to endangered, threatened, or sensitive species are observed during project activities, the requirements of contract standard provision B6.24, Site-specific Special Protection Measures, would apply.	All Units	SOP
27		Units 11 and 12B would be surveyed for flammulated owls (in late May or June) at least two nights the year harvest is to occur to determine presence. If the units are occupied, harvest of Units 11 and 12B would not occur between 4/1 and 8/15 to enable young owls time to fledge. If prescribed burning occurs in the spring, attempts should be made to burn as early as possible to avoid disturbance to any nesting owls, if present.	Units 11 and 12B	Project Specific
Aquatics				
28	To protect watershed resources by minimizing or eliminating potential sediment delivery to waterbodies.	Tree cutting and ground-based equipment would be prohibited from all RHCA buffers. However, tree cutting and removal would be allowed within ephemeral draw buffers but ground-based equipment would be prohibited. Equipment may cross ephemeral draws at designated crossings. Within W1, no tree cutting would occur within RHCAs. The construction of hand fireline, as necessary, would not be allowed within these buffer areas unless approved by fisheries biologist and/or hydrologist. Any variations from these buffers would need to be approved by a fisheries biologist, hydrologist, or soil scientist prior to implementation. **Channel Type** — **Buffer (feet)** Perennial fish bearing streams — 300 Perennial non-fish bearing streams and wetlands greater than 1 acres — 150 Seasonally flowing or intermittent — 100	All harvest units	SOP

Resource Protection Measure	Resource Objective	Description of Resource Protection Measure	Units/Location	Standard Operating Procedure (SOP), Project Specific Measure
		streams and wetlands less than 1 acre Ephemeral draws 50		
29		Prior to haul activities, surface drainage requirements would be met for roads to be used for haul	All roads used for hauling	SOP
30		Haul would be prohibited on Road 153 between the intersection with Road 7650 and the Clear Creek trailhead.	Road 153	Project Specific

2.3 Monitoring

There are generally three different types of monitoring:

- Implementation monitoring determines whether the project activities were implemented as designed and answers the question, "Did the project do what it said it would?"
- Effectiveness monitoring determines if management practices as designed and executed result in the desired resource conditions and answers the question, "Were the activities effective in achieving the goals?"
- Validation monitoring examines the quality of the data and assumptions used in the analysis process and answers the question, "Were the project assumptions correct?"

Implementation and effectiveness monitoring would be conducted under this project to: (1) determine whether the original objectives of the activities are met; (2) determine the need for additional action; and (3) educate and assist in the design in future projects.

For this project, monitoring would be implemented in accordance with the requirements outlined in the Lolo National Forest Plan. Forest Plan monitoring, done on a sample basis, would also determine the overall effectiveness of the project and effectiveness of the design criteria.

Monitoring of the vegetation treatment activities implemented under contract would occur during and immediately following contract implementation. All preparation and subsequent project-associated operations would be monitored by Forest Service representatives to ensure compliance with specifications.

Water Quality and Fisheries

Implementation and effectiveness monitoring would be completed for road decommissioning and storage activities, culvert removal sites, and riparian habitat conservation area (RHCA) buffers (stream buffers) on a sample basis. The intent of such monitoring would be to ensure protection of water quality and that activities were completed as designed.

Fire, Fuels and Air Quality

Prescribed burning would follow an approved Prescribed Fire Plan, which would define the acceptable range of measurable criteria for environmental conditions and fire behavior. Prior to ignition, fuel moistures and weather conditions would be measured to ensure they are within acceptable limits. During ignition, weather conditions, smoke dispersion, and fire behavior parameters would be monitored to ensure they are within acceptable limits.

Vegetation

A certified Silviculturist would develop or approve silvicultural prescriptions for each vegetation treatment unit and would assure compliance with these prescriptions during sale preparation, contract administration, and post harvest activities. The silviculturist would be

involved in and/or consulted during treatment area boundary layout, tree designation, and contract preparation.

Activities that involve the removal of wood products would be monitored by a qualified Timber Sale Contract Administration team, including a Contracting Officer, Forest Service Representative, Timber Sale Administrator, and/or Harvest Inspector. This team would inspect provisions of the timber sale contract. Specifically for forest vegetation protection, they would monitor snag retention, protection of residual trees, utilization of material meeting merchantability specifications, and retention of down coarse woody material.

Regeneration success in harvested areas would be monitored following standard procedures in Forest Service Handbooks. As necessary, additional treatments would be implemented until stands met certification standards identified in silvicultural prescriptions.

Weeds

Shelterwood harvest units and associated landings would be monitored for the presence of weeds in conjunction with the 1st, 3rd, and 5th year regeneration surveys. Units to be commercially thinned and their associated landings would be monitored for the presence of weeds in conjunction with the post-treatment vegetation monitoring. Other landings would be monitored in conjunction with the roadside weed spraying maintenance schedule. If weeds (other than cheatgrass) are found on skid trails or landings, they would be treated using an appropriate control method as needed.

An adaptive management approach would be used for prescribed burning only treatments to determine weed population response trends. Existing weed populations would be monitored before and after the burning of the first two units. If monitoring indicates a marked increase in weeds, the treatment and other potential contributing factors to the increase would be evaluated. Depending on the conclusions reached, the remaining prescribed burn units could proceed, be dropped, or additional mitigations applied.

2.4 Alternatives Considered but Eliminated From Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Some public comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. Several alternatives were considered, but dismissed from detailed consideration for the reasons summarized below.

Original Proposed Action

The original proposed action was dropped from detailed study because it was modified in response to public comments and preliminary analysis findings by Forest resource specialists. See description of modifications in Chapter 1.

Decommission all roads within the Inventoried Roadless Area

One commenter asked the Agency to consider an alternative that decommissioned all roads within the Clear Creek Inventoried Roadless Area and within Section 31, the cherry-stemmed exclusion area within the IRA, presumably to restore the roadless character.

The Forest Service considered this alternative but dropped it from detailed study because the Lolo Forest Plan designates this area as suitable for timber management. The Lolo Forest Plan (1986) evaluated the Clear Creek IRA for possible wilderness designation. This approximate 5500-acre area ranked low for wilderness characteristics and most of the area was subsequently designated as suitable for development. At that time, approximately 75 percent of the area was leased for oil and gas and several mining claims were located within the IRA. The majority of these leases and claims are still in place. Prior to and after publication of the Lolo Forest Plan, some roads were constructed within the IRA and timber harvest was conducted in some areas. Currently there are approximately 9 miles of road within the Clear Creek IRA.

Following policy, the Forest Service completed a project-specific travel analysis for the Clear Creek project area that identified which roads were needed for future management as outlined by the Forest Plan and which ones were not. Since the IRA is designated as suitable for timber harvest, most existing roads were determined needed for future management.

Approximately 3.3 miles (37 percent) of road within the IRA are proposed for storage and 0.75 miles (8 percent) are proposed for decommissioning. Within Section 31, the cherry-stemmed exclusion within the IRA, the 3.2 miles of road are proposed for either decommissioning (26 percent) or storage (74 percent).

Reconsider fire policy to allow unplanned wildland fires to burn within the project area

One organization asked the Forest Service to consider allowing unplanned wildland fires to burn under specified weather conditions in sensible locations.

Due to the values at risk, existing fuel conditions, and prevailing wind direction, this alternative was dropped from detailed study. Decisions on how to respond to wildfires are made at the time the fires are discovered and sized-up. These decisions are based on site-specific conditions at the time, including but not limited to, location, weather, time of year, and fuel conditions.

The eastern portion of the project area is located within the wildland urban interface (WUI) as identified in the Sanders County Community Fire Protection Plan and in the Lolo National Forest Fire Management Plan. Numerous private residences are located within the project area near the mouth of Clear Creek, and immediately to the north and east of the project area. The project area is also about two miles west of Thompson Falls. Within wildland urban interface areas, the current Forest Plan direction states that the appropriate management

response is to suppress all wildland fires using rapid, aggressive initial attack actions. Thus, a full suppression response in WUI areas is expected into the future.

Outside the WUI, the Wildland Fire Decision Support System (WFDSS) process will provide strategic response to wildfires. The WFDSS is the current analysis process used to develop management actions in response to wildfire. However, due to the values at risk associated with ignitions in the project area and the area's proximity to the community of Thompson Falls, full suppression would be expected on most fires.

Address all deferred or outstanding road maintenance needs/BMP upgrades within the project area

The Clear Creek project area contains approximately 134 miles of roads under Forest Service jurisdiction. About 85 miles of these are system roads and 50 miles are undetermined roads. The Clear Creek project will treat approximately 80 percent of the road miles under Forest Service jurisdiction within the project area with decommissioning, storage, or maintenance (see Table 9).

Table 9: Road Treatment Summary

Road Treatment	Miles	Percent of miles under Forest Service jurisdiction within the project area
Decommission	31	24%
Storage	43	32%
Maintenance	33	25%
TOTAL	107	80%

The remaining 27 miles or 20 percent would be left untreated by this project, although undersized culverts on these roads would be replaced. These roads receive periodic maintenance on a priority basis. Of the roads left untreated by the project, only about 5 miles are open and drivable to public wheeled motorized travel for part of the year. The rest of the roads untreated by the project are closed yearlong to public wheeled motorized travel.

Although Alternative 2 would not address all of the deferred road maintenance needs (the bulk of which is roadside brushing) within the project area, it would treat the majority of the road system and address the highest priority needs (e.g. undersized culverts and additional drainage).

An alternative that completes all deferred road maintenance work within the watershed was considered but dropped from detailed study because the remaining maintenance items not addressed by Alternative 2 are of low priority and would not contribute to the purpose and need of the project. The Forest Service instead proposes to complete road work where other resource benefits (e.g. improved water quality) would be achieved.

CHAPTER 3: ENVIRONMENTAL EFFECTS

This section provides a summary of the environmental effects of the two alternatives, the modified proposed action and no action. It provides the necessary information to determine whether or not to prepare an environmental impact statement. Further analysis and conclusion about the potential effects are available in reports for each resource and other supporting documentation cited in those reports. These documents are contained within the project file, which is available at the Plains/Thompson Falls Ranger District office in Plains, Montana.

3.1 Past, Present and Reasonably Foreseeable Future Actions

Consistent with 36 CFR 220.4(f) and Council on Environmental Quality (CEQ) guidance, the past, present, and reasonably foreseeable future actions were considered for analysis of cumulative effects where appropriate for each resource. Past actions considered in cumulative effects analysis include those that contributed to establishing the baseline conditions of the project area today.

Timber Harvest

Past management actions on National Forest System lands within the project area include timber harvest and related activities. According to Forest Service records, approximately 5400 acres of timber harvest has occurred within the Clear Creek drainage since the 1950s with the majority occurring within the 1960s (45 percent) and 1980s (21 percent). The most recent harvest activity on National Forest System lands within the project area includes:

- Clear Creek Nonsaw: Sale awarded in 2010 and completed in fall 2011. This sale involved commercial firewood (dead lodgepole pine) removal on 18 acres.

- Upper Clear (1992-1998): About 700 acres of timber harvest occurred mostly within the upper portions of Clear Creek, primarily on the south side and head end of the drainage.

- Prospect Blowdown (1987-1991): This sale included the salvage of 5 acres of blowdown material.

District records indicate that all other harvest activity on National Forest System lands occurred prior to 1985. Timber harvest has also occurred in the past on much of the private land within the project area. Stimson Timber Company logged their lands located in Sections 3, 4, and 32 in about 2005. More detailed information is contained within the project file.

Road and Watershed Work

Road work included maintenance of Road 7602 to BMP standards in 2006. In the early 2000s, 4¼ miles of Road 7650 was reconstructed under the Mosquito Helio Timber Sale.

This sale did not harvest trees within the Clear Creek drainage but some of the timber was hauled out through the Clear Creek project area.

In addition, some watershed improvement projects have been completed within the project area. In 2006, several undetermined roads in proximity to Clear Creek and nearby wetlands were decommissioned to mitigate unauthorized motor vehicle used in riparian areas. In 2005, the culvert over Wheatgrass Gulch on Road 153 was replaced with a larger structure. In 1997, segments of Road 153 were reconstructed with additional drainage structures and gravel surfacing applied. Other work included decommissioning of the lower ¼ mile of Road #17049; planting of streamside vegetation; additional road maintenance and riprap placement. Also, in 1997 instream channel restoration and stabilization work was completed in Clear Creek with mixed success.

In fall 2013/spring 2014, realignment work of the Clear Creek road #153 that was proposed in the original Clear Creek EA (2012) was completed. This work included realignment of 4 road segments totally approximately 1200 feet located immediately adjacent to Clear Creek. Work included:

- Creating a vegetated floodplain that separates the road from the creek and planting riparian vegetation.
- Reinforcing streambanks with rootwads, establishing a bankfull bench, and planting riparian vegetation.
- Applying heavy maintenance and gravel surfacing to the Clear Creek Road (#153) where the road is adjacent to Clear Creek.

Ongoing and Reasonably Foreseeable Future Actions

Currently within and outside the project area, there are several reasonably foreseeable future actions, which include:

- Herbicide treatment of weeds along approximately 40 miles of roadsides within the project area is ongoing.

- Outside the project area, but within the Prospect Creek watershed there are two ongoing projects that are implementing similar activities to those in the Clear Creek project.
    - The Shorty Gulch Fuels Reduction project is located approximately 2 miles to the south in Shorty and Foster Gulches. This project is currently ongoing (Environmental Assessment and Decision Notice completed in 2008) and authorizes the treatment of forest fuels on 946 acres through various methods including prescribed burning, non-commercial mechanical treatments, and timber harvest. The active timber sale includes 197 acres of harvest which was completed in July 2014.
    - The Antimony project is ongoing and located approximately 5 miles southwest in the Antimony and Cox Gulch drainages. The project includes approximately 1020 acres of vegetation treatments including prescribed burning, non-commercial mechanical treatments, and timber harvest. In addition, road decommissioning, storage, and maintenance as well as stream restoration work is also authorized.

- Outside the project area on the Kootenai National Forest, the on-going Little Beaver Hazardous Fuels Reduction Project lies approximately three miles to the north of the Clear Creek project area boundary in the Little Beaver and Beaver Creek drainages. Activities include approximately 1128 acres of timber harvest, 679 acres of prescribed burning, and 5.5 miles of new permanent road construction to access vegetation treatment units.

3.2 Vegetation

The north side of Clear Creek, where proposed vegetation treatment areas are located, consists of low to mid elevation ponderosa pine, Douglas-fir, and western larch forests that include mostly warm, dry to moderately dry habitat types. This area also includes moister sites on east and north aspects and in draws. Field surveys indicate that the 1910 and earlier fires which burned most of the Clear Creek drainage, left behind surviving groups and individual large ponderosa pine, Douglas-fir, and western larch trees. Vegetative patterns indicate that the survivor trees may have been more open grown, which allowed them to withstand such a large natural disturbance event. Currently, tree densities are higher than what would have historically occurred on these sites. In the event of a wildfire, these areas would likely experience a uniformly higher stand level tree mortality than what was experienced in the past in this area.

In addition, comparison of aerial photographs from the 1940s and today show there has been a noticeable reduction in the amount of ponderosa pine cover types on these warm, dry sites. Some of this reduction is likely attributed to timber harvest in the 1950s and 1960s that targeted this species for removal. Loss of ponderosa pine is also due to ongoing mortality from insects. High stand densities increase the risk of bark beetle-induced tree mortality (Hagle et al. 2000).

Root disease has also become more prevalent in some areas due to the increase in stand density and Douglas-fir composition. Without fire or other disturbance to control species composition and density, root disease pockets become larger as trees become more susceptible from decreased vigor and overstocking, the trees die, and the disease centers regenerate to dense stocking of host species, continuing the cycle.

Alternative 1: Direct and Indirect Effects (Vegetation Report, pages 16-17)

There would be no direct effects of Alternative 1 because no activities would occur. However, this alternative would not contribute to the restoration of the vegetative conditions that more accurately reflect historic conditions which would increase the area's ecological resiliency to uncharacteristically large and intense disturbances. Alternative 1 would not provide a reduction of bark beetle infestation risk of host trees. There could be a continuing loss of the few surviving remnant old trees scattered within the project area from bark beetle predation. Alternative 1 would maintain or increase the higher than normal levels of root disease and the perpetual regeneration of susceptible species that will die prematurely. Root disease centers would remain in early successional stages and mature trees may never

develop (Gibson 1996). If and when large wildfires occur in the project area, it is reasonable to expect fire severity levels would be elevated; that is, many stands that developed with low-severity fires would experience mixed and high severity fires and stands that developed with mixed severity fire would experience high severity fire.

Alternative 1: Cumulative Effects

Cumulatively, No Action would allow current vegetative conditions to continue the trend toward a more homogenous, closed canopy mature forest until the area is affected by large-scale disturbance, like fire. Increased stand densities on dry sites would continue to contribute to a decline in tree vigor and resilience to insects and disease. The mountain pine beetle populations and observed predation of host ponderosa pine trees could continue in a worsening outbreak leading to a further loss of species diversity. The combination of homogeneous closed canopy forests and ongoing tree mortality would increase the risk of large-scale, high intensity wildfire.

Alternative 2: Direct and Indirect Effects

Old Growth (Vegetation report, page 18)
Alternative 2 would have no direct, indirect, or cumulative effects on old growth. No activities are proposed within existing old growth (as defined in Green et al. 1992, errata corrected 2005) or Forest Plan Management Area 21 (which are areas allocated in the Forest Plan to provide for old growth forest succession). Field reviews concluded that none of the areas proposed for treatment meet minimum old growth characteristics (Green et al. 1992, 2005). Although some remnant old trees are present, they occur randomly at densities of less than two trees per acre, in small groups (less than 1/10th acre) or as individual trees. Alternative 2 would retain these remnant old trees.

Proposed vegetation treatment activities would promote growth of remaining trees, but old growth criteria, primarily age, would not be achieved for decades due to the influence of fires in the late 1800s and in 1910.

Although no activities are proposed within existing old growth, the following discussion has been added to this updated EA to respond to comments on the original EA published in 2012. The Lolo National Forest is currently meeting the Forest Plan strategy for old growth at the forest-wide scale, and appears to have abundance sufficient to continue meet the strategy in the event of disturbance such as fire or pathogens.

The Lolo National Forest uses the Region 1 old-growth forest type characteristics (Green et al 1992, 2005) to identify and allocate old-growth, in addition to or in substitution of old-growth stands previously allocated (Management Area 21) in the Forest Plan (USDA Forest Service 1986). The current approach of inventory, analysis, and tracking of old-growth stands during landscape-scale Ecosystem Management Area (EMA) analysis was adopted by the Lolo Forest Supervisor's letter dated 4/29/94 (2070/1950). The policy provides for implementation of an old-growth strategy within the Lolo Forest Plan to conserve biological diversity, including old-growth associated species; retain at least 8 percent of the Forest land in old-growth reserves; manage landscapes using ecological principles; and prescribe treatments that consider the range of natural variation, age class distribution, and natural

processes. Ecosystem Management Areas have served as the analysis area for making old-growth allocations.

A Forest-wide old-growth analysis using Forest Inventory and Analysis (FIA) data (Bush et al. 2007) shows the Lolo National Forest continues to meet the old-growth strategy of the Forest Plan. The estimated percentage of old-growth (using the more restrictive definition provided by Green et al. 1992, 2005) on all forested lands on the Lolo National Forest is 9.6 percent (FIA 2006, with a 90 percent confidence interval of 7.7 to 11.5 percent), which is in accordance with the 8 percent strategy (Lolo Forest Plan EIS, page II-61). Using the Lolo Forest Plan definition of old-growth (page VII-24 and 25), the FIA inventory data indicates that at least 14.4 percent of the Lolo National Forest forestlands are old-growth (i.e., old forest stands as represented by large size and over 160 years old).

A previous landscape scale analysis identified existing and recruitment old-growth stands (based on criteria from Green et al. 1992, 2005) for the Prospect watershed. The analysis identified at least 8 percent of the forested lands to be recommended for designation as Management Area 21 at the time of the next Forest Plan revision. "Those stands that meet Region 1 old [growth] criteria are identified as well as those having the potential to meet" (Prospect NFMA analysis, Old Growth Letter, 1998). These stands either meet the R-1 Old Growth Criteria (Green, et al. 1992, 2005) or were considered recruitment stands. Clear Creek is a sub-drainage within the Prospect watershed.

Within the smaller area of the Clear Creek analysis, there are no areas allocated to Management Area 21 under the 1986 Forest Plan or subsequent amendments. During the 1986 Forest Plan development and through subsequent watershed analyses, individual stands were designated to be managed for old growth and categorized as replacement old growth stands or retained old growth stands. The retained old growth stands were further classified as existing old growth or potential old growth (expected to meet Region 1 old growth definition within 2 decades). Currently within the Clear Creek project area, there are no stands classified as replacement old growth. However, 348 acres are classified as existing old growth, and 633 acres are classified as potential old growth. It must be noted that large portions of the Clear Creek drainage and the larger Prospect watershed burned in wildfires in the late 1800s and early 1900s, which limits the amount of existing or potential old growth within these areas today.

Meeting the Vegetative Purpose & Need (Vegetation report, pages 17-19)
Alternative 2 would use a combination of prescribed burning and mechanical treatments on approximately 2096 acres to lower stand densities and favor fire and disease-resistant tree species, which would reduce forest fuels, improve forest health, and reduce risk of insect predation. The scientific basis for restoration treatments is summarized in Appendix E.

Reducing stand densities would reverse the current trend of moving toward a more homogeneous closed canopy forest on about 26 percent of the warm, dry forest types within the project area which would increase the likelihood of supporting low and mixed-severity wildfires and decrease the likelihood of supporting high-severity wildfires within treated areas. Modeling suggests that the predicted wildfire-induced tree mortality following

implementation of Alternative 2 would range from 5-13 percent basal area mortality as opposed to nearly 100 percent predicted mortality in Alternative 1. Treatments would reduce crown continuity to limit crown fire spread, reduce understory and mid-story conifers that act as ladder fuels capable of carrying surface fires into the crowns, and reduce ground fuel accumulations to reduce the heat intensity on the tree boles and roots. All treatments would retain the larger fire-tolerant trees and fire-tolerant trees species (e.g. western larch and ponderosa pine). The average tree diameter would increase within treated areas as well as the proportion of ponderosa pine and western larch trees.

Improved tree health and vigor and reduced moisture stress provided by the resultant lower stand densities would also reduce the hazard of western and mountain pine beetle-caused mortality in the ponderosa pine (Hagle et al. 2000; Lockman 2010) and Douglas-fir beetle-caused mortality in Douglas-fir (Kegley 2004; Lockman 2010).

Shelterwood harvest followed by prescribed burning and planting of tree seedlings is proposed on approximately 247 acres to improve forest health where root disease is causing mortality in the Douglas-fir. These treatments would establish root disease-resistant tree species (i.e. western larch, western white pine, and ponderosa pine), which would limit long-term accumulation of surface fuels and restore mature forests over time. Although these areas would appear as forest openings following treatment, they would not be devoid of trees. Instead, they would contain scattered residual trees occurring as individuals and in patches. These areas would appear as openings until new trees grow and fill the site. Tree regeneration has been successful in the Clear Creek area in the past. Previously harvested areas are currently certified as meeting Regional stocking standards.

Alternative 2: Cumulative Effects

There are no reasonably foreseeable vegetation management actions within the project area. When collectively evaluated with past actions, Alternative 2 would incrementally increase the forest resilience to disturbance processes (fire, insects, disease, etc.) on the drier habitat types by favoring long-lived fire and disease-tolerant seral species at more historic levels.

3.3 Fire and Fuels

Effects Common to All Alternatives

According to the current Lolo National Forest Fire Management Plan (2014), the appropriate management response to unplanned ignitions in this area is a rapid, aggressive initial attack to protect improvements, facilities, and the infrastructure and suppress the wildfire spread in and around those areas commensurate with the values at risk (Lolo FMP, page 55). The Wildland Fire Decision Support System (WFDSS) process would provide a strategic response for a long-duration wildfire event.

Although unplanned ignitions would likely continue to be suppressed within the Clear Creek project area because of the values at risk and prevailing wind direction, wildfires would still likely occur as evidenced by the unplanned ignitions that burn on the Lolo National Forest every year. Last year (2013), wildfires burned approximately 20,000 acres within and

adjacent to the Lolo National Forest despite suppression efforts (http:nciweb.nwcg.gov). Thus, wildland fire will continue to serve as a natural disturbance factor within the Clear Creek area. Forest vegetation will continue to produce new growth on a yearly basis. This biomass will continue to accumulate unless active management is used to reduce the fuel or wildfire is allowed to consume the fuel.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would provide for the existing conditions and trends to continue without prescribed vegetation treatments. If full suppression continues as the primary response to wildland fire, the project area forests would continue to mature and increase in density. This could lead to more extensive mixed and stand-replacing fires under normal summer conditions. Initial attack of a wildland fire (line construction, holding, and mop-up) would become more difficult when heavy fuel loadings are encountered and aerial fuels become involved with fire.

Alternative 2: Direct and Indirect

Proposed vegetation treatments are designed to reduce the risk of developing a stand-replacing crown fire on site or the continuation of a crown fire from an off-site source as well as increasing the effectiveness of aerially delivered fire retardant and ground suppression forces. The reduction of surface and ladder fuels along with separation of tree crowns would decrease the risk of crown fire and increase the safety and efficiency of firefighting resources working to contain a wildland fire. Proposed treatments are also designed to retain a mature, fire-resilient forest overstory.

Commercial Thinning Followed by Prescribed Burning

Alternative 2 proposes commercial thinning followed by prescribed burning on approximately 904 acres. Under normal summer conditions, fuel modeling[5] indicates that this treatment would effectively modify fire behavior and reduce the intensity of a potential wildfire under normal summer conditions because these treatments would:

- increase the probability that wildfire flame lengths would be less than four feet (the maximum flame length where direct attack suppression forces may be effective)
- increase canopy base height, which is the lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate a fire vertically into the canopy (the higher the canopy base height, the more difficult it is to initiate a crown fire)
- increase the crowning index, which is the 20-foot wind speed needed to support an active or running crown fire (a higher crowning index means that higher wind speeds are needed to initiate and maintain a crown fire)
- change the potential wildfire type from a crown fire to a surface fire that burns the surface fuel layer which lies immediately above the ground fuels but below the tree canopy.

[5] The Fire and Fuels Extension (FFE) to the Forest Vegetation Simulator (FVS) model was used to evaluate the existing condition and proposed fuel treatments. Limitations of the model are discussed in the Fuel report (page 8), contained within the project file.

Within proposed commercial thinning units, the tops of trees would be removed with the trees cut, which would minimize the amount of slash on the ground and the potential fire hazard within the treatment units. Fuel modeling results are supported by research that found thinning followed by prescribed burning effective at altering fire behavior to reduce fire severity (Graham et al. 1999, Peterson et al. 2005)

Shelterwood Harvest Followed by Prescribed Burning

Shelterwood harvest is proposed on approximately 247 acres to improve forest health where root disease is causing mortality in the Douglas-fir. These treatments also would effectively moderate fire behavior by reducing surface and ladder fuels. Fuel modeling indicates similar benefits as described above for the commercial thinning treatments. However, wind speed within these treated areas would likely increase because of the more open nature of the resulting stands. Wind is an important and highly variable factor in fire behavior. Scientific literature and experience show that exposed areas may receive more wind. Because surface fuels are drier due to exposure to heat and wind, and wind speed is increased in open stands, it is critical that surface fuels be treated to minimize fire intensity (Graham et al. 1999; Agee and Skinner 2005; Graham et al. 2004; Peterson et al. 2005). Prescribed burning would be conducted following harvest activities to reduce surface fuels (natural and harvest-related).

Prescribed Burning

Prescribed burning alone, proposed on approximately 679 acres, would also reduce surface and ladder fuels and improve the fire-resiliency of the forest overstory. Fuel modeling also indicates this treatment would improve fire behavior including reduced flame lengths and increased canopy base height and crowning index.

Non-commercial Thinning

Alternative 2 includes approximately 68 acres of non-commercial thinning. This type of treatment would reduce ladder fuels, increase tree crown spacing, and create more open conditions in the warm, dry forest types that could be maintained by fire in the future.

There could be an increase in fire hazard during the time between initial treatment (cutting activities) and the treatment of activity-generated slash through prescribed burning (typically no longer than three years). Once surface fuels are treated, this potential temporary increase in fire hazard would be neutralized.

The duration of effectiveness of proposed treatments is estimated to be about 20 years. Future treatments would be necessary to maintain the reduced fuel conditions that would be achieved by Alternative 2. While it is unknown at this time as to what those future treatments might be, prescribed fire could potentially be used for periodic maintenance.

Alternative 2: Cumulative Effects

Past disturbances within the project area including timber harvest, prescribed fire, and naturally occurring fire have shaped the current fuel conditions. These disturbances have created an array of forest structures with various age classes and species compositions within affected areas. Fire suppression has also played a role.

Although past timber harvest and associated fuel treatments fragmented the fuel continuity on the north side of Clear Creek at the time, several decades have passed such that the effectiveness has been mostly neutralized. One exception is the regeneration timber harvest completed on approximately 100 acres of Stimson Timber Company land in about 2005, which substantially reduced forest fuels within the cutting areas. The proposed vegetation treatments would also reduce fuels and break up the canopy continuity in treated areas.

3.4 Air Quality

Alternative 1: Direct, Indirect, and Cumulative Effects

In the short term, the air quality impacts from Alternative 1 would be less than Alternative 2 because no activities would occur. However, in the long-term, Alternative 1 would not allow the opportunity to reduce the severity of potential wildfires within the treatment areas.

Wildfire has the potential to result in extensive smoke and particulate matter, more so than the prescribed burning proposed in this project because wildfire typically burns during hot, dry periods consuming more vegetative material and is of longer duration. In addition, wildfire has the potential to result in extensive smoke and air quality impacts from $PM_{2.5}$ and PM_{10} emissions. In fact, emissions from wildfire are typically twice those of a prescribed fire on the same acreage due to greater emission factor, fuel consumption, and fire intensity. Emissions from a wildfire would also occur over a period of a few days to several weeks as opposed to intermittent days over several years for a prescribed fire project.

If a wildfire occurred, there is a potential for the NAAQS to be exceeded depending on the size and during of the wildfire. If a large wildfire were to occur, the Forest Service and the State of Montana Air Quality Bureau could, depending on the specific situation, restrict all regulated burning. However, effects of smoke from a large wildfire could become cumulative with present and foreseeable activities or combined with unregulated pollutants in the area, such as dust from roads.

Alternative 2: Direct, Indirect, and Cumulative Effects

Smoke from prescribed burning contains particulate matter that would temporarily decrease air quality within and downwind of burn units. In this area, prevailing winds tend to disperse smoke to the northeast. During the smoldering phase of the burns, smoke may pool or settle into the Clark Fork River valley until it is scoured by thermal heating or gradient winds. The sensitive areas within the project area would be the nearby private residences. The community of Thompson Falls, which is identified as a non-attainment area[6] for particulate matter less than 10 microns in diameter (PM_{10}), is located about 4 miles to the east-southeast of the nearest burn unit, outside of the prevailing wind direction.

Under Alternative 2, prescribed burning would occur on approximately 1830 acres. In addition, piles of slash generated from vegetation treatments would also be burned. Most of the prescribed burning would occur in the spring, but some of the burning could occur in the

[6] A non-attainment area is an area that fails meet a particular National Ambient Air Quality Standard.

fall under favorable burning and smoke dispersion conditions. These burning treatments would be accomplished over multiple days and over several years because appropriate burning time periods are limited due to weather, ventilation conditions, and fuel moisture conditions.

Overall, smoke impacts would be temporary and minimized through daily monitoring of airshed conditions. The Thompson Falls non-attainment area is not expected to be impacted because prevailing winds would typically blow the smoke to the north of town. The State of Montana has implemented a certified smoke management system, which is administered through the Montana/Idaho Airshed Group. As a member of the Airshed Group, the Forest Service submits burn requests to the Smoke Monitoring Unit, which coordinates and approves prescribed burning activities in a manner designed to meet ambient air quality standards. In addition, all prescribed burns would be actively monitored visually. If any prescribed burn appears to be generating too much smoke, measures would be taken to shut down burning operations. If any prescribed burn appears to be generating nuisance smoke for days after ignition is complete, those areas may be extinguished. Alternative 2 would meet Federal and State air quality standards for particulate matter.

Prescribed burning could cause some localized reduced visibility from the smoke. By burning under good to excellent ventilation conditions as required, smoke plumes should quickly disperse to insignificant visibility impact levels.

Other prescribed burning on other federal, state, and private lands within the affected airshed that may occur at the same time as burning activities for this project would be monitored cumulatively on a daily basis and would contribute to the local Smoke Monitoring Unit's decision to approve a prescribed burn request on a given day.

3.5 Weeds

Currently, weed populations are present throughout most of the drainage and consist mainly of spotted knapweed, St. Johnswort, and oxeye daisy with lesser components of cheatgrass, meadow hawkweed, sulfur cinquefoil, common tansy, and common mullein. The highest concentrations of weeds are in close proximity to roads, including drivable roads and those that have grown in with vegetation. Small (1/10th acre) to medium (1-2 acre) size populations of weeds are present in forest openings in close proximity (within 500 feet) of these roads. Individual plants or small groups are scattered throughout the project area.

Weeds are capable of invading intact native plant communities and out-competing native plants for nutrients, water, and growing space. Over time, weeds can replace much of the native understory vegetation (grass and forbs) leading to departures from the current structure and function. Many habitat types within the project area (dry Douglas-fir with grass or forb understories) are vulnerable to weed colonization when the forest canopy or soil is disturbed.

Alternative 1: Direct, Indirect, and Cumulative Effects

No ground disturbing activities would occur on National Forest System lands in Alternative 1. Thus, there would be no direct effect on weed establishment and spread. With the already authorized roadside herbicide treatment ongoing along approximately 40 miles of roadway, existing weeds would be reduced along drivable roads within the project area at least for a few years following the treatment. Without follow-up treatments the amount of weeds and weed species currently within the project area would be expected to increase. Weed expansion would likely occur very gradually except in the case of a severe wildfire, which would likely accelerate weed spread.

Alternative 2: Direct, Indirect, and Cumulative Effects

Proposed project activities that disturb the soil and/or create openings in the forest canopy would increase the potential for weed establishment and spread. Based on these factors and the existing forest type, most of the proposed vegetation treatment units have a moderate to high weed risk. Weeds are currently located within and/or adjacent to all proposed treatment areas. The originally proposed treatment areas that had the highest risk to weed establishment and spread were dropped from the project (see Chapter 2). The proposed treatments that have a high weed risk are prescribed burning (679 acres) and shelterwood harvest followed by prescribed burning (247 acres). Proposed commercial thin treatment areas (904 acres) have a moderate weed risk. In addition, proposed road work including maintenance, decommissioning, storage, and construction that disturbs soil and/or removes competing vegetation has the potential to contribute to the establishment and spread of weeds. However, Alternative 2 would treat existing weeds on roads with herbicide prior to project activities to reduce existing weed populations and their spread. In addition to the approximate 40 miles of roadside weed treatment that is already authorized, Alternative 2 would treat another 15 miles of existing roadway. Also, all proposed new temporary and long-term specified roads would be treated as needed. Weed treatments would minimize the potential for weed spread into areas that would be harvested and/or prescribed burned.

To further reduce the risk of weed spread, equipment that may operate off-road would be cleaned prior to use, areas of disturbed soil would be grass seeded and, where possible, landings and skid trails would be located where there are no obvious standing weed infestations. Prescribed burning would occur when the duff layer in the soil has a high moisture content. Burning when soil moisture is higher would minimize mortality of existing vegetation allowing it to retain occupancy which would limit weed colonization. Higher soil moisture would also limit duff consumption (and the risk of exposing bare soil) from burning which would reduce the potential for weed establishment. Weed resource protection measures listed in Table 8 (see Chapter 2) are incorporated into Alternative 2 to minimize the potential for weed spread. Monitoring would be conducted within vegetation treatment units (particularly in landing areas and skid trails where more ground disturbance occurs) to determine presence of weeds following project activities (see Monitoring Section in Chapter 2). If weeds are identified, they would be treated as needed.

In addition, an adaptive management approach would be used for the prescribed burn only treatment units to determine weed population response trends. Existing weed populations

would be monitored before and after the burning of the first two units. If monitoring indicates a marked increase in weeds, the treatment and other potential contributing factors to the increase would be evaluated. Depending on the conclusions reached, the remaining prescribed burn units could proceed, be dropped, or additional mitigations applied.

Cumulative Effects Common to All Alternatives

Past soil disturbing activities and natural events on private and National Forest System lands have inadvertently helped spread weeds into and within the project area. The majority of weed spread will likely continue along roadsides and animal trails where seeds are introduced by human and wildlife activity. On National Forest System lands, currently authorized herbicide treatment along approximately 40 miles of existing drivable road is ongoing and will reduce existing weed populations along roadways. Areas that have been already sprayed (about 19 miles of roadside) show a noticeable improvement in the reduction of weeds. Future treatments would be necessary to maintain reduced weed populations particularly along open, drivable roads. Besides ongoing weed spraying, there are no other scheduled reasonably foreseeable future actions within the project area. Current public use of the area (e.g. recreation, pleasure driving, hunting, firewood cutting) is expected to remain at existing levels.

3.6 Threatened, Endangered, and Sensitive[7] Plants

Effects Common to All Alternatives

All alternatives would have no effect on any federally listed Endangered or Threatened plants because no habitat for them occurs in or near the project area (Botany report, page 2).

Vectors such as vehicle traffic and wildlife would continue to spread invasive plants into and within the project area. Potential habitat for some sensitive plant species would be reduced as invasive plants become more widespread, but the viability of these species would not be adversely affected because potential habitat would remain in the project area.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effects on sensitive plant species or their habitat, because no activities would occur. Indirect and cumulative effects are described above under the Effects Common to All Alternatives.

Alternative 2: Direct, Indirect, and Cumulative Effects

Botanical surveys were conducted and three sensitive plant species were identified within proposed vegetation treatment areas: hill monkeyflower (*Mimulus clivicola*), western pearlflower (*Heterocodon rariflorum*), and whitebark pine (*Pinus albicaulus*). The project area also contains potential habitat for several other sensitive plant species: tapertip onion (*Allium acuminatum*); diamond clarkia (*Clarkia rhomboidea*); clustered lady's slipper (*Cypripedium fasciculatum*); and stream orchid (*Epipactis gigantean*).

[7] Forest Service sensitive plant species, identified by the Regional Forester, are species for which population viability is a concern.

Hill monkeyflower
An estimated 11,000 hill monkeyflower plants were mapped within the project area in southerly aspects on moderately steep slopes below 4100 feet in elevation. The plants are concentrated on bare soil patches associated with wildlife trails, gradual downslope soil movement, and overturned tree rootwads. These micro-habitats are also vulnerable to invasive weed establishment, thus none of the hill monkeyflower populations in the project area are weed-free.

Hill monkeyflower is likely adapted to periodic fire, since it occurs in dry forest habitats that historically burned on average about every 20-25 years (Pfister et al. 1977). Historic fires may have helped maintain the open forest canopy and bare soil patches that characterize hill monkeyflower locations. However, historic post-fire conditions are, in many respects, no longer pertinent because modern habitat conditions have changed with the arrival of highly competitive non-native weeds. To avoid exacerbating weed spread in hill monkeyflower populations which could diminish seed production for these sensitive plants and lead to population declines, approximately 519 acres of originally proposed prescribed burning was deleted from the project. Approximately 70 percent of the known hill monkeyflower plants are located within these dropped acres. In addition, the two populations located within harvest units 15B and 28 would be buffered from logging activity and temporary road construction (see Resource Protection Measure #3 in Table 8) to maintain existing tree cover and prevent heavy soil disturbance that could promote weeds. Although Alternative 2 may affect individual plants or habitat, it would not result in a trend toward federal listing or loss of species viability because the areas containing the vast majority of known plants would be avoided (Botany report, pages 5 and 9).

Cumulative Effects

Hill monkeyflower populations in the project area were likely affected by past road construction and timber harvest. The direct effects of these activities were probably not detrimental to hill monkeyflower in the long-term because the species commonly colonizes disturbed soils. Indirectly, invasive weed spread could have detrimentally affected some hill monkeyflower populations, but the extent is unknown. Although interestingly, the largest population in the project area has persisted in the presence of moderate to heavy infestations of weeds that include spotted knapweed and St. Johnswort. So perhaps, hill monkeyflower can co-exist with these invasive weeds. In June 2011, approximately 50-100 hill monkeyflower plants were inadvertently killed during roadside herbicide spraying because their presence was unknown at the time. This loss represents less than 1 percent of the known hill monkeyflower plants within the project area which would not measurably affect the population.

Western pearlflower
Approximately 21,000 western pearlflower plants were identified on about 10 acres within the project area. This is the largest population found in intact native habitat in Montana. Similar to hill monkeyflower, western pearlflower occurs in habitats that are prone to invasive weed establishment and weeds are currently present. No activities would occur where these plants are located because the originally proposed prescribed burning treatments

in this area were deleted. Thus, Alternative 2 would have no direct, indirect, or cumulative effects on this species (Botany report, pages 6 and 9).

Whitebark pine

Surveys indicate that whitebark pine trees are located along the ridges at the head end of the Clear Creek drainage, including the western end of prescribed burn Unit 84 at elevations above 5700 feet. Unit 84 is at the eastern edge of a large whitebark pine population that occupies several ridges radiating out from Clear Peak. Whitebark pine is adapted to periodic fire. Fire can benefit this species by killing competing vegetation and creating bare ground areas that are favorable to whitebark pine seedling establishment. However, it can also kill whitebark pine trees. In order to achieve project objectives and protect the whitebark pine trees to the west of Unit 84, prescribed burning would be implemented when these whitebark pine locations are snow-covered or retain adequate fuel moisture to withstand burning (Resource Protection Measure #4 in Table 8). Because whitebark pine trees would be protected during prescribed burning of Unit 84, Alternative 2 would have no direct, indirect, or cumulative effects on this species (Botany report, pages 6 and 9).

Diamond clarkia and Tapertip onion

Habitat for common clarkia and tapertip onion exist within most of the proposed prescribed burn units and in the drier timber harvest units. Both of these species occur in relatively dry, open montane forests and are thought to be adapted to periodic fire since they occur in habitats that historically burned on average, every 20-25 years (Pfister et al. 1977). Monitoring indicates that these species have persisted after thinning and/or burning activities. These types of activities could potentially lead to increased weed spread which would reduce the quality of the habitat for common clarkia and tapertip onion. However, resource protection measures 16-23 in Table 8 would minimize this risk and thus the project would not lead to the loss of species viability (Botany report, pages 7 and 9).

Clustered lady's slipper

Potential habitat for clustered lady's slipper is common in the eastern portion of the project area and is occasional in the remainder of the project area. Timber harvest and/or prescribed burning that reduces the mature canopy cover to less than 40 percent, especially on drier south to west aspects, would reduce the amount of potential clustered lady's slipper habitat within the project area. Monitoring indicates that clustered lady's slipper plant numbers decline if too much canopy cover is removed – presumably because more sun and wind reaching the forest floor results in an understory environment that is too dry for the species. Over time, such sites redevelop adequate tree canopy cover and once again become favorable habitat for clustered lady's slipper. Since most of the Clear Creek vegetation treatment units that contain potential habitat for this species would retain a minimum of approximately 50 percent of the tree cover after implementation, most of this habitat would remain intact. On the approximate 247 acres where tree canopy cover would likely be reduced below 40 percent, potential habitat would temporarily be rendered unsuitable until adequate tree cover redevelops. Because the Plains/Thompson Falls Ranger District contains thousands of acres of potential habitat for this species, a temporary loss or reduction in quality of a small amount of potential habitat in the project area would not lead to a loss of species viability or contribute to a trend toward Federal listing (Botany report, pages 7 and 9).

Stream orchid
Potential habitat for stream orchid is perennial wetland habitats, seeps, and springs. Most potential habitat for stream orchid in the project area would be protected within riparian no-activity buffer zones and thus would remain unaffected by project activities. Most of the proposed instream work would occur where the stream goes dry during most of the year which is not suitable habitat for the stream orchid. However, where the creek flows year-round, potential habitat could be altered. Considering this species is documented at locations where light to moderate disturbance has occurred (Rocchio et al. 2006), project disturbance would not reduce its potential habitat within the project area. In fact, the proposed riparian habitat enhancement along Clear Creek could improve long-term habitat quality for stream orchid (Botany report, page 8).

Cumulative Effects

The project would have no cumulative effects on populations of tapertip onion, diamond clarkia, clustered lady's slipper, or stream orchid because none occur in the project area. However, potential habitat for these species has been affected by past and ongoing activities. Soil disturbance associated with past construction of roads, skid trails, and log landings would have removed small, scattered areas of potential habitat. The quality of hundreds of acres of potential habitat for these species within the project area has been reduced by invasive weed spread caused by natural and human-related disturbances. Past and ongoing herbicide spraying of drivable roads have reduced weed populations in portions of the project area. Potential habitat for all of these sensitive species remains common in the project area and elsewhere on the Plains/Thompson Falls Ranger District; therefore the reduction in quality of potential habitat due to weeds has not caused adverse cumulative effects for any of these species (Botany report, page 8).

3.7 Hydrology

Clear Creek flows into Prospect Creek, which in turn flows into the Clark Fork River below the dam at Thompson Falls. Clear Creek and Prospect Creek are listed by the State as water quality impaired due to sediment and alteration of streamside vegetation. Within Clear Creek, the sediment impairment is from coarse[8] sediment primarily due to bank erosion (TMDL Plan, page 55). The Montana Department of Environmental Quality (DEQ) developed a Total Maximum Daily Load (TMDL[9]) Plan for Sediment (2009) in Prospect Creek. This document outlines plans to restore water quality within the above named streams.

Approximately 5 miles of the middle section of mainstem Clear Creek is intermittent, as are several of its tributaries. These stream segments typically only flow for about two months during spring runoff. This intermittency appears to be a natural phenomenon attributed to terrain morphology.

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[8] Coarse sediment is generally defined as particles greater than ¼ inch in diameter.
[9] A TMDL is the maximum amount of a particular pollutant that a water body can assimilate without causing applicable water quality standards to be exceeded.

The Prospect TMDL Plan (2009) estimated the annual sediment delivery within Clear Creek to be approximately 6436 tons. Approximately 70 percent of the estimated annual sediment load (including both fine and coarse sediment) is attributed to natural hillslope and streambank erosion. Forest roads and human-influenced streambank erosion account for 0.5 and 30 percent, respectively, of the estimated total annual sediment load (Hydrology report, page 26). The location of forest roads in close proximity to streams (e.g. Clear Creek road #153) and historic timber harvest in the valley bottom have contributed to human-influenced streambank erosion. To address these issues, the Prospect TMDL Plan recommends application of road BMPs, instream rehabilitation work, riparian planting, and weed treatment, which are all proposed in Alternative 2.

Several studies indicate the majority of the road-related fine sediment introduced to streams comes from small definable areas that make up a relatively small percentage of the road network (Luce and Black 1999; Woods et al. 2006; Croke and Hairsine 2006; MacDonald and Coe 2008, NCASI 2012). They also identified that road segments at stream crossings and road segments located close to streams are generally responsible for the highest contribution of fine sediment from the road system (NASCI 2012, Woods et al. 2006, MacDonald and Coe 2008, Coe 2006). These findings suggest that addressing these contributing sources can substantially reduce road-related sediment delivery.

In fall 2013/spring 2014, four segments of the Clear Creek Road #153, totaling approximately 1200 feet immediately adjacent to Clear Creek, were realigned to elevate and move the road further from the creek and a vegetated floodplain was created to separate the two. As part of this project, approximately 1.1 miles of road was gravel surfaced. As indicated above, these actions will substantially reduce sediment delivery from the road and bank erosion. Additional BMPs to improve road drainage and minimize erosion are proposed as part of the Clear Creek project.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would maintain the existing conditions and not make progress toward water quality restoration goals. The existing road system would continue to contribute various quantities of fine sediment to project area streams and unstable stream banks would continue to erode. Water yields in the project area would remain fairly low, unless affected by large-scale wildfire (Hydrology Report, page 29).

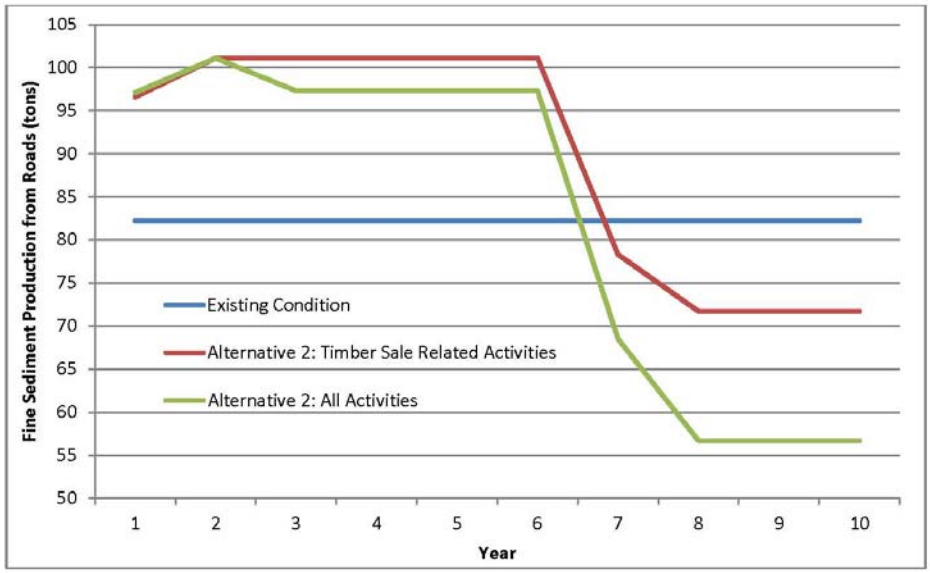
Alternative 2: Direct and Indirect Effects

Alternative 2 would improve water quality over existing conditions in the long term due to reduced fine sediment yields resulting from road improvements, storage, and/or decommissioning. In addition, watershed rehabilitation work would reduce streambank erosion (coarse and fine sediment yields) and improve floodplain health and overall stream function.

Although sediment-generating activities would typically occur during the time of year when the middle reach of Clear Creek and several of its tributaries are dry, road use, maintenance, storage, and decommissioning activities near streams would result in a short-term increase in

fine sediment when water does flow in the late spring/early summer. However, over the long term (10 years) these activities (road maintenance, storage, decommissioning) would reduce fine sediment delivery to area streams below existing conditions (see Figure 4). Maintenance activities would apply Best Management Practices (BMPs) to improve drainage and reduce surface erosion. Physical storage and decommissioning treatments would reduce sedimentation and surface erosion and improve water infiltration by removing culverts on stream crossings, and scarifying and revegetating the road surface. Approximately 2 and 6 miles of road within 100 and 300 feet of streams, respectively, would be taken out of service through decommissioning or storage. Modeled short-term fine sediment increases are relatively small in comparison to the modeled existing conditions within the project area and would essentially be a one-time occurrence. The predicted long-term sediment reductions below existing sediment levels would persist for some time. Design criteria and application of Best Management Practices would ensure that water quality standards are maintained.

Figure 4: Modeled fine sediment load from roads, by year, in the Clear Creek watershed. Project implementation begins Year 1



Sediment modeling indicates that increased traffic and log truck use on existing roads, particularly those in close proximity to streams, during project implementation would yield a modest, short-term (less than 5 years) increase in fine sediment loading compared to current sediment delivery from existing roads. However, prior to use, roads would be improved to Best Management Practice standards to minimize the potential for sediment delivery in both the short and long-term (10 years). Numerous studies support the effectiveness of road BMPs to reduce soil erosion and delivery of road-related sediment to streams (NCSAI 2012).

In spring 2014, approximately 1.1 miles of the Clear Creek road #153 located in close proximity to Clear Creek were gravel surfaced to an average depth of 8 inches. Studies indicate application of gravel surfacing to a depth of 6-8 inches reduces erosion from unpaved road surfaces by 70-96 percent (Coe 2006, USEPA 2005; Burroughs and King 1985 & 1989; Swift 1984). Thus, this action will reduce existing sediment yield from the road in

the long-term and mitigate for project-related increase in traffic. To further minimize potential fine sediment yield from haul activities, haul would be prohibited on approximately 3.5 miles of Road #153 where the road encroaches on segments of the stream (see Resource Protection Measure #30 in Table 8).

Proposed new road construction (3 miles of temporary and 0.25 miles of long-term specified) is not expected to have measurable effects to water quality because road construction and placement would occur within areas which have little potential for interaction with water resources (e.g. mid- to upper-slope areas with no stream crossings). In addition, Best Management Practices and Resource Protection Measures (see Table 8) would be employed to minimize potential sediment effects.

Proposed vegetation management activities, including timber harvest, are also not expected to have measurable effects to water quality because no activities would occur within stream buffers (Resource Protection Measure #28 in Table 8), which are designed to eliminate and/or reduce the potential for sediment delivery to water bodies (USDA 1995) (Hydrology report, page 37). In addition, standard procedures of applying Best Management Practices (BMPs) during harvest activities would be followed to minimize soil disturbance. Research by Litschert and MacDonald (2009) concluded that current forest harvest practices, proper design, layout, and use of BMPs were effective at reducing the potential for sediment delivery (Soil report, page 30).

The proposed recreation-related projects would positively influence water resources:

- Rerouting portions of the Clear Creek trail to avoid wet areas.
- Expansion of the Clear Creek trailhead to provide parking would include the relocation of the switchback on Road #153 away from the creek, which would reduce the risk of the stream washing out the road during flood events and facilitate a healthier floodplain and stream function.
- Relocation of streamside dispersed campsites away from the streambank to improve riparian vegetation

Although the above work involves some ground disturbance, the potential impacts to water quality are negligible and not expected (Hydrology report, page 33).

Instream rehabilitation work in the intermittent stream reach would include placement of engineered log jams and soil lifts to control bank erosion and create desirable energy dissipation and habitat conditions. These activities would arrest large bedload contributions that currently occur during spring runoff. Activities would be conducted when the stream reach is dry. A relatively small increase in fine sediment delivery would likely occur during the first spring after rehabilitation work is completed when water occupies the channel. However, this activity-generated sediment contribution would likely be undetectable because water flows are high during this time period, which typically increases fine sediment transport capability. High water flows would dilute activity-generated sediment and flush it through the stream system.

Culvert replacements and removals would reduce risk of structure failure and sediment delivery. Culvert removals would be associated with proposed road storage and decommissioning. Under Alternative 2, nine culverts would be removed and eight replaced with larger ones to pass 100-year flow events. Modest, short-term sediment yields are expected from these activities but would be relatively small in comparison to the potential sediment yields if these culverts were to fail at some time in the future. Monitoring results from culvert removal and replacement projects on the Lolo and Bitterroot National Forests suggest that these activities may typically recruit less than two cubic yards of sediment to the stream during and immediately following implementation. After 24 hours, sediment levels decline back to pre-work levels (Casselli et al. 1999, Jakober 2002). Foltz et al. (2008) suggest sediment concentrations and turbidity drops with distance from the culvert work site. In their study, the sediment effects were undetectable ½ mile downstream.

A temporary gravel stockpile would be placed just off the Clear Creek Road #153, about a mile east of the Quail Gulch gravel pit. Although the stockpile would be located within the 300-foot Riparian Habitat Conservation Area of the intermittent reach of Clear Creek, it is farther away from the stream than the height of any tree that provides shade to the stream or could potentially fall into the stream to provide future wood. The site is a dry, flat terrace with no riparian indicators. Because the site is flat and there is live vegetation between it and the stream, there is no potential for any material from the stockpile to migrate to the stream. Thus, the temporary stockpile would have no effect on water quality or hydrologic function. It would also not retard the attainment of Riparian Management Objectives outlined in the Inland Native Fish Strategy (1995).

Alternative 2 is not expected to have detrimental effects on water yields. The projected open forest area conditions (less than two percent of the analysis area) created by Alternative 2 combined with the existing condition would be below the threshold that current research indicates would result in detrimental changes in water yield (Hydrology Report, page 38).

Alternative 2: Cumulative Effects

In fall 2013/spring 2014, four segments of the Clear Creek road #153, totaling approximately 1200 feet immediately adjacent to Clear Creek, were realigned to elevate and move the road further from the creek and a vegetated floodplain was created to separate the two. As part of this project, approximately 1.1 miles of road was gravel surfaced. These actions stabilized streambanks in these locations and reduced erosion and sediment delivery. Also as part of this project, large woody debris was placed in the stream channel to dissipate water energy and reduce bank erosion. Minor disturbance and sediment delivery likely occurred upon implementation, but given the annual inputs from the road surface and eroding banks, sediment reductions will likely be immediate and substantively offset rehabilitation-related sediment yield.

Consistent with Montana DEQ's TMDL Plan, Alternative 2 would improve water quality by reducing sediment delivery to streams from forest roads and bank erosion over the long-term. It would also replace 8 culverts with larger structures and remove 9 culverts which would improve stream flow and/or fish passage and reduce risk of failure and sediment delivery. These actions would contribute to an overall trend of sediment load reductions within the

Prospect Creek watershed. The Montana DEQ's TMDL sediment load allocation for Clear Creek calls for a 50 percent reduction in sediment loading from forest roads; 80 percent reduction in sediment loading from human-influenced bank erosion; and a 77 percent reduction in the risk of sediment loading from culvert failure (MTDEQ 2009, page 87). When all activities are considered, modeling indicates that Alternative 2 would achieve TMDL loading allocation reduction from forest roads and culverts; and contribute to the allocation reduction for human-influenced bank erosion (Hydrology report, pages 42-43).

Within the Prospect Creek watershed there are two other projects that are authorized: Shorty Gulch Fuels Reduction project and the Antimony project.

The Shorty Gulch Fuels Reduction project is located approximately two miles upstream of the Clear Creek project area. This project was determined to have no measurable effects, if any, to water quality and beneficial uses within Prospect Creek (Shorty Gulch Environmental Assessment and Project File, 2008). The drainages in which the Shorty Gulch project is located, Shorty and Foster Gulches, are tributary to Prospect Creek. These streams do not flow year-round and go subsurface for much of the year. Thus, there is limited connectivity between these drainages and Prospect Creek. All project activities would occur outside of stream buffers prescribed by the Inland Native Fish Strategy (INFISH) to protect streams from non-channelized sediment inputs. Roads used for hauling forest products would be maintained commensurate with use. Due to the relatively small area of potential ground-disturbing activities (197 acres of tractor and skyline harvest) compared to the 108,000-acre Prospect Creek watershed, in treatment units separated from streams by appropriate buffers, within ephemeral drainages which are tributary to Prospect Creek, cumulative effects to Prospect Creek, if any, are considered insignificant

The Antimony project is ongoing and located within the Cox Gulch and Antimony Creek area about five air miles southwest of the Clear Creek project area. Although this project will have no effect on the water resources within the Clear Creek project area, it could affect Prospect Creek because for about two months out of the year, Antimony Creek and Cox Gulch flow into Prospect Creek about nine miles upstream to the west. One of the objectives of the Antimony project is to enhance watershed conditions, aquatic habitat, and stream function. This project includes similar activities to the Clear Creek project (e.g. prescribed burning, timber harvest, mechanical non-commercial vegetation treatments, road decommissioning, storage, and maintenance). If the Clear Creek project is authorized, activities for both the Antimony and Clear Creek projects could be ongoing at the same time. Sediment modeling conducted for the Antimony project indicates that authorized road-related activities will result in a short-term sediment increase of about 10 percent, but a 44 percent decrease in road sediment from existing levels over ten years for the entire project area. In addition the project will remove seven culverts and replace two culverts with larger ones to pass 100-year flow events. These improvements would meet the State's TMDL sediment load allocation goal for Prospect Creek. Cumulatively over the long-term, the Clear Creek and Antimony projects would contribute to an improving trend in water quality within Prospect Creek. Both projects would be consistent with the Lolo National Forest Plan, State water quality standards, and the Clean Water Act.

There would be no cumulative effects with the Little Beaver Hazardous Fuels Reduction project on the Kootenai National Forest because the Clear Creek project is located within a different watershed with no hydrologic connection to Little Beaver Creek.

Consistency with the Forest Plan and other Regulatory Requirements

Alternative 2 would be consistent with the Lolo Forest Plan.

- Best management practices have been incorporated into the project and would be applied to assure that water quality is maintained at a level that is adequate for the protection and use of the National Forest and that meets or exceeds Federal and State standards. (Forest Plan, page II-12)

- Project-related increases in water yield would be limited so channel damage would not occur as a result of the land management activities. (Forest Plan, page II-12).

- Alternative 2 was designed to have minimum impacts on the aquatic ecosystem and would not cause permanent or long-term unnatural stress. Channel structure and intragravel sediment accumulations would not be adversely affected. (Forest Plan, page II-14)

Alternative 2 would also be consistent with all other regulatory standards and guidelines. Activities potentially affecting water quality would meet the intent of sections 208, 313, 319, 404, and 303 of the Federal Clean Water Act by fulfilling appropriate permit requirements.

3.8 Fisheries

This section has been updated to reflect new information that has increased the knowledge and understanding of the fisheries and habitat in Clear Creek. This new information includes updated fish population data (Moran and Storaasli 2013) and a clearer understanding of the significance of the intermittent section of Clear Creek as related to sediment transport. In addition, the Forest has already completed the relocation of four segments of the Clear Creek Road #153 away from the stream and applied gravel surfacing and heavy maintenance to the road, which will improve aquatic habitat and reduce sediment delivery from proposed log haul activities.

Surveys conducted within about the last decade indicate that several different species of fish inhabit Clear Creek. The lower 2.5 miles, below where the stream goes dry, contains primarily non-native species (brook and rainbow trout) with a few occurrences noted in 2003 of native bull trout, listed under the Endangered Species Act as threatened. Surveys conducted in 2009 and 2012 did not detect any bull trout and identified a high density of non-native fish (Moran and Storaasli 2013). Clear Creek above the intermittent section contains non-native brook trout and westslope cutthroat trout, which is identified by the Forest Service Northern Region as sensitive. Most of the tributaries to Clear Creek do not contain fish due to their small size and lack of adequate water supply and habitat. However, Looters Gulch and Stick Gulch located on the south side of Clear Creek, support westslope cutthroat trout.

Within Prospect Creek, downstream of Clear Creek, surveys indicate the primary fish species are non-natives. Bull trout are likely also present in this reach of Prospect Creek during migration periods (May to July) because it is a migratory corridor to upstream spawning areas in Prospect Creek. There are no known bull trout spawning areas in this lower reach of Prospect Creek and there is very little suitable spawning habitat due to the natural stream gradient and morphology.

Within Clear Creek, the current population status is "not present" for bull trout and "depressed" for westslope cutthroat trout most likely due to the presence of non-native fish and the blockage of migratory corridors by hydroelectric dams on the lower Clark Fork River, downstream of Prospect Creek. The Cabinet Gorge dam was constructed in 1952 and the Noxon Rapids dam was constructed in 1960. Prior to 1960, bull trout spawned in Clear Creek but it is unlikely that they do so currently. The US Fish and Wildlife Service (USFWS) concludes that bull trout do not spawn in the lower end of Clear Creek because of high water temperatures and excessive deposition of large substrate materials creating poor spawning habitat. In addition, the high density of non-native brook trout in the lower end of Clear Creek essentially precludes the possibility of successful spawning by bull trout due to the high likelihood of hybridization (USFWS Clear Creek Biological Opinion 2013, page 25). The high density of non-native fish likely originated in the late 1940s and early 1950s, when Clear Creek was stocked with non-native brook trout to enhance sport fishing.

According to the Prospect TMDL Plan (page 55), fish and their habitat within Clear Creek are generally not impaired due to fine sediment, but rather from excessive coarse sediment loading which results in low pool frequencies and high channel width to depth ratios - reduced quality of habitat for bull trout. Coarse sediment loading is primarily attributed to bank erosion, both natural and human-induced.

The quality of aquatic habitat upstream of the intermittent section of Clear Creek is generally considered in good condition. Clear Creek downstream of the intermittent section, which is primarily on private land, is characterized as a stream with multiple channels supporting marginal aquatic habitat. The active stream corridor in this location is defined by multiple mid-channel bars caused by excessive coarse sediment deposition. The middle and lower portions on private lands appear to be more stable than the private lands directly downstream of the National Forest System land boundary.

Although segments go dry for about 8-10 months out of the year, Prospect Creek is identified as a priority bull trout watershed (INFISH 1995). In addition, USFWS designated the entire mainstem of Prospect Creek from its confluence with the Clark Fork River to the headwaters as bull trout critical habitat[10] (USFWS 2010; 75 FR 63898). Downstream of Clear Creek, Prospect Creek runs for approximately two miles before flowing into the Clark Fork River.

[10]Critical habitat is defined in the Endangered Species Act as a specific geographic area(s) that contain features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Western pearlshell mussels are also listed as a sensitive species in the Northern Region. Surveys conducted in 2008 did not identify the presence of these mussels within Prospect Creek or its tributaries, which includes streams within the Clear Creek project area.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would maintain the existing condition and not make progress toward water quality restoration goals or the recovery of native fish species.

Alternative 2: Direct and Indirect Effects

Alternative 2 would have no direct, indirect, or cumulative effects on western pearlshell mussel because this species does not exist within the project area or in downstream Prospect Creek, as determined by stream surveys.

The only fisheries habitat parameters that have the potential to be directly or indirectly affected by proposed activities are sediment, woody debris, pool habitat, and connectivity (fish passage). Stream temperature would not be affected because there would be no modification of the vegetation along stream corridors. However, the proposed planting of riparian vegetation along some segments of Clear Creek would likely contribute additional shade over time.

In the long-term once project activities are completed, Alternative 2 would result in an improving trend in fisheries habitat through the reduction of fine sediment from forest roads below existing levels, the addition of instream woody debris, the stabilization of streambanks in priority areas, and remedy of fish passage barriers.

Proposed instream rehabilitation work to stabilize streambanks (which would also reduce fine and coarse sediment yields) and the addition of large woody debris would improve habitat conditions when water is present in the channel. No harvest activities would occur within Riparian Habitat Conservation Areas (see Resource Protection Measures Table 8 in Chapter 2), thus stream shade and future in-stream wood recruitment would be maintained. Culvert removals and replacements with larger structures would remedy two fish passage barriers and improve access to an additional 0.6 miles of upstream habitat. Road maintenance and physical road decommissioning and storage treatments near streams would reduce fine sediment delivery. However, these road and stream-related activities would contribute additional fine sediment to area streams during project implementation. Several measures, including haul restrictions and best management practices (see Resource Protection Measures in Chapter 2) are incorporated into the project design to minimize sediment delivery from project activities.

Project activities would primarily occur during the summer and fall when the middle reach of Clear Creek and several tributaries on the north side of the drainage are dry. Therefore, the timeframe for when potential sediment yield from project activities would most likely enter live water in mainstem Clear Creek would be generally in the late spring/early summer during spring runoff. At this time, water flows are high, which typically increases the fine sediment transport capability. Below the intermittent stream reach, about one mile of the

main Clear Creek Road #153 is unpaved, which could yield increased sediment inputs at various frequency during haul activities. Project-related sediment delivery could cause a short-term increase in turbidity as fine sediment is entrained in the water column, which may temporarily affect fish movement as they avoid areas of increased turbidity. Any change to turbidity related to project activities would not likely be visible to the human eye except immediately downstream of delivery points. While displacement could occur, no physical harm is expected. Some sediment generated during project activities may temporarily deposit in the bottom of pools in the lower 2.5 miles of Clear Creek until scoured out by the next high spring flow. However, any deposition is unlikely to have a measurable effect to native fish because of the large cobble substrate of the streambed and the relatively small fractional increase in sediment likely to be produced annually from project activities (less than one percent per year relative to existing watershed background loading). Pool habitat would not be adversely affected.

The project would not affect species viability for westslope cutthroat trout or result in a trend toward Federal listing under the Endangered Species Act for the reasons stated above and because the high quality habitat upstream of the intermittent reach of Clear Creek would be relatively unaffected by project activities except for the removal of one culvert and the replacement of three others. Studies indicate that the increase in sediment generated from culvert removals/replacements lasts about 24 hours (Casselli et al. 1999, Jakober 2002, Foltz et al. 2008). Foltz et al. (2008) suggest sediment concentrations and turbidity drop with distance from the work site. In their study, the sediment effects were undetectable ½ mile downstream. This culvert work would provide improved access to upstream habitat. The remedying of these passage barriers is not expected to exacerbate the spread of non-native fish species because they have not been found in the tributaries to Clear Creek where culvert work would take place.

Because of the rarity of bull trout and the relatively small amount of project-generated sediment transported to Clear Creek and the lower two miles of Prospect Creek, it is reasonable to conclude that if juvenile and adult bull trout were present at the time of increased suspended sediment levels they could be displaced. However, it is not expected that sediment inputs would reach a level where feeding, spawning, or sheltering of bull trout would be impacted. Once activities are completed, culvert removal/replacement, road maintenance, decommissioning and storage, and stream rehabilitation work would result in the reduction of long-term sediment delivery in the Clear Creek watershed; thus providing long-term benefits for aquatic species.

Although the project would not conduct sediment-generating activities within about a mile of Prospect Creek (the first 1.2 miles of Road #153 are paved), sediment from upstream activities could potentially reach Prospect Creek during spring runoff. Effects to bull trout in Prospect Creek would be limited to migrating fish from the Clark Fork River since there are no known spawning areas downstream of Clear Creek. In taking a conservative approach, the Agency determined that bull trout and designated critical habitat within Prospect Creek could be adversely affected in the short-term. In their review of this determination, USFWS concluded the project would not result in the incidental take of bull trout because bull trout

are extremely rare in the action area and increased sediment effects would be diluted or limited (USFWS Clear Creek Biological Opinion 2013, page 29).

Effects to Primary Constituent Elements of Bull Trout Critical Habitat

When the USFWS designated bull trout critical habitat for the coterminous United States population, they identified nine primary constituent elements (PCEs) as essential for the conservation of bull trout and may require special management considerations (75 FR 63933 October 18, 2010). Primary constituent elements (PCEs) are physical or biological features essential to the conservation of a species for which its designated or proposed critical habitat is based on. Below is a discussion of project effects on the PCEs within designated critical habitat in the two miles of Prospect Creek located downstream of the Clear Creek project area:

1. Springs, seeps, groundwater sources and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

No project activities would occur within critical habitat. In the Clear Creek subwatershed, INFISH Riparian Habitat Conservation Areas would be designated around all riparian features to protect them. Thus, there would be no effect to springs, seeps, groundwater sources and subsurface connectivity. Analysis completed by the project hydrologist concluded that timber harvest and other activities proposed in Alternative 2 would not have any measurable effect to water quantity.

Increased sediment delivery from road and stream-related activities in Clear Creek may temporarily increase turbidity as fine sediment is entrained in the water column during spring runoff (fewer than two months a year). However, estimated sediment increases would be very small relative to overall sediment loading in the Prospect Creek watershed. Sediment contributed to streams would be composed of small-sized material that would stay suspended through much of lower Prospect Creek. Once project activities are completed, sediment loading would be slightly reduced below the existing condition. The high water volume of Prospect Creek during the spring would dilute any project-generated sediment that may reach critical habitat.

2. Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitat, including but not limited to permanent, partial, intermittent, or seasonal barriers.

Propect Creek downstream from the confluence with Clear Creek is primarily a migratory corridor for bull trout since spawning habitat is naturally very limited and no known spawning sites have been identified in this reach. Migratory fish are found upstream (Moran 2013). Increased sediment delivery from road and stream-related activities in Clear Creek may slightly increase turbidity in Prospect Creek during spring runoff (fewer than two months a year), which could temporarily affect fish movement as they avoid areas of increased turbidity. The magnitude is not expected to rise to a level to disrupt normal behavior patterns such as breeding, feeding, or sheltering to a bull trout. Longer-term sediment reductions from project activities would at least maintain migratory habitats.

Chemical contamination/nutrients are not a concern because proposed mitigations for weed spraying would be followed. There would be no other effects to Prospect Creek from project activities.

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The amount and quality of the food base within Prospect Creek is not expected to be affected by the short-term increase in project-generated sediment. Since increased sediment delivery would occur during periods of high runoff that correspond to high stream flows and sediment would be diluted by the time it reaches Prospect Creek, impacts of project activities to macroinvertebrates, if any, would be undetectable. Gravelle et al. (2009) found macroinvertebrate communities relatively unresponsive to road construction and timber harvest in the watershed where Best Management Practices (including stream buffers) were applied, despite the fact there was some short-term sediment loading to the stream systems. Stream temperature would be maintained and no chemical contamination is expected due to applied Resource Protection Measures. Effects to forage fish would be similar to those expected for bull trout and are not expected to reduce prey species.

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.

Alternative 2 would have no effect to PCE #4 because project activities are not proposed within Prospect Creek mainstem, and the low magnitude of project-generated sediment in Clear Creek would not effect Prospect Creek habitat features. The reach of Prospect Creek below Clear Creek to its confluence with the Clark Fork River is a steep narrow channel with natural armoring of rock outcropping and boulders.

5. Water temperatures ranging from 2 to 15°C (36-59°F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.

Water temperature in Propsect Creek would not be affected because no project activities would occur within this watershed. Riparian Habitat Conservation Areas would be protected in Clear Creek. Therefore, PCE #5 would not be affected.

6. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.

This PCE is not relevant for this section of Prospect Creek. Survey data discussed previously indicate that this section of stream is dominated by non-native fish species and provides no known areas for reprodution or early bull trout life phases. For fluvial bull trout, this segment of stream provides a migration path from the Clark Fork River to spawning areas in upper Propect Creek. Therefore, this project will not affect PCE #6.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.

Analysis done by the project hydrologist concluded that timber harvest and other activities proposed in Alternative 2 would not have any measurable effect on water yield, and thus would not affect peak/base flows. Therefore, there would be no effect to PCE #7 in Prospect Creek from project activities.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

This PCE is not relevant for this section of Prospect Creek. Survey data indicate that this stream reach is dominated by non-native fish species and provides no known areas for reprodcution. For fluvial bull trout, this segment of stream provides a migration path from the Clark Fork River to spawning areas in upper Propect Creek. Therefore, Alternative 2 would not affect PCE #8.

9. Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.

Non-native trout species dominate in lower Prospect Creek. Sediment loading described above would be expected to have similar effects on non-native fish, but those effects are small relative to existing conditions. Therefore, Alternative 2 would not change the distribution or abundance of fish in lower Prospect Creek and would not affect PCE #9.

Alternative 2: Cumulative Effects

Herbicide treatment of roadside weeds has already been authorized on drivable roads within the Clear Creek project area. The fisheries analysis included this ongoing activity when calculating the potential effects of herbicide associated with the weed spraying proposed within Alternative 2. Cumulatively, there is some risk of herbicide reaching a stream channel should a storm event that generates substantial runoff occur after spraying is completed. The sites with the greatest potential to deliver herbicide to stream waters are the roadside ditches. Because product label requirements and resource protection measures outlined in the 2007 Lolo National Forest Integrated Weed Management EIS and Record of Decision would be followed, there would be a very low risk for native fish to be affected by the concentrations of herbicide or duration of exposure that would likely occur. There are no other reasonably foreseeable future actions within Clear Creek.

In fall 2013, four segments of the Clear Creek Road #153, totaling approximately 1200 feet immediately adjacent to Clear Creek, were realigned to elevate and move the road further from the creek and a vegetated floodplain was created to separate the two. As part of this project, approximately 1.1 miles of road was gravel surfaced in 2014. These actions stabilized streambanks in these locations and reduced erosion and sediment delivery. Also as part of this project, large woody debris was placed in the stream channel to dissipate water energy and reduce bank erosion. Minor disturbance and sediment delivery likely occurred upon implementation, but given the annual inputs from the road surface and eroding banks, sediment reductions will likely be immediate and substantively offset rehabilitation-related sediment yield.

Existing forest roads that cross streams or closely parallel streams contribute fine sediment to water bodies and existing undersized culverts on forest roads inhibit fish passage. Road maintenance, decommissioning, and storage activities proposed in Alternative 2 would remedy some of the existing effects that forest roads have had on water quality and fish habitat within the project area.

The native fish and their habitat within the Prospect Creek watershed have been affected by past natural events and human-related activities. The Prospect Creek Highway (FH7) encroaches on the stream channel for several miles and portions of the channel were altered during construction. Montana DEQ estimates that a large quantity of traction sand applied to the roadway in winter is delivered to Prospect Creek. Utility corridors (pipeline and powerlines) within the valley bottom have resulted in reduced riparian vegetation along segments of Prospect Creek which increases stream temperature, reduces wood recruitment to the stream, and reduces stream stability. Installation of hydroelectric dams on the lower Clark Fork River downstream of Prospect Creek blocked the migration of native fish.

In recent years, several projects have been completed within the Prospect Creek watershed to improve fisheries habitat (e.g. stream channel work in Daisy Creek, culvert replacements in Cooper Creek, instream woody debris placement in Crow Creek, eradication of non-native fish in Blossom Lakes (completed by Montana Fish, Wildlife, and Parks), planting of riparian vegetation along portions of Prospect Creek). Although Alternative 2 would produce sediment in the short-term during project activities, the ultimate reduction in sediment from existing conditions over the long-term would contribute to the ongoing upward, although slow, trend toward recovery of fisheries habitat within the Prospect Creek watershed.

Within the Prospect Creek watershed there are two other projects that are authorized: Shorty Gulch Fuels Reduction project and the Antimony project.

The Shorty Gulch Fuels Reduction Project, located about two miles upstream in Prospect Creek, was determined to have no direct, indirect, or cumulative effects on bull trout or westslope cutthroat trout because the two drainages in which activities are located (Shorty Gulch and Foster Gulch) contain streams that do not flow year-round and go subsurface for much of the year (Shorty Gulch Fuels Reduction Environmental Assessment 2008 and Project File). Thus, there is limited connectivity between these drainages and Prospect Creek. No fish population information is available for these two drainages and no fish were

sighted during field reviews conducted within the project area. All project activities would occur outside of stream buffers prescribed by the Inland Native Fish Strategy to protect streams and riparian areas.

The Antimony project is ongoing and located approximately nine miles upstream in the Prospect Creek watershed. Although this project will have no effect on the water resources or fisheries habitat within the Clear Creek project area, it could affect Prospect Creek because Antimony Creek and Cox Gulch flow into Prospect Creek during spring runoff. The majority of the modeled sediment from the Antimony project is from the decommissioning of a 2-mile segment of the Cox Gulch road, which will improve fish habitat and water quality within Cox Gulch. Short-term sediment loads created by the Antimony project will be so diluted by the time they reached the segment of Prospect Creek below Clear Creek, that there will be little if any effect to native fish and their habitat. Thus, the potential cumulative effects from the short-term increase in sediment loads resulting primarily from watershed improvement activities occurring within the same bull trout subpopulation would be insignificant. Over the long-term, the Antimony and Clear Creek projects would likely contribute to a long-term improving trend in water quality and fisheries habitat within Prospect Creek.

There would be no cumulative effects with the Little Beaver project on the Kootenai National Forest because there is no hydrologic connectivity between Clear and Little Beaver Creeks. The Little Beaver project was determined to have no effect on fish due to the location and nature of project activities in relation to fish bearing portions of Little Beaver Creek. There is no live water connectivity with Little Beaver Creek from areas where timber harvest and road construction would occur.

Consistency with the Forest Plan

Alternative 2 would meet Lolo Forest Plan standards relative to fisheries.

- Best management practices have been incorporated into Alternative 2 and would be applied to assure that water quality is maintained at a level that is adequate for the protection and use of the National Forest and that meets or exceeds Federal and State standards. (Forest Plan, page II-12)
- Consistent with Endangered Species Act recovery goals, Alternative 2 was designed to be compatible with the habitat needs of bull trout through resource protection measures, best management practices, and project design. Specific actions are proposed to enhance habitat and contribute to the recovery of bull trout to a non-threatened status by addressing human-caused sediment sources, remedying passage barriers, and stabilizing streambanks affected by past management. (Forest Plan, pages II-13 to 14)
- Alternative 2 was designed to have minimum impacts on the aquatic ecosystem and would not cause permanent or long-term unnatural stress. (Forest Plan, page II-14)
    - No changes to aquatic insect density or diversity would likely occur due to the relatively low magnitude and timing of project-generated sediment, application of mitigation measures, and protection of Riparian Habitat Conservation Areas. Gravelle et al. (2009) found macroinvertebrate communities relatively unresponsive to road construction and timber harvest in the watershed where Best

Management Practices (including stream buffers) were applied, despite the fact that was some short-term sediment loading of the stream systems.

- Although some fish may be temporarily displaced due to project-generated sediment, fish populations would not be reduced.
- Intragravel sediment accumulations would unlikely be measurably affected. Some project generated-sediment could temporarily deposit in the bottom of pools in the lower 2.5 miles of the stream until scoured out by the next high spring flow. However, any deposition is unlikely to have a measurable effect to native fish because of the large cobble substrate of the streambed and relatively small fractional increase in sediment likely to be produced annually from project activities.
- Channel structure would not be adversely affected because there would be no measurable change to water yield. The relatively small quantity of fine sediment generated by instream and road-related activities would not cause aggradation or changes to channel morphology (Megahan and King 2004).

In addition, Alternative 2 would be consistent with Inland Native Fish Strategy (1995) requirements and direction and the Endangered Species Act (see Fisheries report in the Project File for more detailed information).

3.9 Soils

The Forest Service Soils Manual (FSM 2550; Nov 2010) and Region 1 Soil Quality Standards provide guidelines and methods to show compliance with the National Forest Management Act (NFMA). The objectives of the Region 1 Soil Quality Standards (R1 SQS) include managing National Forest System lands "without permanent impairment of land productivity and to maintain or improve soil quality", similar to the NFMA. Region 1 Soil Quality Standards are based on the use of six physical and one biological attribute to assess current soil quality and project effects. These attributes include compaction, rutting, displacement, severely-burned soils, surface erosion, soil mass movement, and organic matter.

The analysis standards address basic elements for the soil resource: (1) soil productivity (including soil loss, porosity; and organic matter), and (2) soil hydrologic function. The soil productivity direction identifies a value of 15 percent detrimental soil disturbance as a guideline for maintenance or loss of soil productivity and to show compliance with the NFMA.

Alternative 1: Direct, Indirect, and Cumulative Effects

Because there are no activities proposed in Alternative 1, there would be no direct effect on soils. Soil structure and humus development would continue. As the tree canopy continues to close and shade the soil surface, decomposition rates would slow allowing organic matter and nutrients to accumulate on the soil surface. This process would continue until a disturbance such as fire consumes or partially consumes the accumulated litter, duff, and woody material. If future fires are within site resiliency and recovery potentials, as discussed

in Brown et al. (2003), long-term effects on soil health and productivity are likely to be relatively small. However, fire severity exceeding the historic range could have detrimental effects on soil productivity through the oxidation and loss of soil organic matter and associated soil biota, as well as through accelerated rates of erosion (Harvey et al. 1987; Neary et al. 2008). Alternative 1 meets the Lolo Forest Plan, the Regional soil quality standards, and the National Forest Management Act for the management of soil resources. (Soil Report, pages 19-20)

Alternative 2: Direct and Indirect Effects

The soil surveys and assessment determined that Alternative 2 would maintain soil productivity and comply with Region 1 soil quality standards (USDA Forest Service 1999), as well as other pertinent laws and regulations (Soil Report, pages 2, 20, 48). The Forest soil scientist was involved in the design of this project to ensure protection of the soil resource. Resource protection measures (outlined in Table 8) and best management practices would be used to minimize soil disturbance and ensure that productivity is maintained. More detailed information regarding the soils analysis and findings is contained within the Soil Report and associated documentation in the Project File.

Timber Harvest

Although all harvest units would meet Region 1 soil quality standards following implementation, Alternative 2 would result in 57 acres[11] (about 5 percent of the proposed harvest acres and less than one-half of one percent of the Clear Creek project area), of detrimental soil disturbance. However, this soil disturbance is not considered substantial or a permanent impairment (USDA Forest Service Forest Plan Soil Monitoring Reports 2006/2007, 2009, 2010/2011). Recovery would occur over time. Monitoring of previously harvested timber sale units on the Lolo National Forest and peer-reviewed research suggest that detrimental soil disturbance dissipates over time and does not irreversibly damage soil (Ibid.). Though recovery timelines for both physical soil properties (i.e. de-compaction and aggregate formation) and forest floor formation are long (20-80 years); the Clear Creek project would retain soil building processes within each harvest unit. Unit-specific calculations of predicted detrimental soil disturbance are listed in Appendix C.

Detrimental soil disturbance is expected within landings, in primary skid trails, at skid trail or skyline corridor convergence, and along temporary roads. Monitoring, adaptive management, and rehabilitation are included in Alternative 2 to assure maintenance of soil resources or mitigate soil conditions if Region 1 soil quality standards were unexpectedly exceeded.

Winter logging or use of a log forwarder is required in Unit 7 (refer to Resource Protection Measure #7 in Table 8), to ensure that the potential detrimental soil disturbance from proposed activities, in combination with existing soil conditions, would not exceed the 15 percent Regional standard. Monitoring conducted on the Lolo National Forest has found an

[11] This acre calculation includes estimated detrimental soil disturbance from log landings, post harvest activities, and temporary road construction.

average detrimental soil disturbance of about 4 percent for winter ground-based equipment with a range of 2-6 percent. Similar results are reported for operations over slash mats.

Ground-based timber harvest (i.e. tractor logging) that has the most potential to cause soil compaction and displacement, would occur on approximately 76 acres. However, the resource protection measures (outlined in Table 8) and best management practices would be used to minimize soil disturbance and ensure that productivity is maintained. No long-term impacts to soil productivity are anticipated.

No new erosion is expected from harvest treatment areas because standard operating procedures and site-specific resource protection measures (Table 8) would minimize operational footprints and maintain the forest floor, ground cover, and soil organic matter. Alternative 2 is not expected to alter landslide or mass movement risk (Soil Report, page 29).

Prescribed Burning

Prescribed burning would be of low severity and retain most live trees, shrubs, and other forest vegetation which would maintain a functional forest floor on at least 85 percent of any activity area. Any effects would not be adverse to soil productivity because nutrient replenishment mechanisms would remain on site.

Temporary Road Construction

Alternative 2 would construct approximately 3 miles of temporary road. All soil disturbance and displacement would be confined to within the boundary of the road template. Temporary roads would be considered 100 percent detrimentally disturbed and have reduced soil productivity for greater than 40 years until vegetation, organic matter, and the forest floor is restored. Acres of detrimental soil disturbance from this activity are included in the calculation displayed above for timber harvest. All temporary roads would be rehabilitated following use for this project. Rehabilitation would restore soil productivity to the extent possible and include recontouring the road template and cut and fill slopes, providing drainage, scarifying the surface, slash placement, and planting.

Long-term Specified Road Construction

Alternative 2 would construct approximately 0.25 miles of long-term specified road to access treatment areas. This route would be engineered considering hydrologic function and road bed stability. Soil resources would be dedicated to the Forest transportation system, thus new long-term specified road construction is not considered as part of the calculation of detrimental soil disturbance. This newly constructed road would be placed into storage following use for this project.

W1 and W2 Treatments

Treatment units W1 and W2 were separated from the original proposed action after extensive ecological review (see Soil File 8 in the Project File). Soil function, forest floor, and groundcover conditions in the two areas are altered. A soil ecology emphasis has been applied to these two units and a detailed existing condition and rehabilitation treatment plan written (Ibid.). The treatments were designed to ensure they would not further alter soil moisture or soil temperature regimes and that sufficient standing and down trees remain

where available to capture, store, and disperse flood flows in this very dynamic watershed. Proposed treatments would move W1 and W2 towards improved soil biological, physical, and chemical function.

Alternative 2: Cumulative Effects

For activities to be considered cumulative, their effects need to overlap in both time and space with those of the proposed actions. The appropriate geographic area for soil cumulative effects analysis has been defined as the "land affected by management activity" (USDA Forest Service 1999). This is because soil productivity is a site-specific attribute of the land. The productivity of one area of soil is not dependent on the productivity of another area whether that area is adjacent or not. Similarly, if one acre of land receives soil impacts from management activities and a second management activity that may affect soils is planned for that same site, then soil cumulative effects are possible on that site. Thus, cumulative effects to soil productivity are appropriately evaluated on a site-specific basis. A larger geographic area such as a watershed or project area is not considered an appropriate geographic area for soil cumulative effects analysis. This is because assessment of soil quality within too large an area can mask or "dilute" site-specific effects (Nesser 2001). Thus, cumulative effects to soils are evaluated for site-specific activity areas (i.e. proposed vegetation treatment units), but are not evaluated for the entire watershed or project area.

As discussed above, the post-project detrimental soil conditions for all harvest, prescribed burn, and non-commercial mechanical treatment units would be below 15 percent within each activity area and meet Region 1 soil quality standards. This assessment of post-project soil conditions reflects the cumulative effects to the soils because it considers existing soil conditions resulting from any previous management or natural activity that affected the soil as well as the direct and indirect effects of Clear Creek proposed actions. There are no reasonably foreseeable future actions that overlap the activity areas; therefore there would be no additional cumulative effects than what is previously described above.

Consistency with the Forest Plan and Other Direction

Alternative 2 would be consistent with the Lolo National Forest Plan, National Forest Management Act, and soil policy. The project would be consistent with the goals, objectives, and standards for soil resources set forth in the Lolo Forest Plan because project design criteria and Best Management Practices have been included to protect soil resources and limit the disturbance footprint; landscapes with sensitive soils would be protected. In addition, large wood levels have been considered as found in the Lolo National Forest Down Woody Material Guide (2006) and Graham et al. 1994. The Forest Soil Scientist has been involved in project planning and would be involved with the project through implementation by coordinating with other team members including silviculture, timber, and fire specialists to ensure the maintenance and enhancement of soil resources.

Forest Service Manual 2500-99-1 establishes guidelines that limit detrimental soil disturbance to no more than 15 percent of an activity area. All units would meet Region 1 soil quality standards following project implementation; this assessment is based on a

consistency review completed for each unit that included harvest methods, post-harvest activities, landings, unit access, and remediation (see Appendix C).

The National Forest Management Act (NFMA) requires that all lands be managed to ensure maintenance of long-term soil productivity, hydrologic function, and ecosystem health. All proposed activities are consistent with this direction; proposed activities would not result in irreversible damage to the soil resource.

3.10 Wildlife

The proposed action (Alternative 2) is consistent with applicable Forest Plan goals, direction, and standards. The proposed activities would have no effect on any federally listed Threatened or Endangered species and would not reduce the viability of any species identified as sensitive in the Forest Service Northern Region. Alternative 2 complies with applicable conservation strategies for wildlife species and is consistent with the Endangered Species Act, the Lolo National Forest Plan, and other laws providing direction and requirements for the management of wildlife species and habitat.

Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) directs federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

Canada Lynx

The U.S. Fish and Wildlife Service (USFWS) listed Canada lynx as a threatened species in March 2000. USFWS determined that the main threat to lynx was "the lack of guidance for conservation of lynx and snowshoe hare habitat in National Forest Land and Resource Plans and BLM Land Use Plans" (USDI -FWS 2000a). In March 2007, the Forest Service issued the Northern Rockies Lynx Management Direction (NRLMD) Record of Decision (ROD). The ROD was amended to forest plans in the Northern Rockies and established management direction to conserve and promote recovery of the Canada lynx, by reducing or eliminating adverse effects from land management activities on National Forest System lands, while preserving the overall multiple use direction in existing plans.

The NRLMD provides standards and guidelines to apply to lynx habitat. The Lynx Conservation Assessment and Strategy (LCAS; Ruediger et al. 2000 p. 7-2) discusses the use of lynx analysis units (LAUs) to analyze project impacts to Canada lynx. LAUs approximate the area used by an individual lynx and are the units used to analyze the effects of a project (USDA-FS 2007, FEIS Vol. I, p. 370). LAUs are mapped on a broader scale than lynx habitat and thus contain many areas that are not suitable for lynx use. Lynx analysis units contain nearly all the mapped lynx habitat on the Lolo National Forest. An LAU may or may not actually contain a lynx.

The Lolo National Forest is considered occupied lynx habitat; therefore, the standards and guidelines in the NRLMD apply to treatment units located in the affected LAU for this project. The Upper Prospect LAU overlaps the western portion of the project area. About 9 percent of this 27,789-acre LAU is located within the Clear Creek project area boundary. There is no designated lynx critical habitat[12] within the Clear Creek area or on the entire Plains/Thompson Falls Ranger District (74 FR 8616, February 25, 2009).

The Rocky Mountain Research Station has been studying winter and summer habitat use patterns of lynx on the Lolo National Forest since 1998. Results indicate that, in winter, lynx preferentially forage in spruce-fir forests with high horizontal cover, abundant hares, deep snow conditions, and large-diameter trees (Squires et al. 2010). In summer, Squires et al. (2010) found that lynx will expand habitat use to include young, regenerating forests. Stands at lower elevations comprised primarily of Douglas-fir, larch, and ponderosa pine are typically drier, have relatively open understories, and, as such, do not represent potential lynx habitat (Squires et al. 2010).

Spruce-fir habitats are rare in the Clear Creek project area and the mapped lynx habitat in Clear Creek consists mainly of suboptimal habitats such as hemlock, lodgepole pine, or grand fir forest types. Habitat in the project area is therefore generally less optimal for lynx because of the natural forest types in the Clear Creek area; not because of previous forest management. Snow track surveys conducted in the winter of 2011 did not document lynx presence within the Clear Creek project area.

The updated analysis presented in this EA considered the latest science, including that used to revise the 2013 Lynx Conservation Assessment and Strategy.

Alternatives 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect or cumulative effects on Canada lynx because no actions would occur in the project area.

Alternative 2: Direct, Indirect, and Cumulative Effects

Alternative 2 would have no direct, indirect, or cumulative effect on the Canada lynx because:

1) The proposed treatment units are not within, nor do they alter any lynx habitat.
2) Surveys for lynx within the project area did not detect their presence.
3) The project would maintain all of the elements necessary for lynx to move across the landscape.
4) The project is consistent with all standards and guidelines for vegetation management projects as outlined in the Northern Rockies Lynx Management Direction (see Appendix F).

[12] Critical habitat is defined in the Endangered Species Act as: specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management consideration or protection; and specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination such areas are essential for the conservation of the species.

A portion of five treatment units (121 acres) is proposed in the Upper Prospect LAU within the Clear Creek project area; however none of the units are within lynx habitat (Table 10). LAUs were mapped at a very coarse scale and contain areas of lynx habitat and areas unsuitable for lynx habitat.

The Clear Creek project area contains about 3246 acres of lynx habitat – most of which is not spruce-fir forest. None of this lynx habitat overlaps any proposed treatment units, and only two harvest units (16A and 16E) are proposed within ½ mile of any lynx habitat. Distance from lynx habitat would preclude the likelihood of disturbing lynx foraging and denning habitat. Proposed treatments are primarily in ponderosa pine and drier Douglas-fir forest types which are not suitable lynx habitat because they are too warm and dry to support the dense horizontal cover used by lynx (Squires et al. 2010). Treatment units were field-verified and determined to be drier forest types (ponderosa pine and drier Douglas-fir) and therefore the project would not impact any suitable lynx habitat existing outside of the LAU.

Table 10: Proposed Treatment Units Located within the Upper Prospect Lynx Analysis Unit

Unit #	Treatment Type	Total Unit Acres	Acres within the LAU	Acres within Lynx Habitat
16A	Timber Harvest, Commercial Thin	33	4	0
16E	Timber Harvest, Shelterwood Cut	35	14	0
84	Prescribed Underburn	88	88	0
85	Prescribed Underburn	13	13	0
89	Prescribed Underburn	24	2	0
TOTAL			121	0

The non-commercial thin Unit 41, which is located outside the LAU, is not suitable snowshoe hare habitat. Snowshoe hares are a primary prey species for lynx. This unit does not contain the optimal forage and dense horizontal cover consisting of thousands of stems per acre preferred by hares (Griffin 2004, Griffin and Mills 2009, Koehler 1990, Litvaitis et al. 1985). The unit is a relatively dry site with scattered overstory trees and a patchy understory. Thus, non-commercial thinning this 68-acre area would not affect snowshoe hare habitat or the number of snowshoe hares.

Lynx are highly mobile and able to disperse long distances. The project would maintain all of the elements necessary for lynx to move across the landscape. Vegetation treatments would maintain adequate cover and not create any barren areas (Squires et al. 2013). Vegetation treatments are focused in dry forest types that were historically less dense than they are today. Vegetation treatments would result in forest densities more consistent with historical conditions. The project is not within a lynx corridor as mapped in the NRLMD.

The Forest Service discussed this project and the findings for lynx with U.S. Fish and Wildlife Service (letter dated 6/3/2014). The USFWS expressed no concerns and determined that formal or informal consultation was not necessary (memo dated 6/4/2014).

Alternative 2 is consistent with the Lolo Forest Plan, Northern Rockies Lynx Management Direction (see Appendix F), and the Endangered Species Act.

Grizzly Bear

The grizzly bear was listed as threatened under the Endangered Species Act in 1975. The Lolo National Forest encompasses portions of three grizzly bear recovery areas, the Northern Continental Divide, Cabinet-Yaak, and Bitterroot. The Clear Creek project area is not located within any grizzly bear recovery zone and is not in the current, mapped occupied distribution area for grizzly bears.

The Mount Headley Bear Management Unit (#22) of the Cabinet-Yaak Grizzly Bear Recovery Zone is the nearest to Clear Creek. From the project area it is about 4 miles away, across the Clark Fork River, Highway 200, and a main railway. In addition, residential development lies between the Bear Management Unit and Clear Creek. The project area is not within an identified linkage zone (Servheen et al. 2001). The project area is also not within or adjacent to an area identified as a "recurrent use area" by grizzly bears (Allen 2011), referred to as BORZ (bears outside of recovery zones). The Clear Creek project area does not meet the guidelines used to delineate BORZ (Allen 2011), which include:

- Evidence of multiple bears, with females and cubs given high priority
- Multiple years of bear use (typically at least three observations since 1994). Radio collar documentation is given a high priority.
- Additional information such as credible sightings, captures, and mortality sites are also taken into consideration.

No evidence of grizzly bears has been found within the project area in several decades (the last observation was in 1979, of moderate quality). In 1993 and 1995, a single bear was observed near Emma Peak and in Beaver Creek, to the north and outside of the project area. Additionally, Mace and Roberts (2012) observed no bears moving from the Northern Continental Divide Recovery Zone as far as the project area. Thus no grizzly bears are known to exist in the Clear Creek project area, and none have been observed within the project area since 1979 or observed within several miles of the action area since 1995.

The Forest Service, U.S. Fish and Wildlife Service, Montana Fish, Wildlife and Parks, and U.S. Geological Survey (USGS), along with many other cooperators, have been surveying for grizzly bears within and around the Cabinet-Yaak Grizzly Bear Recovery Zone. The USFWS office in Libby, Montana is trapping, radio-marking, and following radio-collared bears where they travel. Surveys indicate no bears have moved into the Clear Creek project area. The USFWS is also collecting all grizzly bear observations known from within or surrounding the Cabinet-Yaak Recovery Zone. Forest Service wildlife biologists, technicians, and other Forest personnel working in the Clear Creek project area over the last 5 years have not observed grizzly bears or sign of grizzly bears (e.g. scat or tracks). The 2012 USGS-led study to determine the grizzly population of the Cabinet-Yaak ecosystem did not include the Clear Creek area because there was no evidence or even a suspicion that bears occupied the area. That study also found very few bears near the Clear Creek area. Thus, recent efforts to define where bears are present on the landscape have not indicated there are grizzly bears in Clear Creek or in the surrounding drainages south of the Clark Fork River.

Grizzly bears are opportunistic omnivores (Schwartz et al. 2003) and feed on an array of animals and plants. Their opportunistic selection of food items has permitted bears to occupy a great variety of vegetation types in North America (Herrero 1972). In Montana, grizzly bears use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, snow chutes, and alpine habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals (Servheen 1983, Craighead and Mitchell 1982, Aune et al. 1984). The Clear Creek project area would likely provide suitable foraging habitat for grizzly bears and travel management restrictions on roads would provide for security areas.

In April 2011, the Forest issued an expanded food/wildlife attractant storage order requiring all users of the Lolo National Forest to properly store all attractants in a "bear resistant" manner.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on grizzly bears because no activities would occur and this species is not known to inhabit the project area.

Alternative 2: Direct, Indirect, and Cumulative Effects

Alternative 2 would have no direct, indirect, or cumulative effects on grizzly bears because:

1) The project is not located within any area identified as a likely place to have grizzly bears and the project area has no management direction to manage for grizzly bears. The project area is not within or adjacent to a Grizzly Bear Recovery Zone or BORZ.
2) The Clear Creek project area is likely unoccupied. Grizzly bear presence has not been documented in the project area since 1979 or near the area since 1995. Forest Service personnel have been working in the project area for the last five years and have not sighted any grizzly bears or grizzly bear sign.
3) Ongoing and recent data collection efforts by numerous agencies to find occupied areas have not detected any grizzly bears in or adjacent to the project area.
4) None of these proposed activities would preclude grizzly bear movement or use within the Clear Creek project area if a bear were to move into or through the area.
    a) The project would maintain existing open road density and reduce total motorized road density, thus security would be maintained.
    b) Harvest and burning treatments would increase grass/forb/shrub production (Zager et al. 1983; Kerns et al. 2004) and maintain forested connectivity that may provide a bear moving through the area with foraging opportunities and cover.
    c) Riparian areas that provide spring foraging habitat would be protected (see Resource Protection Measures in Chapter 2)
5) Food storage restrictions apply on all National Forest System lands on the Lolo National Forest.

The Forest Service discussed this project and the findings for grizzly bear with U.S. Fish and Wildlife Service (letter dated 6/3/2014). The USFWS expressed no concerns and determined that formal or informal consultation was not necessary (memo dated 6/4/2014).

Alternative 2 is consistent with the Lolo Forest Plan and the Endangered Species Act.

Sensitive Species

Peregrine Falcon, Common Loon, Northern Bog Lemming, Northern Leopard Frog, and Bighorn Sheep

Alternatives 1 and 2: Direct, Indirect, and Cumulative Effects

All alternatives would have no impact on these species because no suitable habitat for them exists in the project area (Wildlife report, pages 3-4, 61, 64, and 67)

Bald Eagle

No bald eagle nests are known in Clear Creek, but eagles likely use the area occasionally for foraging.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on bald eagles because no activities would occur and there are no anticipated changes in the quantity or quality of food sources or other habitat components.

Alternative 2: Direct, Indirect, and Cumulative Effects

Alternative 2 would have no direct, indirect, or cumulative effects on bald eagles because their use of the area is intermittent and proposed activities would not change the foraging opportunities within the area.

Wolverine

In February 2013, the U.S. Fish and Wildlife Service listed wolverine as a proposed threatened species (Federal Register 78:7864-7890, February 4, 2013). They concluded that while wolverines appear stable to expanding, the primary threats to the contiguous U.S. population is the risk of eventual habitat and range loss due to climate warming, with secondary threats from trapping/wolverine harvest, with potential threats from disturbance associated with human developments [e.g. houses and ski areas] and transportation corridors [e.g. interstate highways and high volume secondary highways]), and loss of genetic stochasticity due to isolation between snowy habitats caused by climate change (Federal Register 78:7864-7890, 2013). The USFWS specifically mentions that forestry-related management practices are not likely a factor contributing to the decline (78 FR at 7879). Timber management, winter elk security, thermal cover, or over-the-snow uses managed by the Forest Service were not identified as treats to the U.S. population (78 FR at 7878-79).

On August 13, 2014, after considering the best available science, the USFWS declared that listing the wolverine as a threatened species was not warranted because they determined the effects of climate change are not likely to place the wolverine in danger of extinction now or in the foreseeable future (79 FR 47522). Although the USFWS acknowledged that climate change effects are expected to result in loss of some wolverine habitat, they noted that there

is no available data to inform whether or how these projected impacts may affect the viability of wolverine populations. Thus, the USFWS withdrew its proposed listing rule.

The wolverine is listed as a sensitive species by the Forest Service in Region 1. Up until November 2012, this species was legally trapped in Montana under the administration of Montana Fish, Wildlife, and Parks. In November 2012, a court-issued restraining order suspended all wolverine trapping in the state of Montana and the trapping season remains closed. According to records, no wolverines have been trapped (and recorded) within the Clear Creek project area since 1975.

Wolverine occurrence has been correlated with remoteness from human development (Banci 1994). However, historical records for western North America reveal little evidence of wolverine presence outside of subalpine habitats (Aubry et al. 2007). The only study to look at wolverine's spatial relationship with human infrastructure (May et al. 2006) found spatial separation occurring at broad spatial scales but little evidence of avoidance at finer scales (Copeland et al. 2010). The negative association between wolverines and human presence is sometimes interpreted as active avoidance of human disturbance, but it may simply reflect the wolverine's preference for cold, snowy, and high-elevation habitat that humans avoid (79 FR at 47537).

The U.S. Fish and Wildlife Service concluded that because wolverine habitat is generally inhospitable to human use and occupation and most of it is also federally managed, wolverines are somewhat insulated from impacts of human disturbances from industry (e.g., logging), agriculture, infrastructure development, or recreation. More than any other factor, deep, persistent, and reliable spring (mid-April to mid-May) snow cover is the best overall predictor of wolverine occurrence, possibly due to the species' need for deep snow during the denning period (78 FR at 7872). Inman et al. (2012) suggest the correlation between wolverine distribution and persistent spring snow cover may also be based on the species' behavior of caching food in cold, structured microsites to inhibit competition with insects, bacteria, and other scavengers. Year-round habitat for the wolverine is found at high elevations centered near the tree line in conifer forests, rocky alpine habitat above tree line, cirque basins, and avalanche chutes that have food sources (78 FR at 7868).

Wolverine habitat exists in the western portion and higher elevations of the Clear Creek project area based on the presence of denning habitat (cirque basins) and maps of persistent spring snow. Snow tracking and hair snagging surveys were conducted within Clear Creek and the larger Prospect watershed in 2011 (Lolo National Forest, unpublished data, 2011). No wolverine sign was observed; however lack of detection does not mean the species or suitable habitat are not present. Wolverines naturally occur in low densities with a reported range from one animal per 25 miles^2 to one animal per 130 miles^2 (Hornocker and Hash 1981; Hash 1987; Copeland 1996; Inman et al. 2007a). This may be due to their need for large territories and their tendency to defend those territories from other wolverines (79 FR at 47530). Home ranges for wolverines are large and vary greatly in size depending on availability and distribution of food and gender and age of the animal. In central Idaho, average home ranges for resident adult females were 148 miles^2 (~95,000 acres) and average home ranges for resident adult males were 588 miles^2 (~376,000 acres) (Copeland 1996).

Wolverines in Glacier National Park had average adult female home ranges of 55 miles^2 (~35,000 acres) and adult male home ranges of 193 miles^2 (~124,000 acres) (Copeland and Yates 2006).

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on wolverines because no activities would occur in the project area.

Alternative 2: Direct and Indirect Effects

Wolverine habitat was assessed using the Lolo National Forest wolverine denning habitat model which focuses on high-elevation cirque basins and with the Northern Region's spring snowpack model (from Copeland et al. 2010). Both models show wolverine denning habitat widely distributed across the Forest. No treatments are proposed within denning habitat (high elevation cirque basins). There is a small area of overlap between a mapped area of where snow may infrequently remain into the spring and the western end of Unit 84 which is proposed for prescribed burning to enhance winter range, flammulated owl habitat, and dry forest habitats. However, because this treatment unit has been field-verified as a south-facing aspect with mainly ponderosa pine and Douglas-fir trees except for the far western edge, it is unlikely this is an area of persistent spring snow. Snow data was mapped at a broad scale. Mapping at that scale can produce inaccuracies when looking at very specific local areas. This treatment area would be burned in the spring to protect the whitebark pine located outside the western end (see Resource Protection Measure #4 in Table 8). Areas with snow present would not burn. If a wolverine were present during implementation it could be temporarily displaced by the sound of the helicopter used for ignition, but effects would be limited because the unit would likely be treated within about 2 hours. There are numerous areas within and adjacent to the Clear Creek project area for an affected wolverine to displace to.

Public motorized access within the Clear Creek project area is currently limited through the use of travel management restrictions on roads. Alternative 2 would not increase public motorized access and thus access for trapping would not increase. The wolverine trapping season has been suspended in Montana and remains closed.

Alternative 2 would not affect wolverine dispersal or movement across the landscape because no activities would occur within preferred habitat and proposed activities outside of preferred habitat on a total of 2096 acres would occur on a small portion (from 1-8 percent) of a wolverine home range. Vegetative cover would remain in all treatment units following completion of the project. The USFWS concluded that there is no evidence that human development and associated activities are preventing wolverine movements between suitable habitats (79 FR 47538). Moriarty et al. (2009) and Inman et al. (2009) found that wolverines are capable of long distance movements through variable and anthropogenically-altered terrain. Wolverines are not thought to be dependent on specific vegetation or habitat features that might be manipulated by land management activities, nor is there evidence to suggest that land management activities are a threat to the conservation of the distinct population segment (79 FR 74539).

Alternative 2 would not lead to a loss of species viability or contribute to a trend toward Federal listing because:

1. The project would not change the presence, absence, or abundance of snow remaining late into the spring.
2. No activities would occur within denning habitat.
3. The project would not increase human use or access to habitat areas of persistent snow.
4. Trapping access has been limited within the project area through travel management restrictions on roads. The Clear Creek project would not increase public motorized access. The wolverine trapping season has been suspended in Montana since November 2012 and remains closed.
5. The project activities are proposed primarily in areas (mid-elevation dry forest types) not specifically selected by wolverines for use. In addition, wolverines naturally occur in low densities. Thus, the potential for disturbing/displacing even one individual wolverine is low.
6. Proposed vegetation treatments would not affect wolverine movement or dispersal across the landscape.

Prior to the withdrawal of the proposed rule, the U.S. Fish and Wildlife Service concurred with the Forest Service's finding that the project would not jeopardize the Lower 48 population of the wolverine and determined a conference was not required (letter dated May 30, 2014).

Alternative 2: Cumulative Effects

There are no reasonably foreseeable future actions within the Clear Creek project area. Due to the large size and variability of wolverine home ranges, cumulative effects were considered at the larger watershed scale. Within the Prospect Creek watershed, two other projects could be ongoing at the same time as the Clear Creek project. The Shorty Gulch and Antimony projects would occur on a combined total of approximately 2000 acres separated from the Clear Creek project area and each other by several miles. These projects are primarily located in mid-elevation dry forest types, which are not specifically selected by wolverines for use. No activities are located in denning habitat or areas of persistent spring snow. All three projects would occur on a total of about 3 percent of the entire Prospect Creek watershed. At the watershed scale, even if a wolverine were present in any one of these project areas during implementation, temporary displacement of a wolverine on this 3 percent of area would likely have no discernible effects due to the species' very large home range and the fact that no activities would occur in primary habitat.

The Little Beaver project located on the Kootenai National Forest approximately three miles north of the Clear Creek project area could possibly cause a wolverine to temporarily avoid activity areas during implementation. However, none of these activities are located in denning habitat or in areas of persistent spring snow.

If all four projects were going on at the same time, there are ample areas within and between the project areas for a wolverine to displace to if present during implementation. Thus, cumulative effects would be immeasurable.

Flammulated Owl

Flammulated owls are small, migratory birds that inhabit mountainous forests throughout western North America. They were once considered quite rare, but more recent opinion is that they are common but secretive (McCallum 1994). The combination of their small size (about 7 inches in height); low-pitched, soft voice; nocturnal nature; and cryptic coloring, which allows them to blend into their surroundings, makes observation of them difficult. This owl's secretive nature and widely scattered distribution make it very difficult to gauge population trends for this species.

The species is ranked by NatureServe as globally apparently secure - uncommon but not rare (MNHP 2010). In Montana, the Natural Heritage Program ranks the species as potentially at risk, but may be locally abundant (Ibid). McCallum (1994) noted that flammulated owls are "perhaps the most common raptor of the montane forests of the western United States." Samson (2006) suggests that habitat is very abundant throughout the Northern Region and on the Lolo National Forest. This species has been observed in at least 7-8 drainages on the Plains/Thompson Falls Ranger District since 1995. Flammulated owls have been documented in Prospect Creek in recent years, including the Clear Creek project area.

Flammulated owls in the Northern Rockies of the western United States and Canada have been found primarily in low to mid-elevation montane forests with low to moderate canopy closure, a large tree component, and snags (McCallum 1994b) – structural characteristics associated with older forests. Older ponderosa pine forests and ponderosa pine/Douglas-fir forests appear to be favored (Linkhart and Reynolds 1997). This species also favors relatively open areas or patches of openings for foraging, and also some dense patches of younger trees for roosting (Samson 2006). National Forest System lands within the Clear Creek project area contain about 4552 acres of suitable flammulated owl habitat, mainly at lower elevations north of Clear Creek. In 2010, four owls were observed in three locations but no nests were found during surveys. However, no birds were detected in 2011 within the same general area. Lack of or limited detection does not mean the habitat is unsuitable – only that the owls did not respond to the survey calls, the surveyors failed to hear the birds' response call, or birds could have been absent during the survey period. As stated above, this species is difficult to detect.

To gain knowledge on habitat availability, Samson (2006a, 2006b) estimated flammulated owl habitat in each National Forest in Region One using habitat variables reported in local scientific literature to build habitat relationships models. The models were used to query the Forest Inventory and Analysis (FIA) database, resulting in statistically reliable habitat estimates by Forest wherein changes can be effectively monitored over time. Coupled with the breeding distribution data collected in 2005 and 2008, the owl and its habitat appear relatively common and widespread throughout managed habitats Region-wide, including the Lolo National Forest. Conservative estimates show flammulated owl habitat on the Lolo National Forest is 3 times the amount needed to maintain a minimum viable population

Region-wide (Samson 2006a). Results also indicate that breeding habitat is well-distributed. Although a modest decline in ponderosa pine from 1942 to present was reported in 9 of 12 National Forests, Douglas-fir has increased substantially, suggesting an overall increase in habitat for the owl.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effect on flammulated owls because no management activity would occur. However, over the long-term continued ingrowth of understory trees would continue to reduce the quality of foraging habitat. Increased tree density would reduce the space for birds to maneuver while feeding in the air and shade out the herbaceous understory plants that support the insects upon which flammulated owls prey. In addition, the increase in tree density and continued absence of active management or lower-intensity wildfire would result in an increased risk of stand replacement wildfire. A stand replacement wildfire would render the existing owl habitat unsuitable for a long period of time.

Alternative 2: Direct and Indirect Effects

Flammulated owls are migratory and may reside in the project area from April to October each year. Proposed vegetation management activities may temporarily disturb individual owls and cause displacement at the beginning of courtship/mating season or post-fledging if they are present during project implementation.

In Alternative 2, vegetation management activities would occur within 777 acres (16 percent) of the suitable flammulated owl habitat on all ownerships within the project area (17 percent of habitat on National Forest System lands) (see Table 11).

Table 11: Proposed Treatments in Suitable Flammulated Owl Habitat

Suitable Flammulated Owl Habitat within Project Area (acres)	Treatment Type	Total Acres (% Of Available) By Treatment Type	Total Treated Acres (% Of Available)	Portions Of Units Affected
4781	**NON-COMMERCIAL TREATMENTS**			
	Non-commercial Thin	31 (0.6%)	**194 (4%)**	41
	Prescribed Burn	139 (3%)		80, 82-85, 88-91, 93-97, 100
	Watershed Improvement	24 (0.5%)		W1, W2
	COMMERCIAL TREATMENTS			
	Commercial Thin	480 (10%)	**583 (12%)**	1-3, 1A, 5-9, 6A, 8A, 12A, 12B, 14, 15, 15A, 15B, 16A, 16B, 16C, 27, 31, 31A, 61, 62, 62A
	Shelterwood Cut	103 (2%)		1B, 4, 11, 16D, 16E, 27A, 29, 30, 31B, 31C, 60

Commercial thinning and prescribed burning on 619 acres would promote open-forested conditions in these dry forest types. In the event of a future wildfire, there would be a higher probability that these treated areas would remain as suitable flammulated owl nesting and

foraging habitat as opposed to untreated areas that would be more susceptible to damage from high severity fire. These treatments would remove an estimated 20 to 50 percent of the canopy, leaving at least 50 percent intact. Structural components (canopy cover and large live trees and snags) consistent with where owls occur in this part of their range as summarized in Samson (2006a) would be retained. Commercial thinning and prescribed burning would improve foraging habitat by creating more space between trees for birds to maneuver while feeding and increasing sunlight to herbaceous and shrub plant species. After treatment, these areas would be characterized by larger trees, a variety of tree sizes/ages, herbaceous grasses and forbs in the understory, and more open stand conditions. These treatments would likely increase herbaceous understory plants that support the insects upon which flammulated owls prey. Snags which are often used for nesting would be retained unless they are a hazard to workers.

For the shelterwood harvest treatments on approximately 103 acres of owl habitat (about 2.3 percent of the suitable flammulated owl habitat on National Forest System lands within the project area, see Table 11) canopy cover would likely be reduced below suitable levels for occupancy by the species (less than the recommended minimum of 35 percent as summarized in Samson 2006a). Following shelterwood harvest, these areas would be considered unsuitable habitat for owls for several decades until the areas are regenerated with mature trees. These 103 acres consist of 27 patches of suitable habitat ranging in size from less than an acre to 21 acres, which is smaller than the average territory size for the flammulated owl (approximately 40 acres). The three largest patches are 14, 19, and 21 acres; the remaining patches are smaller. Despite this reduction, the amount of flammulated owl habitat on the Lolo National Forest would remain abundant within the project area and across the Forest following implementation of Alternative 2.

In 2010, owls were detected within and immediately adjacent to two proposed harvest units (11 and 12B), although no nests were identified. Unit 11 is not considered suitable flammulated owl habitat because the dominant tree species of the stand is not ponderosa pine, which is preferred by the owl. Unit 12B is considered suitable habitat. These two units would be surveyed in the year that harvest would occur to determine if owls are present at that time. If the units are occupied, harvest of these units would not occur between April 1 and August 15 to enable any young owls time to fledge (see Resource Protection Measure #27 in Table 8), which would avoid potential harm to individual birds. The existing suitable habitat within Unit 12B would remain suitable after commercial thinning treatment.

Alternative 2 would not lead to a loss of species viability or contribute to a trend toward Federal listing because suitable habitat would be maintained on all but 2.3 percent of the existing habitat on National Forest System lands within the project area and habitat is abundant across the Forest and Region. Alternative 2 would improve the quality of foraging habitat on about 14 percent of the existing flammulated owl habitat on National Forest System lands within the project area.

Alternative 2: Cumulative Effects

Where past regeneration harvest occurred in low elevation mature stands of ponderosa pine and Douglas-fir, it likely reduced the amount of suitable flammulated owl habitat within the

project area until regenerated trees reach maturity. Within the Clear Creek project area, approximately 1500 acres is privately owned, with about 85 percent (1250 acres) of that is industrial timber lands. Most of the industrial timber lands were cut using regeneration harvest methods about a decade ago, which likely removed some suitable flammulated owl habitat.

Currently there is approximately 4552 acres of suitable owl habitat on National Forest System lands within the Clear Creek project area. Although Alternative 2 would reduce the amount of habitat by an additional 103 acres, the other treatments proposed in flammulated owl habitat would improve foraging conditions as described above. Activities that restore the open character of ponderosa pine and dry Douglas-fir stands and retain mature large diameter trees are believed to be beneficial for these owls (Linkhart et al. 1998; Goggans 1985). Overall, Alternative 2 would contribute to an improving trend on about 14 percent of the flammulated owl habitat on National Forest System lands within the project area.

Since the territory size for flammulated owls is relatively small (approximately 40 acres), past, present, or future actions outside of Clear Creek would not likely affect owls that inhabit the project area from April to October. However, cumulative effects on habitat were considered at a larger scale. Outside the project area, the Shorty Gulch Fuels Reduction Project, located within the Prospect Creek watershed about 2 miles to the south of the Clear Creek project area is currently ongoing. Fuel reduction activities include prescribed burning, and commercial and non-commercial mechanical treatments on approximately 946 acres. Although some activities may displace individual owls if they are present during implementation, none of the activities would reduce the existing amount of flammulated owl habitat. Fuel reduction activities would improve existing foraging habitat similarly to what is described above for the Clear Creek project, which would benefit the species.

The Antimony project is ongoing and located in the Cox and Antimony Creek area approximately five miles to the southwest of the Clear Creek project area. The environmental analysis concluded that proposed thinning and underburning activities would improve flammulated owl habitat on approximately 361 acres contributing to the improving trend of the quality of flammulated owl habitat within the Prospect Creek watershed. However, shelterwood harvest on 40 acres would likely reduce tree canopy cover below suitable levels for occupancy by the species. These 40 acres of shelterwood harvest combined with the 103 acres of shelterwood harvest in the Clear Creek project would reduce the amount of suitable flammulated owl habitat within the Prospect Creek watershed by less than one percent for several decades until the areas are regenerated with mature trees. Thus, habitat would remain abundant within the watershed and across the Forest.

The Little Beaver project, located approximately three miles north of the Clear Creek project area would reduce the amount of suitable flammulated owl habitat by 399 acres from regeneration harvest. However, 5618 acres of flammulated owl habitat would remain. The 399 acres would equate to a 7 percent reduction in habitat within the Little Beaver project area and less than a one percent reduction on the Kootenai National Forest. Abundant habitat would remain within the Little Beaver project area and Kootenai National Forest.

If all four projects were ongoing at the same time, there is ample habitat within and in between these project areas for birds to displace to if they are present during implementation.

Harlequin Duck

Harlequin ducks require swift moving, productive streams to breed in spring and summer. They have not been detected in Clear Creek or Prospect Creek. Limited habitat is available in Clear Creek due to the intermittent nature of the stream. Since the middle reach of Clear Creek goes dry, only the lower 2.5 miles and portions of the upper reach contain suitable habitat.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on this species because no activities would occur.

Alternative 2: Direct, Indirect, and Cumulative Effects

Since no project activities would occur within riparian areas in the lower 2.5 miles or in the suitable habitat in the upper reach of Clear Creek, Alternative 2 would have no effect on nesting habitat. Although road-related activities near streams could temporarily increase fine sediment delivery to Clear Creek, it would not likely affect the amount of waterborne insects available for foraging females and young. Thus, Alternative 2 would not lead to a loss of species viability or contribute to a trend towards Federal listing

Boreal Toad

Adult western toads are largely terrestrial and use a variety of habitats including wetlands, forests, meadows, and floodplains. However, they breed in lakes, ponds, and slow streams (Maxell 2000, Werner et al. 2004). No boreal toads, tadpoles, or breeding habitat were found in the project area during surveys.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on this species because no activities would occur.

Alternative 2: Direct, Indirect, and Cumulative Effects

No activities other than culvert removals and replacements and instream rehabilitation work would occur within streamside buffers (refer to Resource Protection Measure #28 in Table 8) which would protect breeding concentrations of any amphibians present in aquatic habitats. Culvert work would occur during low water in July/August, which is not considered within the breeding season for this species. The instream rehabilitation work would also occur in July/August when Clear Creek is dry. Alternative 2 would remove and/or replace culverts that currently limit passage of aquatic organisms. Proposed road maintenance, decommissioning, and storage would reduce long-term fine sediment yield to area streams (see Hydrology and Fisheries sections of this document). The long-term reduction in stream sediment and improved stream connectedness would enhance amphibian habitat.

Outside the breeding season, adult toads could potentially use a variety of upland habitats within the project area, thus a limited number of individual toads could be at risk of mortality from project activities. However, Alternative 2 would not lead to a loss of species viability or contribute to a trend towards Federal listing because no breeding areas would be adversely affected; individuals are likely very widely distributed in upland areas; there would be a low potential for direct or indirect harm from activities due to the widely dispersed nature of individuals; no discernable cumulative effects; and habitat connectivity would be increased (Wildlife report, page 65).

Coeur d'Alene Salamander

Although no salamanders were found in the project area during surveys, they could be present in some of the cold, tributary streams, especially south of Clear Creek. This species, as far as it is known, generally remains very near streams, seeps, and springs and does not use upland areas. It uses the wet zone immediately adjacent to streams, but does not live in the water.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on this species because no activities would occur.

Alternative 2: Direct, Indirect, and Cumulative Effects

Streamside buffers would maintain cover and limit disturbances near streams, seeps and springs, which would adequately protect habitat for Coeur d'Alene salamanders (see Resource Protection Measure #28 in Table 8).

Culvert removal removals/replacements could impact individual salamanders if they were on site during implementation of these activities. Because the risk is low (no Coeur d'Alene salamanders have been located within the drainage and culverts/removals would occur during low water), the project would not contribute to a loss of species viability or contribute to a trend toward Federal listing.

The potential effects of this project combined with those of past, present, and reasonably foreseeable future actions would not contribute appreciable cumulative effects to this species or its habitat and would not affect population viability. Herbicide treatment of existing weed populations along drivable roads is ongoing. The Clear Creek project would implement the same weed treatment on roads that would be reopened to provide access for project activities. Herbicide application would follow all protective requirements listed in the Lolo National Forest Weed Management EIS (2007) and Forest Plan Amendment 11. These measures were designed to protect water quality and minimize potential effects to aquatic species.

Fisher

Although fishers are listed as sensitive by the Forest Service in Region 1, they are legally trapped in the state of Montana under the administration of Montana Fish, Wildlife, and

Parks. According to records, no fishers have been trapped (and recorded) within the Clear Creek project area since before 1987. Snow tracking and hair snagging surveys were conducted within the Clear Creek and Prospect Creek drainages in 2011 (Lolo National Forest, unpublished data, 2011). Two potential fisher tracks were observed and followed, but no genetic material was collected on either track. Thus, it remains unconfirmed if these tracks were from a fisher. Given the patchy distribution of fisher habitat and the difficulty in surveying for the species (described below) one cannot assume that fisher are not present in the project area on occasion.

Research to determine distribution and abundance using DNA analysis of hair has been ongoing in Region One of the Forest Service since 2006-2007 (Schwartz et al. 2007). The Lolo National Forest has participated in the grid-based/hair trap surveys over the past several years, coordinating with partners at Montana Fish, Wildlife and Parks and others to expand the coverage of fisher detection surveys across the Forest. Preliminary results have documented fisher presence scattered across 4 of 5 Ranger Districts on the Forest.

Fishers were petitioned for listing as a threatened or endangered species in February 2009. In March 2011, the U.S. Fish and Wildlife Service determined that listing was not warranted (76 FR 38504, June 30, 2011). Based on limited survey information, the current distribution of fishers appears similar to the historic distribution in Idaho and Montana. Precise, current fisher population numbers or trends are unknown. Population numbers were never thought to be historically large because the species is extremely limited in distribution due to its large home range size, particularly in naturally fragmented landscapes. To add to their limited distribution, fishers are highly territorial; therefore overlap among individuals is limited. This also makes the species difficult to survey for and detect. It is known that fisher populations in Montana have resurged from previous lows in concert with human development, timber harvest, and regulation of trapping harvest by Montana Fish, Wildlife, and Parks.

The home range of fishers varies in size from 7 to 32 miles^2 (average female: 7-12 miles^2) (Foresman 2012), wherein optimum habitat is thought to include mature, moist coniferous forest with a woody debris component, particularly in riparian/forest ecotones in low- to mid-elevation areas that do not accumulate large amounts of snow (Jones and Garton 1994; Heinemeyer 1993, Ruggiero et al. 1994). A review of fisher research suggests that the species uses a diversity of tree age and size class distributions at the patch or stand level that provide sufficient (generally greater than 40 percent) overhead cover (either tree or shrub). Based on limited research, fishers in northwestern Montana were most often found in moist grand fir and cedar habitat types (Heinemeyer 1993). Banci (1989) believes the best fisher habitats are multi-aged stands interspersed with small openings and containing riparian habitats. Complex understory structure with abundant woody debris may also be an important habitat factor. The fisher feeds on a variety of prey including snowshoe hares, porcupines, carrion, squirrels, small mammals and birds (Banci 1989, Powell and Zielinski 1994; and well summarized in 76 FR 38504, June 30, 2011).

In the Clearwater Mountains of north-central Idaho, Sauder and Rachlow (2014) found that landscapes with greater than or equal to 50 percent mature forest arranged in contiguous,

complex shapes with few isolated patches, and open areas consisting of less than or equal to 5 percent of the area appear to constitute a forest pattern used by fisher.

Conservative estimates of fisher habitat on the Lolo National Forest using Forest Inventory Analysis (FIA) data show that fisher habitat is relatively abundant comprising 530,782 acres in winter and 159,136 acres in summer (Samson 2006b). The estimated habitat threshold for maintaining a minimum viable population of fisher across all of Region One is 100,078 acres (Ibid.). Thus, habitat on the Lolo National Forest appears more than sufficient to maintain fisher viability Region-wide.

Patches of optimum habitat in the project area are primarily located on the south side of Clear Creek and in the headwater area. Large diameter spruce/fir and moist grand fir are limited in the project area due to stand replacing fire that occurred in 1910. On the north side of Clear Creek where vegetation treatments are proposed, fisher habitat is limited due to drier habitat types that fishers tend to avoid (Jones and Garton 1994, pages 377-378). Table 12 provides a summary of the amount of modeled fisher habitat, including acres that meet summer and winter habitat requirements. Criteria for estimating habitat were adapted from Forest Inventory and Analysis (FIA) models developed by Samson (2006b) for fisher in the Northern Rockies using standard methods developed by the Region One Vegetation Analysis Team. In general, habitats include a variety of mature (overstory greater than 15 inches in diameter at breast height, depending on the habitat type) and older, moist coniferous and deciduous forest habitat types at low-to mid-elevations with at least 40 percent canopy cover. Habitat use in summer appears more restricted to riparian corridors compared to a broader range of habitat use in winter (as described above). Potential habitat includes moist coniferous forest types at mid- to low- elevations, where stand structure does not meet the canopy cover or size class requirements, but could grow into fisher habitat in the future. Suitable winter habitat in the project area comprises 33 percent ((860+2161)/9290 acres, Table 12) of the total modeled suitable and potential fisher habitat, whereas suitable summer habitat comprises 9 percent (860/9290 acres).

Table 12: Summary of suitable fisher summer and winter habitat, additional winter habitat that does not meet summer habitat requirements, and other potential habitat that currently does not meet summer or winter habitat requirements but has the potential to grow into suitable fisher habitat in the future.

Project Area (acres)	Summer and Winter Fisher Habitat (estimated acres)	Additional Winter Habitat that does not meet summer habitat requirements (estimated acres)	Other Potential Habitat (estimated acres)	Total of Suitable and Potential Fisher Habitat (estimated acres)
18,223	860	2161	6269	9290

Research on the impacts of vegetation treatments on fisher is limited (summarized in 38532 Fed. Reg. Vol. 76, No. 126, June 30, 2011). Powell and Zelinski (1994) purported that fishers may tolerate small patch cuts or other small-scale disturbances, provided these occur in a larger matrix of relatively dense, closed canopy, late succession forest. They went on to state that such openings, with adequate woody debris left on site, might even increase the

value of habitat by providing a diversity of prey, which would support a diverse diet for fishers.

In its' 12-month status review of the species, the USFWS stated that "due to its need for forest cover and susceptibility to capture and mortality from furbearer harvest… precautionary measures to protect the species [should] be continued" (38504 Fed. Reg. Vol. 76, No. 126, June 30, 2011). The USFWS concluded that: "Timber harvest and management have significant potential to alter the suitability of a landscape for fishers; conversely, management of forests using mechanical means or fire can assist in creating conditions that foster larger trees, create snags, increase woody debris, or open densely stocked areas to provide habitat for fisher prey species. Fishers in the Northern Rocky Mountains evolved in forest types where fire frequency and intensity were mixed, and wind throw was common, resulting in a complex and intricate landscape mosaic of young, mixed-age, and late-seral components (Jones 1991, p. 111; Arno et al. 2000, pp. 225–227). Thus, the result of silviculture treatments or harvest may resemble the natural disturbances and the succession that follows (Powell and Zielinski 1994, p. 64)" (Ibid at. p. 38520).

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on fishers because no activities would occur that would change the existing vegetative condition or human access.

Alternative 2: Direct and Indirect Effects

Because of their naturally rare and wide distribution and the naturally limited amount and distribution of suitable habitat (discussed above), the potential for effects to even one individual fisher is relatively low. Direct effects, if they should occur, would be in the form of disturbance and displacement caused by mechanical treatments, prescribed burning, and road work. Evidence of fisher response to disturbance and displacement from vegetation management is limited, with mixed conclusions (38504 Fed. Reg. Vol. 76, No. 126, June 30, 2011). There is no scientific evidence that suggests fisher mortality would occur from proposed activities. Because of the spatial and temporal variability of proposed activities within the project area, and because suitable, large displacement areas occur in and adjacent to the project area, effects would likely be small in scale at any one time dispersed over a large area during the life of the project. Vegetation and road treatments are not expected to result in fisher mortality. Commercial treatments and roadwork would not occur in areas that provide large patches of suitable fisher habitat, which are primarily found on the south side of Clear Creek and in the headwater area. Instead, these activities would occur on the north side of Clear Creek in less suitable habitat consisting of small noncontiguous, patches across numerous treatment units (discussed above, and shown in Table 13).

Indirect effects to fisher could occur from vegetation treatments (Table 13). Suitable habitat would be modified through commercial treatments on 180 acres (6 percent of suitable habitat distributed in small noncontiguous patches across 22 treatment units). Commercial treatments would also occur within 140 acres (2.2 percent) of potential habitat that could become suitable in the future. Non-commercial treatments would occur on approximately 51 acres (1.7 percent) of suitable habitat and on 354 acres (5.6 percent) of potential habitat.

Nearly half the combined total of suitable and potential habitat affected by non-commercial treatments (182 acres) is concentrated in watershed improvement treatment units in the valley bottom, where little vegetation manipulation is proposed (see description in Chapter 2). The approximate other half of the affected habitat (204 acres) is scattered in noncontiguous small blocks among 12 prescribed burn units. Less than one-half of one percent of the affected habitat (19 acres) is contained within 4 separate small blocks in one non-commercial thinning unit.

After applying INFISH Riparian Habitat Conservation Area buffers, all riparian corridors and riparian/forest ecotones would be eliminated from commercial and non-commercial treatments, that would ultimately reduce the total acreage treated and conserve optimum fisher habitat across the project area. No old growth would be treated and treatments would not preclude treated stands from developing into old growth in the future. Commercial treatments are designed to favor growth of large trees and stimulate understory shrubs, grasses and forbs production for fisher prey species. Approximately 60 acres (2 percent) of suitable winter habitat (scattered in small, disjunct blocks in Units 1B, 4, 16D, 16E, 27A, 31B, 31C, 60) would be regenerated through shelterwood cutting. In addition, 34 acres (0.5 percent) of the potential future habitat scattered in small, disjunct blocks would be regenerated through shelterwood cutting (Table 13). Shelterwood cutting would occur within areas affected by root disease and have ongoing tree mortality. These root disease areas would unlikely ever become old growth in the future without the proposed treatment to modify the tree species mix to favor tree species that are resistant to root disease. Shelterwood treatments would temporarily reduce canopy cover until the treated areas regenerate with trees. However, they would be nested among forested areas with denser canopy and understory conditions; therefore the forested nature of the area would be maintained. Such treatments are not expected to impact fisher and may provide for prey such as ground squirrels (Powell and Zielinski 1994).

While forest structure would change within treated areas, forested stands would not be converted to non-forest; therefore forested connectivity would be maintained. A decline in a portion of the large woody debris component would likely occur in all commercial and non-commercial treatment units that would be underburned. This could temporarily reduce habitat quality for fisher denning and fisher prey (Ibid.). However, large woody debris would be left in all treatment units consistent with Forest Plan standards (see Resource Protection Measure #24 in Table 8) which would minimize impacts. All riparian corridors and wet areas in units, that provide optimum fisher habitat, would be avoided altogether through the use of Riparian Habitat Conservation Areas which would further minimize impacts.

Table 13: Proposed Treatments in Suitable and Potential Fisher Habitat. Table includes total acres of existing summer and winter habitat and winter only not used in summer. It also includes potential habitat that currently does not meet summer or winter habitat requirements but has the potential to grow into suitable fisher habitat in the future.

Fisher Habitat	Total Acres Existing	Treatment Type	Total Acres (% Of Available) By Treatment Type	Total Treated Acres (% Of Available)	Portions Of Units Affected
		NON-COMMERCIAL TREATMENTS			
SUMMER AND WINTER	**860**	Non-commercial Thin	5 (0.6%)	**21 (2.4%)**	41
		Prescribed Burn	10 (1.1%)		80, 84, 93
		Watershed Improvement	6 (0.7%)		W1, W2
		COMMERCIAL TREATMENTS			
		Commercial Thin	15 (1.7%)	**15 (1.7%)**	5, 14, 15B
		NON-COMMERCIAL TREATMENTS			
WINTER	**2161**	Non-commercial Thin	4 (0.2%)	**30 (1.4%)**	41
		Prescribed Burn	20 (0.9%)		84, 88, 89, 93, 96
		Watershed Improvement	6 (0.3%)		W2
		COMMERCIAL TREATMENTS			
		Commercial Thin	105 (4.9%)	**165 (7.6%)**	3 , 5, 14, 15, 15A, 16A, 16B, 16C, 27, 31, 31A
		Shelterwood	60 (2.8%)		1B, 4, 16D, 16E, 27A, 30, 31B, 31C, 60
		NON-COMMERCIAL			
POTENTIAL*	**6269**	Non-commercial Thin	10 (0.2%)	**354 (5.6%)**	41
		Prescribed Burn	174 (2.8%)		81-84, 88-91, 93, 95-97
		Watershed Improvement	170 (2.7%)		W1, W2
		COMMERCIAL			
		Commercial Thin	106 (1.7%)	**140 (2.2%)**	1-3, 1A, 5-9, 6A, 8A, 12A, 12B, 14, 15, 15B, 16A, 16B, 16C, 61, 62, 62A
		Shelterwood	34 (0.5%)		4, 11, 16E, 30, 31B, 31C

* Other potential habitat that currently does not meet summer or winter habitat requirements but has the potential to grow into suitable fisher habitat in the future.

Alternative 2 would not contribute to a loss of species viability or trend toward Federal listing because:

- The potential for negatively impacting even one individual fisher is low.
- The project proposes to commercially treat a modest 6 percent of suitable habitat and 2.2 percent of potential future fisher habitat distributed in small, disjunct patches across multiple treatment units. Impacts would be temporary in nature and small in scale.
- No activities would fragment wet forest types.

- Riparian forest areas would be maintained through the application of Riparian Habitat Conservation Areas (see Resource Protection Measures in Chapter 2).
- There would be no change to trapping pressure or effects to population linkages because drivable, open road density would remain unchanged.
- Coarse woody debris and snags would be retained consistent with Forest Plan Standards (see Resource Protection Measures in Chapter 2). No existing old growth would be affected (see Vegetation section).
- Fisher habitat is abundant and well-distributed on the Forest and Region to maintain viable fisher populations (Samson 2006b).

Alternative 2: Cumulative Effects

Historical trapping, increased road access, and clearcutting, especially in riparian areas, all likely impacted fisher populations across the western U.S. Fishers were released in some areas of western Montana to augment nearly extinct populations (Powell and Zielinski 1994). Montana Fish, Wildlife, and Parks regulates trapping of fisher and have reduced quotas over the years, but the species remains vulnerable to trapping pressure. Clearcutting, riparian harvest, and road access has decreased on public lands over the last two decades and has likely stabilized impacts to fisher (summarized in 76 FR 38504, June 30, 2011, including internal citations). Of note, fisher abundance and distribution has increased in concert with the above activities.

Past timber harvest has occurred within the Clear Creek project area using various prescriptions and logging systems. Past harvest on Forest Service lands has occurred on about 5400 acres (30 percent of 28,223 acres), of which two-thirds was completed prior to 1980. Less than half of the past harvest acres (2310 acres or 13 percent of 28,223-acre watershed) received regeneration harvest to create young age class. The remaining acres were thinned using a variety of intermediate and uneven-aged techniques that retained a substantial overstory component. All pre-1980 and many post-1980 stands now likely provide a variety of conditions for fisher foraging and travel.

Within the Clear Creek project area, approximately 1500 acres is privately owned, with about 85 percent (1250 acres) of that in industrial timber lands. Most of the industrial timber lands were cut using regeneration harvest methods about a decade ago. However, most of this private land is located on dry south aspects, which fishers tend to avoid (Jones and Garton 1994, pages 377-378). Thus, effects to fisher habitat from activities on private land are likely inconsequential.

The project would commercially treat a modest 180 acres of additional existing fisher habitat and 140 acres of potential future fisher habitat distributed in small noncontiguous patches across 31 treatment units. At this small scale, treatments are not expected to add negative cumulative impacts to the species.

Gray Wolf

In 2011, gray wolves in Montana were removed from the Endangered Species List (Federal Register 76 (87): 25590-25592) because population recovery goals were met. Montana Fish,

Wildlife, and Parks have been attempting to trap and radio-collar wolves in the Prospect Creek drainage, but to date these efforts have been unsuccessful. The Clear Creek area is north of the general area used by the Mullan pack and west of the area used by the Silcox pack, both of which have radio-collared individuals. Snow tracking surveys in 2011 detected several sets of wolf tracks in Clear Creek. No dens or rendezvous sites are located within the project area, but a known denning site is a few miles to the south.

Wolf pack home range sizes vary from 50-200 square miles and components of wolf habitat are a year-round prey base of mainly deer and elk, suitable denning and rendezvous sites, and protection from human caused mortality (US Fish and Wildlife Service 1987).

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effects on wolves because no activities would occur. However, continued forest succession in the absence of disturbance would reduce the quality of winter range used by deer and elk, a prey base for wolves. This would not likely noticeably affect wolves because of their ability to forage in different locations within their territory and concentrate on different forage species if needed.

Alternative 2: Direct and Indirect Effects

Alternative 2 would maintain adequate secure habitat for wolves to continue to occupy the area at least to the level they have been in recent years because there would be no net change in the density of roads that are open and drivable to the public. If present during project activities, wolves could be temporarily displaced as they would likely avoid areas with active timber harvest, prescribed burning, and road work. However, the effects would be inconsequential because of the wolf's wide-ranging nature. At most, the concentrated area where the majority of activities are proposed makes up about 24 percent of a home range. The undeveloped land to the south and west of the project area would remain undisturbed and would provide for suitable displacement and security habitat during project implementation.

Vegetation management to improve forest health would increase forage for deer and elk and other prey species by reducing tree density and increasing sunlight and nutrients for shrubs, forbs, and grasses.

Alternative 2 would have no effect on any known denning or rendezvous sites.

Although project activities could temporarily displace wolves if they are present during implementation, Alternative 2 would not affect species viability or contribute to a trend toward Federal listing.

Cumulative Effects

Residential development on the private lands in the eastern end of the project area likely has more of an impact on wolves than forest management activities because more people living in wolf habitat often leads to conflicts with pets or livestock. When these conflicts occur,

wolves can be removed. Future private land development would further decrease habitat quality.

Within the Prospect Creek watershed, two other projects could be ongoing at the same time as the Clear Creek project. The Shorty Gulch and Antimony projects would occur on a combined total of approximately 2000 acres separated from the Clear Creek project area and each other by several miles. All three projects would occur on a total of about 3 percent of the entire Prospect Creek watershed. At the watershed scale, temporary displacement of wolves on this 3 percent of area would likely have no discernible effects on the wolves that use the Prospect Creek watershed. Both the Shorty and Antimony projects would improve forage conditions on big game winter range areas which would benefit prey species.

The Little Beaver project located on the Kootenai National Forest approximately three miles north of the project area could also cause wolves to temporarily avoid activity areas during implementation, but transient use could still occur. Ample areas for displacement exist between Clear and Little Beaver Creeks as well as to the west, thus cumulative effects would be immeasurable.

The reduction of forest cover by timber harvest in the Clear Creek project and the Antimony, Shorty Gulch, and Little Beaver projects could increase wolf susceptibility to hunter-caused mortality, but management by Montana Fish, Wildlife, and Parks is designed to prevent this mortality from trending the species toward federal listing through regulated wolf harvest.

Townsend's Big-eared Bat

The Clear Creek project area could be used by these bats for foraging, but there are no known caves, mines, or other potential roosting areas. Rock crevices located in upper Clear Creek may have a low potential to be used as roosts or maternity areas by this species, however these features often are less suitable for bats because they typically do not contain the correct range of temperature and humidity.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effects on this species or its habitat because no activities would occur. However, this alternative would result in the continued decline in the quality of foraging habitat. The open, dry forest habitat types used by this species would continue to grow denser in the absence of vegetation management activities and/or natural low intensity wildfire. Because insect abundance and herbaceous cover are correlated (Healy 1985), shading by young conifer trees in these denser stands reduces herbaceous vegetation (Campbell et al. 2006) and consequently, reduces moth and other insect populations used as forage for bats. The risk of stand-replacing wildfire, which would remove habitat for the species, also would increase over time.

Alternative 2: Direct and Indirect Effects

Minor disturbances from project related activities are unlikely to occur to individuals using the area because: 1) no known suitable roosting sites are available and thus the species would

likely be absent except during actual foraging; 2) bat foraging happens at night, when project activities would not be occurring.

Townsend's big-eared bats generally select dry forests types such as those used by flammulated owls. Alternative 2 would improve foraging conditions on approximately 619 acres of suitable habitat through commercial thinning and prescribed burning activities. The proposed activities would create a more open forest with vigorous herbaceous understory vegetation that would improve foraging habitat for the species if they use the area. Within the 103 acres of potential habitat to be treated with shelterwood cutting followed by prescribed burning, conditions would remain suitable for aerial foraging and the insects upon which these bats prey would likely still be abundant after treatment. Thus, Alternative 2 would not lead to a loss of species viability or contribute to a trend toward Federal listing (Wildlife Report, page 54).

Cumulative Effects

There are no reasonable foreseeable future actions in the project area that would affect Townsend's big-eared bat or its habitat. Alternative 2 would contribute to an improving trend in Townsend's big-eared bat foraging habitat within the project area.

Black-backed Woodpecker

Black-backed woodpeckers are not likely within the Clear Creek project area or if they are, in very low numbers. Black-backed woodpeckers occupy forested habitats that contain high densities of recently dead and dying trees, which primarily wood borer beetles have colonized (Dixon and Saab 2000; Powell 2000). Large expanses of fire-killed trees are considered the most suitable habitat in Montana (Hutto 1995). There are no recently burned areas present within the project area. While many studies have shown black-backed woodpeckers primarily use post-fire habitat, some studies have found these woodpeckers in areas without recent fire. For example, both Bonnot (2006) and Goggans et al. (1987) found black-backed woodpeckers within extensive mountain pine beetle outbreaks that occurred in the absence of fires. However, this specifically was not observed on the Lolo National Forest (Cilimburg et al. 2006). The Clear Creek project area contains some areas of lower quality foraging habitat consisting of insect-killed lodgepole pine, but no vegetation treatments are proposed within them.

The Lolo National Forest contains abundant suitable habitat for this species, several times the amount estimated as needed to support a viable population across the entire Northern Region (Samson 2006b).

Alternative 1: Direct, Indirect, and Cumulative Effects

Because Alternative 1 would not change the existing vegetative condition in the analysis area, it would have no impact on black-backed woodpeckers. Insect-infested trees would likely continue to provide limited foraging opportunities for this species. Suppression of unplanned fires would likely continue. Thus, fire-killed trees would unlikely be recruited except in the event of an uncontrolled wildfire. Because Alternative 1 would have no

measurable direct or indirect effects on black-backed woodpeckers, cumulative effects would be negligible.

Alternative 2: Direct, Indirect, and Cumulative Effects

Alternative 2 would have no direct, indirect, or cumulative effects on black-backed woodpecker because no harvest activities would occur within areas with high densities of recently dead and dying trees (burned or unburned). Although Alternative 2 proposes prescribed burning, these would be low intensity fires which are not expected to kill patches or larger areas of trees, and thus no suitable burned habitat would be created.

Vegetation treatments are proposed on approximately 12 percent of the 18,223-acre Clear Creek project area, primarily in the dry ponderosa pine/Douglas-fir forest types. Although treatments would reduce the risk of high severity fire and insects, and disease outbreaks within treated areas, they would not preclude natural disturbances (e.g. fire, insects, and disease) within these areas and subsequent tree mortality in the future. The entire south side of Clear Creek which contains forests that evolved in stand-replacement fire regimes would remain unaffected by the project. Regional assessments (Samson 2006a, 2006b) indicate viability is not a concern for black-backed woodpecker because:

- A comparison of habitat required for a minimum viable population to that available indicates well-distributed habitat far exceeds that needed, given the natural distribution of the species and their habitats as mapped and according to the scientific literature (Samson 2006b). Black-backed woodpecker habitat is abundant and well-distributed across the Region and Lolo National Forest (Samson 2006a, USDA Forest Service 2012).
- Evidence suggests the black-backed woodpecker is increasing in numbers in the United States (as cited in Dixon and Saab 2000). No demographic information exists to suggest a decline in woodpecker numbers.
- Habitat for the black-backed woodpecker has recently increased and amounts are expected to increase as fires and bark beetle outbreaks continue to increase in size (Gallant et al. 2004, Hessberg and Agee 2003, Hessberg et al. 2004).
- The level of salvage timber harvest of the forest landscape in the Northern Region is insignificant (Samson 2006a).

Management Indicator Species

Pileated woodpecker

The pileated woodpecker, considered widespread and common in Montana (MNHP 2009), functions as an indicator of mature old growth with limited management in the Lolo Forest Plan (Forest Plan, page VI-17). As such, the health of its population acts as an indicator of the condition of habitats for other wildlife species that use large snags and mature forests. The Lolo Forest Plan states, “As monitoring technology becomes available for the goshawk and pileated woodpecker, population trends will be monitored. In the interim, habitat parameters including old-growth acres and condition, and snag densities will be monitored as an indicator of population trend” (Lolo Forest Plan, page II-14).

Estimates of habitat determined from Forest Inventory and Analysis (FIA) data clearly indicate that habitat for the species is abundant and well-distributed Region-wide (Samson 2006a). On the Lolo National Forest, 99,080 acres of habitat is available for nesting and 157,457 acres for winter foraging (considered a critical time of year for the woodpecker; ibid.). Available habitat on the Lolo National Forest alone is twice that needed to maintain a minimum viable population of the species in the entire Region (Samson 2006b). Within the Clear Creek project, there are approximately 11,688 acres of pileated woodpecker nesting and foraging habitat (Table 14).

Population monitoring data collected for breeding birds along random transects across Region One (including the Lolo National Forest) from 1994 to 2000 show a clear upward trend in pileated woodpecker numbers, indicating viability is not a concern (http://www.birdsource.org/LBMP/). Pileated woodpeckers were observed in nearly all survey transects conducted in and around Thompson Falls, close to the project area. Pileated woodpecker foraging sign was identified within the Clear Creek project area.

Pileated woodpeckers often use snags within stands of larger trees for both foraging and nesting although areas with few large trees can serve as foraging habitat. Bird surveys have shown that pileated woodpeckers are common in most habitats on the Lolo National Forest, including young forests, clearcuts, urban/residential areas, and agricultural land.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effects on pileated woodpeckers or their habitat because no activities would occur. However, untreated areas would likely be more susceptible to high severity, stand-replacement wildfire (Cram et al. 2006, Baker at al. 2007). After stand replacement fires occurs, habitat for this species would not meet the recommended conditions for several decades (Giese and Cuthbert 2003, Bonar 2001). Alternative 1 would have no measurable cumulative effects.

Alternative 2: Direct and Indirect Effects

Alternative 2 would maintain the existing amounts of pileated woodpecker habitat and reduce the likelihood of habitat loss by wildfire. As pileated woodpecker habitat is defined in Samson's habitat model (2006a), all areas that are currently suitable habitat would remain suitable habitat after treatment. Alternative 2 would treat approximately 1772 acres (15 percent) of the estimated nesting and winter foraging habitat within the project area (Table 14), leaving all of it with some nesting and foraging trees available to the woodpeckers after treatment. The areas that would be treated with prescribed burning or commercial thinning would retain most of the larger trees in the stand, thus have little effect on the species. Shelterwood cutting is proposed within 196 acres (2 percent) of pileated woodpecker habitat within the project area and would retain some foraging and nesting trees but not to the degree as the other treatments. Proposed activities generally would have little effect on pileated woodpecker habitat because vegetation treatments would retain larger overstory trees; snags would be retained in accordance with Lolo National Forest guidelines; no activities would occur within stands that meet the Regional definition for old growth (Green et al. 1992, errata

corrected 2005); and the average tree diameter of the stand would generally increase after treatment because smaller diameter trees would be cut and/or removed (Wildlife Report, pages 24-26). There is a possibility that some smaller snags may be knocked down during project activities but considering the acreage of dead and dying trees within the project area and the larger Prospect Creek watershed, the loss of a few small snags would be undetectable.

Table 14: Proposed Treatments in Pileated Woodpecker Habitat

Pileated Woodpecker Habitat	Total Habitat Acres in Project Area	Treatment Type	Total Acres (% Of Available) By Treatment Type	Total Treated Acres (% Of Available)	Portions Of Units Affected
		NON-COMMERCIAL TREATMENTS			
NESTING AND FORAGING	**5572**	Non-commercial Thin	30 (0.5%)	**693 (12%)**	41
		Prescribed Burn	483 (9%)		81-85, 88-91, 93-97, 100
		Watershed Improvement	180 (3%)		W1, W2
		COMMERCIAL TREATMENTS			
		Commercial Thin	285 (5%)	**337 (6%)**	1-3, 5-9, 6A, 12A, 12B, 14, 15, 15A, 15B, 16A, 16B, 16C, 27, 28, 31, 31A, 61, 62, 62A
		Shelterwood Cut	52 (0.9%)		4, 11, 16D, 16E, 27A, 29, 30, 31B, 31C, 60
		NON-COMMERCIAL TREATMENTS			
FORAGING	**6116**	Non-commercial Thin	30 (0.5%)	**142 (2%)**	41
		Prescribed Burn	106 (2%)		80-82, 84, 85, 88-91, 93-96, 100
		Watershed Improvement	6 (0.1%)		W2
		COMMERCIAL TREATMENTS			
		Commercial Thin	456 (7%)	**600 (10%)**	1-3, 1A, 5, 6, 6A, 8A, 9, 12A, 12B, 14, 15, 15A, 15B, 16A, 16B, 16C, 27, 31, 31A, 61, 62, 62A
		Shelterwood Cut	144 (2%)		1B, 4, 11, 16D, 16E, 27A, 29, 30, 31B, 31C, 60

Alternative 2: Cumulative Effects

The diversity of habitats used by this species would enable it to persist through a variety of influences. Pileated woodpecker habitat is abundant and well-distributed across the Region, Forest, and Clear Creek project area. The ongoing Shorty Gulch Fuels Reduction project (about 2 miles to the south) and Antimony project (approximately 5 miles to the southwest) within the Prospect Creek watershed are also designed to maintain pileated woodpecker habitat by retaining the larger trees and snags in accordance with Forest guidelines. In addition, the Little Beaver project on the Kootenai National Forest (about 3 miles to the north) also retains larger trees and non-lodgepole pine snags. Within the Clear Creek project area, approximately 1500 acres is privately owned, with about 85 percent (1250 acres) of that

in industrial timber lands. Most of the industrial timber lands were cut using regeneration harvest methods about a decade ago, which likely some removed suitable nesting and foraging trees. However, as stated above, pileated woodpecker habitat within the Clear Creek project area is still abundant.

Overall, Alternative 2 would have no measurable cumulative effects on the species or habitat at the project area, Forest, or Regional scale due to the extensive amount of available habitat, the relatively small amount that would be treated, and vegetation treatments would maintain habitat components.

Northern Goshawk

The Lolo National Forest Plan (1986) lists northern goshawks as the management indicator species for natural old growth. Since 1986, northern goshawk habitat has been more clearly defined. U.S. Fish and Wildlife Service documented that while goshawks typically use mature forests or larger trees for nesting habitat and they are considered a habitat generalist, using a variety of forest types and ages (63 CFR 35183, June 29, 1998). Based on broad-scale habitat and inventory and monitoring assessments conducted in the Northern Region, breeding goshawks and their associated habitats appear widely distributed and relatively abundant on National Forest System lands (Samson 2006a, 2006b; Canfield 2006; Kowalski 2006). On the Lolo National Forest alone, there is approximately 1½ times the habitat needed Region-wide to maintain a minimum viable population (Samson 2006a).

The Clear Creek project area is large enough to contain about three to four non-overlapping goshawk pair territories of about 5000 acres each. All necessary habitats are well represented within the area. Nesting habitat is about three to five times as abundant as recommended for goshawks (Reynolds 1992) (see Table 16). Nesting habitat is well-distributed across the Clear Creek area and likely available to any spatial pattern of goshawk home ranges that may exist on the landscape. Foraging habitat generally falls within desired tree size class ranges reported in scientific studies of goshawks in the northwestern United States, including Region 1 (see Table 15 below). However, the grass/shrub and 0-4.9 inch DBH (diameter breast height) tree size classes are underrepresented within the project area due to forest succession and lack of disturbance that would create/maintain openings and/or initiate tree regeneration.

Surveys were conducted within the project area in 2010 and 2011. One pair of goshawks was detected during the 2010 survey, but was located more than 1.5 miles away from the nearest proposed vegetation treatment unit. Limited detection does not mean that the habitat is unsuitable. It just means that taped calls did not elicit a response. Field review verified the suitability of the habitat. No goshawk nests were identified during survey efforts although surveys were concentrated within and in the vicinity of proposed treatment units.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effects on goshawk or its habitat because no activities would occur. However, over time, natural succession of dry ponderosa pine forest types toward denser, shade-tolerant Douglas-fir or grand fir forest types may eventually reduce

habitat and/or habitat quality for goshawks in some areas (Graham et al. 1999, Squires and Kennedy 2006). Without active management, some of the lower elevation stands in the Clear Creek area would be at higher risk to stand replacement wildfire, which would alter the habitat composition away from the mix of vegetation age classes and forest seral stages recommended in the literature (Reynolds et al. 1992, Daw and DeStefano 2001).

This alternative would have no direct impact to the population or species because: 1) habitat is abundant and widely distributed in project area, Forest, and Region; 2) nesting habitat is abundant in the project area and foraging habitat is not far divergent from recommendations of Reynolds et al. (1992) and other pertinent science; 3) cumulative effects of past harvest have likely been minor.

Alternative 2: Direct and Indirect

Proposed treatments would not alter goshawk habitat beyond the desired composition when natural conditions are considered. Following proposed treatments, foraging and nesting habitat would still be within ranges recommended in the scientific literature (see Table 15). Suitable nesting and foraging habitat are abundant now and would continue to be abundant after proposed treatments.

Approximately 247 acres of shelterwood harvest in suitable foraging habitat, would increase the percentage of 0-4.9 inch tree size classes closer to what is recommended in the literature (see Table 15 below). Shelterwood harvest would retain a tree canopy cover of about 10-30 percent that would result in new tree seedling establishment, increasing the percentage of the 0-4.9 inch tree size class within the project area. Consequently, there would be a slight decrease in the percentage of mature forests within the project area. However, the percentage of mature forest component would still be within the range recommended in the scientific literature (see Table 15 below).

Within Alternative 2, 334 acres of suitable nesting habitat overlaps with scattered portions of several proposed vegetation treatment units. This comprises a modest 11 percent of the total available nesting habitat within the project area. In portions of units 1B, 4, 16D, 16E, 27A, 30, 31B, 31C, and 60, shelterwood harvest would reduce suitable nesting habitat by approximately 83 acres (3 percent) within the Clear Creek project area (see Table 16). Shelterwood harvest would retain the largest trees, but the overall canopy cover would be reduced to 10-30 percent, less than what is considered suitable nesting habitat. However, the amount of remaining nesting habitat could support more goshawk nests than the territorial nature of goshawks would tolerate, thus sufficient nesting habitat would remain available. All other proposed vegetation treatments would retain adequate canopy cover to maintain suitable nesting habitat. Nesting habitat would remain widely distributed across the Clear Creek area and likely available to any arrangement of goshawk home ranges that may exist on the landscape.

Within the untreated areas, indirect effects would be similar to those described for Alternative 1.

Table 15: Effects to Goshawk Foraging Habitat by Alternative

Tree Size class	Alternative	Percent of the Clear Creek project area within each size class	Range of conditions for goshawk foraging recommended in Reynolds et al. (1992)	Range of conditions for goshawk foraging in the scientific literature in the Northwestern U.S.*
Grass/shrub	Existing Condition	3.6	10%	7-11%
	Alternative 1	3.6		
	Alternative 2	3.6		
0-4.9”	Existing Condition	1.3	10%	4-17%
	Alternative 1	1.3		
	Alternative 2	2.7		
5.0-9.9”	Existing Condition	30.8	20%	11-66%
	Alternative 1	30.8		
	Alternative 2	30.8		
10.0”+	Existing Condition	64.2	60%	11-66%
	Alternative 1	64.2		
	Alternative 2	62.9		

* Moser 2007, McGrath et al. 2003, Clough 2000, Patla 1997, Desimone 1997

Table 16: Effects to Goshawk Nesting Habitat by Alternative

Alternative	Available acres of nesting habitat[1]	Recommended acres of nesting habitat[2]
Existing Condition/ Alternative 1	3033	600-960
Alternative 2	2950	600-960

[1] Nesting habitat is defined as: *forest type* = grand fir, subalpine fir, intolerant mix, larch, western white pine, ponderosa pine, Douglas-fir, aspen, grand fir/cedar/hemlock mix, subalpine fir/spruce/hemlock mix, and birch, *canopy cover* ≥60%, and *size class* ≥10”.

[2] Reynolds et al. (1992) recommends 6 patches of 25 acres per home range. However, in Region 1, Brewer et al. (2007) recommend 6 patches of at least 40 acres per home range (240 acres per nesting pair), a more conservative approach. In Clear Creek, 960 acres would provide sufficient nesting habitat for the 4 potential home ranges that could “fill” the area with goshawks.

Alternative 2: Cumulative Effects

It is likely that past regeneration harvest within the Clear Creek project area initially converted a portion of potential goshawk nesting habitat to forest openings, which are now fully stocked with trees that are about 30-plus feet tall. But this reduction likely had little to no measureable effects on the species because nesting habitat is currently well-distributed and well above levels recommended in the scientific literature (Wildlife Report, page 21).

Within the Clear Creek project area, approximately 1500 acres is privately owned, with about 85 percent (1250 acres) of that in industrial timber lands. Most of the industrial timber lands were cut using regeneration harvest methods about a decade ago, which likely removed suitable goshawk nesting habitat. However, as displayed in Table 16, the available nesting habitat within the project area could support more goshawk nests than the territorial nature of goshawks would tolerate. Past regeneration harvest on private land provides additional foraging habitat in the 0-4.9 inch tree size class, which the scientific literature suggests is lacking in the project area (Table 15).

Although Alternative 2 would alter a small amount of nesting and foraging habitat, it would not individually or cumulatively lead to a loss of species viability because foraging habitat would be maintained within treatment areas; nesting habitat would remain abundant; no known nests would be disturbed and any newly discovered nests would be protected; and goshawk habitat is abundant and well-distributed across the Forest and Region – more than sufficient to sustain a viable population.

Outside the project area but within the Prospect watershed, the ongoing Shorty Gulch Fuels Reduction project (about 2 miles to the south) and Antimony project (about 5 miles to the southwest) will not alter goshawk habitat beyond the desired vegetative composition when natural conditions are considered. The Shorty Gulch Fuels Reduction project will treat fuels within suitable foraging habitat, but no activities will occur within suitable nesting habitat. These fuel treatment activities will create more open stand conditions that will maintain suitable foraging habitat. The assessment completed for the Antimony project determined that although shelterwood harvest will reduce existing nesting habitat by 14 acres, the project will maintain overall foraging and nesting habitat within the ranges recommended in the scientific literature. The combined reduction of nesting habitat within the Clear Creek project (83 acres) and the Antimony project (14 acres) would comprise approximately 3 percent of the total nesting habitat available within these two areas. The remaining nesting habitat would still support more goshawk nests than the territorial nature of goshawks would tolerate. Together, these three projects (Clear Creek, Shorty Gulch, and Antimony) within the Prospect Creek watershed would treat less than one percent of the estimated amount of goshawk foraging habitat on the Lolo National Forest (Samson 2006a). Thus, these projects would not adversely affect the ability of goshawks to nest or feed on the landscape. Cumulatively, these projects would likely move treated areas into a condition more suitable for goshawk use over time by bringing the percentage of stand age classes closer to recommended levels. These projects would also reduce the risk of stand replacement fire within treated area maintaining goshawk habitat over the long term.

Goshawks were not assessed as part of the Little Beaver Creek project on the Kootenai National Forest. To be conservative, it is assumed that regeneration harvest would reduce suitable nesting habitat on 432 acres. Despite this reduction, ample nesting habitat would remain within the Little Beaver project area and in the area that lies between Clear Creek and Little Beaver Creek.

Big Game (Elk)

The Lolo National Forest Plan designates elk as a management indicator species for the Forest's ability to provide habitat for other big game ungulate species. Winter range management, one of the objectives of the Clear Creek project, is the single most site-specific consideration when managing elk habitat (Christiansen et al. 1993).

Elk surveys conducted by Montana Fish, Wildlife and Parks include the Prospect Creek and Clear Creek area (Hunting District 123). The Clear Creek project area comprises about 15 percent of Hunting District 123. Elk population numbers in this Hunting District were at objective in 2010 and 2011 and slightly below objective when last measured in 2012

(MTFWP 2014). Population data collected over the last two decades indicates there are natural fluctuations in animal numbers from year to year.

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct effect on elk because no management activities would occur. However, continued forest succession would result in conifer encroachment into formerly open, forest stands, which would reduce forage for wintering animals (Irwin and Peek 1983; Gibbs et al. 2004). Weed populations within winter range areas would continue to increase over time.

Alternative 2: Direct and Indirect Effects

Overall, Alternative 2 would improve the big game habitat (Wildlife Report, pages 29-30). Vegetation management activities would improve the forage quality on 904 acres of winter range areas within the project area through prescribed burning and tree thinning. These treatments would increase sunlight to the forest floor and prescribed burning would provide a flush of nutrients, which would enhance the growth of understory plants. Prescribed burning also has the potential to exacerbate weed establishment and spread (see Weed section above), which would compete with plants that big game use for forage. Resource protection measures 16-23 in Table 8 would be used to minimize the potential for weed spread. In addition, ongoing and proposed weed treatments along roadsides would reduce existing weed populations and minimize potential for additional weed spread into winter range areas. The winter range areas with the highest risk for weeds were deleted from the prescribed burning proposals (see Chapter 2).

There would be no net change in the miles of roads that are drivable and open to the public. Thus, existing security would be maintained.

Alternative 2: Cumulative Effects

Ongoing and authorized future weed treatments in Clear Creek will help to reduce the spread new invasive weed species into winter range areas, contributing to the maintenance and/or improvement of forage conditions.

Outside the project area but within the Prospect Creek watershed, the ongoing Shorty Gulch Fuels Reduction project and Antimony project will both improve forage production on approximately 1400 acre of winter range areas through prescribed burning and tree thinning. Open road density will not change in the Shorty Gulch area but will be slightly decreased in the Antimony area, thus existing security will be maintained. Cumulatively, the Clear Creek project would make a small contribution to the upward trend in winter range conditions within the Prospect Creek watershed.

The Little Beaver project area on the Kootenai National Forest will retain suitable cover/forage ratios within the project area. Prescribed burning will improve forage quality on approximately 700 acres. Following completion of the project, big game security (measured by open road density) will remain as it currently is because newly constructed roads will be gated to restrict public motorized access. Although project activities are not

anticipated to adversely affect animal numbers, elk may temporarily avoid areas where there are on-going activities. However, there are plenty of suitable areas for animals to displace to.

3.11 Heritage Resources

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on heritage resources because no activities would occur.

Alternative 2: Direct, Indirect, and Cumulative Effects

Although six historic sites are located within the project area, they are not within or adjacent to any areas where activities are proposed. Thus, Alternative 2 would have no direct, indirect or cumulative effects on heritage resources (Heritage Report, page 5).

Consultation was conducted with the Confederated Salish and Kootenai Tribes for potential effects to cultural resources. Tribal representatives expressed no concerns.

3.12 Transportation

Within the Clear Creek project area, there are approximately 147 miles of road, 91 percent (134 miles) is under Forest Service jurisdiction and the remaining 9 percent is private (12 miles) and county road (1 mile). Of the roads under Forest Service jurisdiction, 84 miles are system roads and 50 miles are undetermined or non-system. Roads range from narrow, brushed-in roads constructed in the 1950s and 1960s to accommodate the logging equipment of that era (typical of the undetermined roads) to higher standard Forest Service system roads. Although approximately 53 miles of road within the project area are currently open yearlong or seasonally to public motorized use, only about 42 miles are physically drivable. The majority of road segments that are not drivable are grown in with vegetation making them impassable.

Forest Service policy prescribes the travel analysis process for many purposes (FSH 7709.55). Travel management decisions are to be "informed by travel analysis, as applicable" (FSM 7710.3). Travel management decisions are defined at FSM 7715 and include "adding a route to or removing a route from the forest transportation system, constructing a National Forest System (NFS) road or NFS trail, acquiring an NFS route through a land purchase or exchange, decommissioning a route, approving an area for motor vehicle use, or changing allowed motor vehicle classes or time of year for motor vehicle use." In these instances "the responsible official has the discretion to determine whether travel analysis at a scale smaller than a ranger district or an administrative unit is needed and the amount of detail that is appropriate and practicable for travel analysis" (FSM 7712.1 (3)).

Following policy, the Forest Service completed a project-specific travel analysis for the Clear Creek project area that documented the need for a short segment of new specified road construction, as well as identified some roads to be stored, some roads to be decommissioned, and some existing undetermined roads to be added to the specified road

system (see Chapter 2 for specific details). The project-specific travel analysis addressed the immediate need of the Clear Creek project, but did not conduct an exhaustive review of the entire road network for the Lolo National Forest, nor did it consider the fate of roads within the project area in the context of the entire road network on the Forest.

The regulations at 212.5(b) (Subpart A), disclose requirements that the Forest Service incorporate a "science-based roads analysis" when identifying the minimum road system for each national forest. The travel analysis completed for the Clear Creek project was not designed to identify the minimum road system for the Lolo National Forest, although the work completed will be helpful to that broader effort.

Alternative 1: Direct, Indirect, and Cumulative Effects

Under Alternative 1, the existing transportation system and public motorized access within the Clear Creek project area would remain as it currently is. Periodic road maintenance would continue at current levels based on need and priority. Infrequently used roads would continue to close in with vegetation.

Alternative 2: Direct, Indirect, and Cumulative Effects

Alternative 2 would reduce the net total miles of roads open to public motorized use by 4.5 miles. However, there would be no net change in the miles of open roads that can be physically driven (see Table 17). Changes in currently drivable administrative access, which includes roads closed yearlong or seasonally to the public, would be the same as described above for public access. Proposed road decommissioning and storage activities would reduce motorized access in some areas and the reopening of currently brushed-in roads to access vegetation treatment units would provide additional drivable motorized access in other areas.

Table 17: Public Motorized Access by Alternative

Travel Management	Alternative 1 (miles)		Alternative 2 (miles)	
	Total	Drivable	Total	Drivable
Open yearlong	22	21.6	21	21.3
Open Seasonally from May 15 to October 15	11	8.2	9.9	8.2
Open Seasonally from December 1 to October 15	20	11.8	17.6	12.1
TOTAL	53	41.6	48.5	41.6
Net Change from Existing	----	----	-4.5	0

The only loss of existing drivable public motorized access would result from the closure of the Quail Gulch road (#18758) up to the gravel pit, a distance of approximately 0.4 miles. This road would be gated yearlong to public motorized use. A gate would allow for administrative access to the gravel pit. Closing the road to public motorized access would reduce future road maintenance needs and protect the gravel commodity.

Occasionally, people camp at the gravel pit site particularly during hunting season. Thus, closure of this road would decrease the number of dispersed camp sites within the project

area by one. About an equal amount (0.4 miles) of drivable public motorized access would be gained by the relocation of the gate on Road 302 up the road about 500 feet and the brushing of Road #17082 to provide access to treatment units 12A and 12B. In summary, the Clear Creek project would result in no net change to drivable public motorized access.

Proposed new road construction would not increase public access. The 0.25 miles of new long-term specified road would be placed into storage following completion of this project and temporary roads would be decommissioned. Stored and decommissioned roads would not be physically drivable even for administrative access following closure.

3.13 Inventoried Roadless Areas[13] (Roadless Analysis report)

Approximately 33 percent (5470 acres) of the National Forest System land in the project area is located within the Clear Creek Inventoried Roadless Area (IRA) (refer to Map 2 in Appendix A). In the Lolo National Forest Plan, most of the land within the IRA is allocated to Management Areas 16 (timber management), with relatively small parcels of MA 18 (big game winter range and timber management); MA 1 (non-forest); and MA 27 (forest land where timber management is not economically or environmentally feasible at this time due to the physical feature of the land). Approximately 1681 acres (31 percent) of the Clear Creek IRA have been developed since 1986, when the Forest Plan was established. The development includes long-term specified road construction and timber harvest. These management activities occurred within areas where the Forest Plan allowed them. Approximately 8.5 miles of road was constructed in the early 1990s. Subsequently, timber harvest occurred as part of the Upper Clear Timber Sale. The harvest was a mix of regeneration and partial cutting. Although units have regenerated with young trees, they are still visually evident to the casual observer.

Prior to the establishment of the Forest Plan and the designation of this Inventoried Roadless Area, there was already limited development in some areas within the IRA boundary. Development is attributed to past timber harvest and approximately 1.1 miles of road construction in multiple segments. No records were found that specifically identify when these activities occurred. Although vegetative regrowth has occurred and continues to occur on many of the roads and past harvest units, these existing developments are still visually evident to the casual observer.

On January 21, 2001, the 2001 Roadless Area Conservation Rule was established (36 CFR 294 Subpart B) to provide, within the context of multiple use management, lasting protection for inventoried roadless areas within the National Forest System. During the development of the Clear Creek project, the 2001 Roadless Area Conservation Rule was the subject of litigation in multiple jurisdictions. Ultimately, the Rule was judicially upheld and it is in effect, with the exceptions of the states of Idaho and Colorado where separate rules apply. The Clear Creek project was designed to be consistent with the Rule.

[13] Inventoried Roadless Areas are National Forest System lands that were identified in the 1970s and early 1980s as roadless and evaluated for their suitability for possible wilderness status.

Lolo National Forest Plan, Appendix C (1986) contains the evaluation of Inventoried Roadless Areas on the Lolo National Forest. This evaluation assessed the wilderness suitability of each IRA using the characteristics identified in the Wilderness Act of 1964 to define wilderness. During the Forest Plan revision process in 2004-2005, a draft reevaluation of IRAs on the Forest was completed. These two evaluations were used to assess the effects of the Clear Creek project on the Clear Creek IRA. The following table shows the crosswalk between the wilderness attributes identified in Forest Service Handbook 1909.12 and the 1964 Wilderness Act; and the roadless area characteristics defined in the 2001 Roadless Area Conservation Rule (36 CFR Subpart B 294.11).

Table 18: Crosswalk Between Wilderness Attributes[1] and Roadless Area Characteristics[2]

Wilderness Attributes	Roadless Area Characteristics
Natural (ecological systems are substantially free from the effects of modern civilization and generally appear to have been affected primarily by forces of nature)	• High quality or undisturbed soil, water, and air; • Sources of public drinking water: • Diversity of plant and animal communities; • Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; • Reference landscapes
Undeveloped (degree to which the area is without permanent improvements or human habitation)	Natural appearing landscapes with high scenic quality
Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation • Solitude: opportunity to experience isolation from the sights, sounds, and presence of others from the developments and evidence of humans • Primitive and unconfined recreation: opportunity to experience isolation from the evidence of humans, to feel a part of nature, to have a vastness of scale, and a degree of challenge and risk while using outdoor skills.	Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation
Special Features and Values (capability of the area to provide other values such as those with geologic, scientific, educational, scenic, historical, or cultural significance)	• Traditional cultural properties and sacred sites; and • Other locally identified unique characteristics.
Manageability (the ability of the Forest Service to manage an area to meet size criteria and the elements of wilderness)	No criteria

[1]Wilderness attributes identified in Forest Service Handbook 1909.12, Chapter 70 that describe the basic characteristics that make an area suitable for wilderness recommendation. These principal wilderness characteristics originate from the definition of wilderness in the 1964 Wilderness Act.
[2] Roadless area characteristics defined in the 2001 Roadless Area Conservation Rule (36 CFR Subpart B 294.11)

Alternative 1: Direct, Indirect, and Cumulative Effects

Alternative 1 would have no direct, indirect, or cumulative effects on the Clear Creek IRA because no activities would occur.

Alternative 2: Direct and Indirect Effects

Although Alternative 2 proposes limited activities within the Clear Creek IRA, there would be no long-term effects to roadless characteristics. These limited activities include prescribed burning on approximately 96 acres, placing approximately 3.3 miles of road into long-term storage, decommissioning about 0.75 miles of road, replacing 3 culverts on a system road, and rerouting about 2000 feet of the Clear Creek Trail #627. No commercial timber harvest, road construction, or road reconstruction would occur within the IRA.

Prescribed Burning

The purpose of the prescribed burning treatments is to enhance winter range for big game wildlife species (i.e. elk and deer). Following burning, red needles on some trees resulting from tree scorch and black char on the ground and tree boles could be noticeable in the short-term (1-2 years). However since fire was historically a natural disturbance on these landscapes, these short-term visual changes would not be outside of what is expected to occur naturally. Thus, this activity would have no effect on the natural or undeveloped characteristics of the IRAs or change the area's capability as a reference landscape[14].

This activity would not adversely affect water or soil quality because prescribed fire would generally be of low severity. No ignition would occur within Riparian Habitat Conservation Areas. There are no developed sources of public drinking water within the IRA. Smoke from prescribed burning would temporarily reduce the air quality within and downwind of burn units. The 96 acres of prescribed burning within the IRA would likely be implemented within a day or two although smoldering could occur for several days. The prevailing winds would likely disperse the smoke to the northeast, outside the IRA (see Air Quality section).

Prescribed burning would enhance habitat for wildlife species that use more open, dry forest types (see Wildlife section).

The feeling of solitude could temporarily be reduced during project implementation due to the sounds of helicopters during aerial ignition. However, this disturbance would likely occur for only a day or two at the most. Timing would depend on weather, smoke dispersion conditions, and funding. Prescribed burning would have no effect to the other wilderness attributes of primitive recreation, special features, and manageability.

Road Treatments

Road storage and decommissioning activities would likely be implemented over a few days. Storage and decommissioning activities would include ripping the road prism, culvert removal, grass seeding, and covering the road surface with slash. Although these activities would make the road undrivable, the road prism or profile would still be visually evident.

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[14]Reference landscapes are generally defined as areas that have not been altered by the hand of man. These areas serve as a barometer to measure the effects of development on other parts of the landscape (66 FR 3245).

Road storage and decommissioning would have little effect on roadless characteristics, although soil infiltration would be improved on the road prism where physical closure treatments would occur. These roads are closed yearlong to public motorized travel and/or are impassable due to brush, thus closing these roads would not noticeably change the amount of vehicle traffic within the IRA.

Alternative 2 also includes the replacement of 3 culverts on Road 7611 within the IRA. Road 7611 is closed year-long to wheeled public motorized travel. The existing culverts are undersized and would be replaced with larger structures. Replacement activities would occur over a few days once funding is secured. These activities would occur on an existing drivable system road, thus there would be no effects to the wilderness attributes of natural, undeveloped, special features, or manageability. Replacement of these culverts would temporarily yield some sediment to Stick Gulch, a tributary to Clear Creek. However, studies indicate that the increase in sediment generated from culvert removals/replacements lasts about 24 hours (Casselli et al. 1999, Jakober 2002, Foltz et al. 2008). Foltz et al. (2008) suggest sediment concentrations and turbidity drops with distance from the work site. In their study, the sediment effects were undetectable ½ mile downstream.

Although noise from the road storage/decommissioning and culvert replacement activities implemented by heavy equipment could temporarily reduce the feeling of solitude during the time of implementation, there would be no long-term effects to the roadless characteristics of the IRA.

Recreation Activities

The proposed rerouting of 2000 feet of trail to reduce the trail grade to standard would be completed by hand. This activity would not likely result in any noticeable change to roadless attributes because the overall character of the area would not be changed. Use of the trail is not expected to appreciably increase due to the reroute. Incidental cutting of small diameter trees may occur as part of this activity and any cut trees would be left on site.

Alternative 2: Cumulative Effects

Although project activities could temporarily reduce the feeling of solitude during the time of implementation, there would be no long-term effects to the roadless characteristics of the IRA. Cumulatively, the current roadless characteristics and wilderness suitability of the Clear Creek Inventoried Roadless Area would remain similar to what they currently are and would not be notably affected by this project because: 1) activities proposed inside the Clear Creek Inventoried Roadless area would be of short duration; would not disturb the ground in areas previously unaltered by human activity; and prescribed burning would mimic a natural disturbance process under controlled circumstances; and 2) activities proposed outside the Clear Creek roadless area would occur within areas that have been previously developed on National Forest System land.

Consistency with the Forest Plan and 2001 Roadless Area Conservation Rule

All of these actions would be consistent with the Lolo National Forest Plan. In addition, these actions would be consistent with the 2001 Roadless Area Conservation Rule because

road treatments (decommissioning, storage and culvert replacements), trail relocation, and prescribed burning are not prohibited in the Rule. Incidental cutting of small trees could occur as part of the trail reroute. Cut trees would be left on site. This incidental tree cutting would meet the Roadless Rule exemption in CFR Subpart B 294.13(b)(ii)(2), which allows the cutting of timber if it is incidental to the implementation of management activities not otherwise prohibited in this subpart.

The 2001 Roadless Rule also allows maintenance of classified roads (e.g. culvert replacements) in Inventoried Roadless Areas (36 CFR Subpart B 294.12(c)). Road maintenance is defined in the 2001 Roadless Rule as the ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (36 CFR Subpart B 294.11). Replacement of undersized culverts with larger ones is also consistent with the Lolo Forest Plan (pages II-12, III-58).

4.0 AGENCIES AND PERSONS CONSULTED

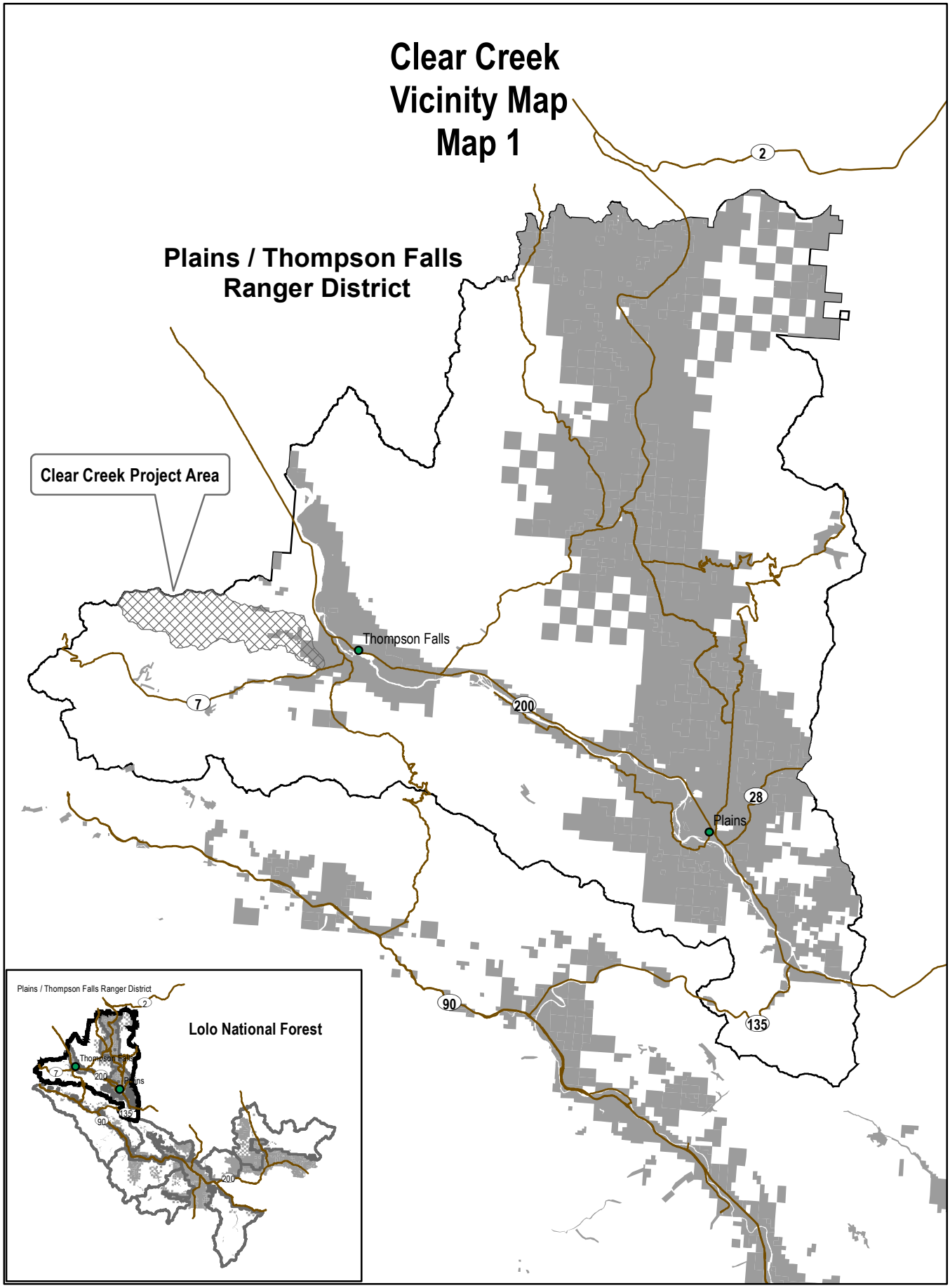
Confederated Salish and Kootenai Tribes
US Fish and Wildlife Service
Montana Department of Environmental Quality
Sanders County Commissioners
Local landowners

The Forest Service extends a special thank you to members of the public who participated in the Clear Creek collaborative process and donated their time and energy to help with the development of this project.

Appendix A

Maps

Clear Creek Vicinity Map Map 1



Clear Creek Project
Alternative 2

Map 2

1 Miles

T 22 N R 32 W
T 22 N R 31 W
T 22 N R 30 W
T 21 N R 32 W
T 21 N R 31 W
T 21 N R 30 W

Clark Fork
Mosquito Cr.
Little Beaver Cr.
Upper Fk Clear Cr.
Clear Cr.
N Fk Clear Cr.
Helwick Gulch
Stick Gulch
Dirty Gulch
Lowers Gulch
Denont Cr.
Prospect Cr.
Daisy Cr.
Brush Gulch
Valentine Gulch
Foster Gulch
Shady Gulch
Table Top Gulch
Gilbert Gulch
Sheepwork Gulch
Wilkes Cr.

7-IPF
627
667
578

Legend

- Structures
- Gravel Stockpile Site
- Clear Creek Analysis Area
- Roads
- Roads Outside the Boundary
- Trails
- Streams
- Inventoried Roadless Areas
- Non-Forest Service Ownership

Other Proposals

- Culvert Replacement
- Install Beaver Mitigation on Culvert
- Trailhead Improvements

Road Treatments

- Long-Term Specified Road Construction
- Temporary Road Construction
- Long-term Storage
- Decommission
- Travel Management Change: From Open to Closed Yearlong

Vegetation Treatments

- Prescribed Burning
- Commercial Thin
- Shelterwood Cut
- Non-Commercial Thinning
- Watershed Improvement

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Appendix B

Proposed Detailed Road Treatments

More detailed information regarding proposed road treatments are located in the Transportation Report in the Project File.

Table B-1. Roads to Add to System (Existing Non-system Roads and New Construction)

Category/ Sub-category/ Road	bmp[1]	emp[2]	Length
Add Existing Non-System Road to System and Store (3-S) after Haul (with BMPs)			
38142	0	0.32	0.32
38172	0	0.71	0.71
38352	0	0.334	0.334
38353	0	0.65	0.65
38354	0	0.71	0.71
38354	1.025	1.474	0.45
38354	1.508	1.68	0.17
38356	0	0.90	0.90
38365	.473	1.70	1.23
38366	0	1.16	1.16
38387	0	0.53	0.53
38395	0	0.75	0.75
38396	0	0.33	0.33
38610	0	0.25	0.25
Sub-totals			**8.49**
Add Existing Non-System Road to System and Store (3-SN) without Haul			
38134	0	0.32	0.32
38209	0	0.68	0.68
38289	0	0.29	0.29
38300	0	0.25	0.25
38309	0	0.79	0.79
38312	0	0.82	0.82
38352	0	0.60	0.60
38355	0	0.34	0.34
38365	0	0.11	0.11
38366	0	0.11	0.11
38367	0	0.68	0.68
38368	0	0.78	0.78
38369	0	0.31	0.31
38387	0	0.21	0.21
38398	0	0.04	0.04
38414	0	0.68	0.68
38448	0	0.51	0.51
38449	0	0.35	0.35
38509	0	0.44	0.44
38510	0	0.26	0.26
38604	0	0.26	0.26
38609	0	0.24	0.24
38655	0	0.21	0.21

Category/ Sub-category/ Road	bmp[1]	emp[2]	Length
38351	0	0.47	0.47
38397	0	0.62	0.62
Sub-totals			**10.37**
Add Existing Non-System Road to System and Leave Open (to Dispersed Recreation) without Haul			
38200	0	0.13	0.13
38305	0	0.23	0.23
38360	0	0.03	0.03
38361	0	0.09	0.09
38362	0	0.09	0.09
38373	0	0.09	0.09
38374	0	0.14	0.14
38412	0	0.09	0.09
Sub-totals			**0.89**
CATEGORY TOTALS			**19.75**
Construct System Road and Store (3-S) after Haul			
CC_P14	0	0.157	0.157
Sub-totals			**0.157**
CATEGORY TOTALS			**0.157**

[1]bmp = beginning milepost
[2]emp = end milepost

Table B-2. Temporary Roads

Category/ Sub-category/ Road	bmp	emp	Length
Construct Temporary Road			
CC_P1	0	0.33	0.33
CC_P16	0	0.4	0.4
CC_P27	0	0.22	0.22
CC_P7	0	0.11	0.11
P16210A	0	0.25	0.25
P17081A	0	0.07	0.07
P17090X	0	0.05	0.05
P38353A	0	0.15	0.15
P38353B	0	0.09	0.09
P38353X	0	0.26	0.26
P38354X	0	0.28	0.28
P38395X	0	0.15	0.15
P38610X	0	0.08	0.08
P38609X	0	0.50	0.50
Sub-totals			**2.94**
Reconstruct Non-system Road as a Temporary Road and Decommission after Use (3-D)			
38287	0	0.09	0.09
38394	0	0.07	0.07
38440	0	0.15	0.15
Sub-totals			**0.31**
CATEGORY TOTALS			**3.25**

Table B-3. Decommission Roads

Category/ Sub-category/ Road	bmp	emp	Length	Closure Level
Decommission System Roads (No Haul)				
16380	0	0.90	0.90	5
18758	0.5	1.04	0.54	5
18759	0.52	1.42	0.90	3D-N
Sub-totals			**2.34**	
Decommission Non-System Roads (No Haul)				
35230	0	0.51	0.51	3D-N
35231	0	0.57	0.57	3D-N
38137	0	0.08	0.08	3D-N
38147	0	0.29	0.29	3D-N
38171	0	0.19	0.19	3D-N
38173	0	0.14	0.14	3D-N
38174	0	1.09	1.09	3D-N
38175	0	0.10	0.10	3D-N
38176	0	0.41	0.41	3D-N
38182	0	0.13	0.13	3D-N
38187	0	0.25	0.25	3D-N
38220	0	0.25	0.25	3D
38226	0	0.05	0.05	3D
38226	0.05	0.10	0.10	3D-N
38230	0	0.44	0.44	3D-N
38231	0	0.50	0.50	3D-N
38288	0	0.08	0.08	3D-N
38302	0	1.07	1.07	3D-N
38303	0	0.76	0.76	3D-N
38304	0	0.35	0.35	3D-N
38305	0.23	0.55	0.32	5
38306	0	0.69	0.69	3D
38306	0.66	1.2	0.52	3D-N
38308	0	1.08	1.08	3D-N
38310	0	1.04	1.04	3D-N
38311	0	0.81	0.81	3D-N
38316	0	0.17	0.17	3D-N
38337	0	0.52	0.52	3D-N
38338	0	0.79	0.79	3D-N
38355	0.34	0.81	0.47	3D-N
38365	0	0.47	0.47	3D-N
38367	0.68	1.31	0.64	3D-N
38399	0	0.28	0.28	3D-N
38413	0	0.15	0.15	3D
38414	0	0.38	0.38	3D-N
38432	0	0.57	0.57	3D-N
38434	0	0.04	0.04	3D-N
38436	0	0.01	0.01	3D-N
38438	0	0.43	0.43	3D-N
38439	0	0.96	0.96	3D-N
38440	0.15	0.8	0.65	3D-N
38441	0	0.53	0.53	3D
38441	0.53	0.88	0.35	3D-N
38442	0	0.51	0.51	3D-N

Category/ Sub-category/ Road	bmp	emp	Length	Closure Level
38443	0	0.55	0.55	3D-N
38444	0	0.44	0.44	3D-N
38445	0	0.57	0.57	3D-N
38446	0	0.35	0.35	3D-N
38447	0	0.88	0.88	3D-N
38450	0	0.51	0.51	3D-N
38451	0	0.50	0.50	3D-N
38452	0	0.38	0.38	3D-N
38483	0	0.11	0.11	3D-N
38507	0	0.19	0.19	3D-N
38508	0	0.32	0.32	3D-N
38509	0.44	0.56	0.12	3D-N
38575	0	0.25	0.25	3D-N
38576	0	0.17	0.17	3D-N
38577	0	0.34	0.34	3D-N
38602	0	1.07	1.07	3D
38603	0	0.49	0.49	3D-N
38605	0	0.05	0.05	3D-N
38606	0	0.05	0.05	3D-N
38649	0	0.44	0.44	3D-N
38650	0	0.13	0.13	3D-N
38651	0	0.30	0.30	3D-N
38652	0	0.06	0.06	3D-N
38653	0	0.13	0.13	3D-N
38654	0	0.11	0.11	3D-N
38655	0	0.29	0.29	3D-N
38656	0	0.08	0.08	3D-N
Sub-totals			**28.62**	
CATEGORY TOTALS			**30.96**	

Table B-4. Store Existing System Road

Road	bmp	emp	Length
Store (3-S) after Haul (with BMPs)			
17049	0.0	2.645	2.645
17081	0	0.76	0.76
17084	0	1.73	1.73
17084	2.10	2.50	0.4
17088	0	0.05	0.05
17090	0	0.5	0.5
Sub-totals			**6.085**
Store (3-S) without Haul			
4211	0	2.40	2.40
16204	0	1.38	1.38
16768	0	1.7	1.7
16788	0	1.553	1.553
17048	0	1.15	1.15
17081 (split)	0.76	1.15	0.39
17086	0	0.24	0.24
Sub-totals			**8.813**
Store (3-SN) without Haul			

Road	bmp	emp	Length
16781			0.62
17087			0.47
18795			0.44
16788			0.5582
17049			0.2496
17084			0.38
17085			0.7000
17089			0.0984
18758			1.6081
18759			0.5857
18763			0.8597
16809			0.2825
16818			1.1187
16819			0.3222
17088			0.1076
Sub-totals			**8.401**
CATEGORY TOTALS			**23.30**

Table B-5. Upgrades, Pre-Haul Maintenance (Best Management Practices) on Existing System Roads to be Retained

Road	bmp	emp	Length
Pre-Haul Maintenance (BMPs) on Existing System Roads to be Retained			
153			4.73
301-2			4.08
302			4.36
7650			7.12
16210			2.07
17082			0.32
Sub-totals			**22.68**
Upgrades and BMPs on Existing Roads Not Required for Haul			
Clear Creek Road Spot Surfacing	3.0	4.04	1.04
Clear Creek Road Realignment (Stream Buffer)			1.04
Road 153 Switch Back Relocation (Higher Estimate)			0.19
Sub-totals			**2.27**
CATEGORY TOTALS			**24.95**

Figure B-1: Road Closure Levels

Level **Allowed Suffix /E, /P** **/E Entrance Oblit, /P Path**	**Typical Device** Site specific situation dependant	**Typical Treatment** All treatments are as-needed.	**Status**
1	Gate	-Blade, seed, fertilize; Normal drainage (BMP's) -Treat noxious weeds	Remains as NFSR as either long-term or intermittent term service.
2	Gate, guardrail, concrete, earth barrier or re-contour intersection	-Type III dip, waterbars OR outslope -Scarify, seed, fertilize -May scatter slash -Treat noxious weeds	Remains as NFSR as either long-term or intermittent term service with gate, or intermittent term service with barrier.
3-SN Natural Storage	Re-contour intersection (entrance oblit) or rock/earth barrier as needed.	No physical or weed treatment needed, Naturally revegetated and stabilized.	**S**- Remains as NFSR as intermittent stored service.
3-S Storage		-Waterbar or outslope -Remove CMP's & restore watercourse -Ditch relief pipes can remain w/ waterbars -Light scarify, seed,as needed -Treat noxious weeds	
3-DN Natural Decommission	Re-contour intersection (entrance oblit) or rock/earth barrier as needed.	No physical or weed treatment needed, Naturally revegetated and stabilized.	**D**- Road is not needed for long term use. Remove from NFSR by route status change to decommissioned. Effectiveness monitored.
3-D Decommission		-Waterbar or outslope -Remove CMP's & restore watercourse -Scarify or Rip 6-12", seed, fertilize as needed -Scatter slash on slopes, -Treat noxious weeds.	
4 Decommission	Re-contour intersection (entrance oblit) or rock/earth barrier	-Waterbar, outslope or selective re-contour -Remove all CMP's & restore watercourse -Rip 12-18", seed, fertilize -Scatter slash on slopes -Treat noxious weeds	Road is not needed for long term use. Remove from NFSR by route status change to decommissioned. Effectiveness monitored.
5 Decommission	Re-contour	-Re-contour entire prism -Remove all CMP's and restore watercourses -Seed and fertilize -Scatter slash on slopes -Treat noxious weeds	Road is not needed for long term use. Remove from NFSR by route status change to decommissioned. Effectiveness monitored.

Appendix C

Estimated Soil Disturbance

DSD = detrimental soil disturbance

Unit #	Acres	Existing % DSD	Harvest Method	Harvest Additions to DSD (%)	Post-harvest Method	Post-Harvest Additions to DSD (%)	Rd Description	Temp Road Additions to DSD (miles)	Estimated DSD (%)	Restoration Reductions to DSD (%)	Total Estimated DSD after rehab (%)
1	8	3%	Skyline	2%	broadcast	2%	temp, share with unit 1A	0.40	16.7%	33%	10.0%
1B	10	3%	Skyline	2%	broadcast - high	4%	temp	0.20	12.9%	33%	8.6%
2	103	3%	Skyline	2%	broadcast	2%	temp	1.10	9.1%	33%	6.0%
3	37	3%	Skyline	2%	broadcast	2%	existing	0.00	7.0%	33%	4.7%
4	40	3%	Skyline	2%	slash/broadcast	2%	existing	0.00	7.0%	33%	4.4%
5	47	3%	Skyline	2%	underburn	1%	temp	0.20	6.8%	33%	4.2%
6	61	3%	Skyline	2%	underburn	1%	temp	0.10	6.3%	33%	4.2%
9	39	3%	Skyline	2%	broadcast	2%	temp	0.10	7.5%	33%	4.5%
11	24	0%	Skyline	2%	broadcast	2%	existing	0.00	4.0%	33%	2.7%
12A	8	3%	Skyline	2%	underburn	1%	existing	0.00	6.0%	33%	1.7%
12B	12	3%	Skyline	2%	underburn	1%	existing	0.00	6.0%	33%	4.0%
14	61	3%	Skyline	2%	broadcast	2%	existing	0.00	7.0%	33%	3.7%
15B	45	5%	Skyline	2%	underburn	1%	existing	0.00	8.0%	33%	4.7%
16A	68	3%	Skyline	2%	broadcast	2%	temp	0.30	7.9%	33%	5.3%
16B	35	3%	Skyline	2%	underburn	1%	temp	0.20	7.1%	33%	4.8%
16C	40	3%	Skyline	2%	broadcast	2%	existing	0.00	7.0%	33%	4.7%
16D	14	3%	Skyline	2%	broadcast	2%	existing	0.00	7.0%	33%	4.7%
27	26	0%	Skyline	2%	broadcast - high	4%	temp, share with unit 27A	0.60	10.5%	33%	7.0%

Unit #	Acres	Existing % DSD	Harvest Method	Harvest Additions to DSD (%)	Post-harvest Method	Post-Harvest Additions to DSD (%)	Rd Description	Temp Road Additions to DSD (miles)	Estimated DSD (%)	Restoration Reductions to DSD (%)	Total Estimated DSD after rehab (%)
28	56	0%	Skyline	2%	underburn	1%	temp	0.20	3.7%	33%	2.0%
29	16	0%	Skyline	2%	broadcast - high	4%	existing	0.00	6.0%	33%	4.0%
30	45	3%	Skyline	2%	broadcast - high	4%	existing	0.00	9.0%	33%	6.0%
31	45	5%	Skyline	2%	broadcast - high	4%	existing	0.00	11%	33%	7.4%
60	26	3%	Skyline	2%	underburn	1%	existing	0.00	6.0%	33%	4.0%
61	45	3%	Skyline	2%	underburn	1%	existing	0.00	6.0%	33%	4.0%
62	52	3%	Skyline	2%	underburn	1%	existing	0.00	6.0%	33%	2.5%
31A	32	5%	Excaline	4%	broadcast-high	4%	ex trail	0.4	19%	25%	14%
1A	9	5%	Tractor	8%	Broadcast	2%	Temp, see unit1	0.0	20%	33%	13%
6A	12	5%	Tractor	8%	underburn	1%	existing rd	0.0	16%	33%	10%
7	17	0%	Winter Tractor	4%	underburn	1%	temp	0.1	9%	33%	6%
8A	9	5%	Tractor	8%	underburn	1%	existing rd	0.0	17%	33%	12%
15A	9	5%	Tractor	8%	underburn	1%	existing rd	0.0	16%	33%	9%
27A	6	0%	Tractor	8%	broadcast-high	4%	temp, see unit 27	0.0	14%	33%	9%
62A	18	5%	Tractor	8%	underburn	1%	existing rd	0.0	17%	33%	11%

See the Soil Report and supporting documentation in the Project File for more information.

Appendix D

Project Consistency with the Montana Forest Restoration Committee's Restoration Principles

The Clear Creek project is consistent with Forest Service policy to use ecological restoration to manage National Forest System lands in a sustainable manner (FSM 2020). The project was also designed to be consistent with the Restoration Principles developed by the Montana Forest Restoration Committee (MFRC)[15]. These principles are based on the premise that restoration is conducted to accelerate the recovery of ecological processes and to enhance societal and economic well-being.

Principles

1) Restore functioning ecosystems by enhancing ecological processes: *Restore ecosystems and biotic composition to achieve ecological integrity through recovery of species diversity, water quality and function, terrestrial, and aquatic habitats, and resilience. Project design will utilize adaptive management, recognizing the dynamic character of ecosystems and the unpredictability of the future. Active and Passive Management strategies will be used to attain desired ecosystem objectives and future conditions.*

Principle 1 essentially outlines the purpose of the Clear Creek project, which was developed to contribute to the recovery of ecological integrity within the Clear Creek drainage (refer to EA, pages 11-15). Project proposals use active management strategies [16] to meet the project objectives described in the EA (pages 11-15). The analysis displayed in the EA and the Project File documents that the project would improve water quality, stream function, aquatic and terrestrial habitats, and the resilience and diversity of vegetative communities. The vegetation treatments focus on the low to mid-elevation warm, dry ponderosa pine and Douglas-fir forest types which the MFRC suggests are the most appropriate candidates for restoration activities because they are likely the furthest from their natural range of variability. Other areas within the project area that are comprised of different forest types would be left to natural processes at this time to maintain a full range of diverse vegetation conditions across the landscape.

2) Apply adaptive management approach: *Restoration will be conducted through adaptive management that includes assessment, project design, implementation, research and monitoring. Adaptive management is an approach to natural resource policy that embodies a simple imperative" actions are experiments; learn from them. The process does not necessarily follow a specific pattern, but rather is dynamic and responds to inputs and outcomes at any one point along the way.*

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[15] The MFRC consists of representatives of environmental organizations, motorized users, outfitters, timber industry, state government and the Forest Service who came together to find common ground regarding management of National Forest lands in Montana. They reached a "zone of agreement" around the idea of restoration: on-the-ground work to restore the health of national forests. The Restoration Principles can be found on the Internet at www.montanarestoration.org/restoration-principles.

[16] Active management strategies are designed to attain desired ecosystem objective by applying cultural operations and forest management strategies.

The Lolo National Forest uses an adaptive management approach to adjust land management actions based on monitoring of completed activities (Lolo Forest Plan, pages V-2 through V-15). The Clear Creek project was designed based on best available science and the outcomes of similar actions.

An adaptive management approach will be used for prescribed burning only treatments to determine weed population response trends. Existing weed populations would be monitored before and after the burning of the first two units. If monitoring indicates a marked increase in weeds, the treatment and other potential contributing factors to the increase would be evaluated. Depending on the conclusions reached, the remaining prescribed burn units could proceed, be dropped, or additional mitigations applied.

3) Use the appropriate scale of integrated analysis to prioritize and design restoration activities: *Use landscape, watershed and project level ecosystem analysis in both prioritization and design of projects unless a compelling reason to omit a level of analysis is present. While economic feasibility is essential to project implementation, priorities should be based on ecological considerations and not be influenced by funding projections.*

An integrated, landscape approach was used to assess the entire project area for restoration opportunities during the development of the Clear Creek project.

4) Monitor restoration outcomes: *Monitoring is essential for determining the effectiveness of implemented restoration projects. Baseline measurements, project monitoring, and the incorporation of research complete the information feedback loop used in future project design. Monitoring must be conducted at multiple scales.*

The design of restoration proposals is based on previous research studies and/or the successful outcomes of similar projects completed on the Lolo National Forest and elsewhere. Monitoring of project activities would occur (EA, pages 42-43).

5) Reestablish fire as a natural process on the landscape: *Reestablishment of natural fire regimes may be accomplished through Passive or Active Management. Passive Management allows for natural processes to take place by not suppressing natural fire starts, subject to cultural and social constraints. Active Management includes silvicultural treatments and/or reintroduction of fire as prescribed fire. Mechanical treatments may be needed in order to reintroduce fire. Restoration activities, including design and implementation, should be tailored to the fire regimes in each forest type. Fire is used to achieve ecological objectives and ultimately increase public understanding and acceptance of fire as a natural process. Once fire is reintroduced, natural or prescribed fire can be implemented or permitted on a natural interval, thereby restoring this fundamental process within the forest community.*

The Clear Creek project would use a combination of prescribed burning and mechanical treatments to restore low and mixed severity fire regimes and restore stand composition and structure to provide resilience (see EA, pages 50-54).

6) Consider social constraints and seek public support for reintroducing fire on the landscape: *The use of fire in restoration will require a commitment to ecological principles combined with sensitivity to social constraints. Current and expanding human occupation of forest landscapes, carbon dioxide release, clean air regulations, and other factors may limit the widespread return of fire. As such, where the risk of social backlash is high, the use of fire will move forward only when broad public support is gained. Proper use of fire as a component of restoration, combined with community outreach, can enhance public support and understanding over time.*

Prescribed burning is frequently used on the Lolo National Forest to achieve various resource objectives, including improving forage conditions on big game winter range, reducing natural and activity generated forest fuels, and reintroducing fire as a natural disturbance process on the landscape. There is general public support for active management to re-introduce fire through prescribed burning, but considerably much less support for passive management, which would allow naturally ignited fire to burn. Prescribed burning is proposed on approximately 1800 acres to reintroduce fire in low and mixed severity fire regimes, restore stand composition and structure to provide resilience, and improve big game winter range forage conditions. Prescribed burning proposals were supported by the collaborative group and most of the people who commented on the proposed action. Successful implementation of burning projects would help to maintain existing support and gain additional acceptance for these types of activities.

7) Engage in community and interested parties in the restoration process: *Community involvement and support enhances the ability to achieve restoration on the ground. Successful restoration seems to occur when there is a consensus-building, grassroots collaborative group whose mission is to coordinate efforts that enhance, conserve, and protect natural resources and local lifestyles for present and future generations. Restoration efforts, should be developed jointly by agency staff, community members, and other interested parties. This cooperation will lead to better and more productive outcomes, and the wide range of knowledge, opinions, and interests will contribute to project design and implementation. Finally, landscape-level approaches are more efficient and effective than smaller individual project efforts and should lead to increased quality of life and a greater sense of connection to the landscape.*

As discussed in Chapter 1 of the EA, the Clear Creek project was developed through collaboration with a diverse group of interested members of the public and the Sanders County Commissioners.

8) Improve terrestrial and aquatic habitat and connectivity: *Restoration projects should enhance habitat for the complex of terrestrial and aquatic species that are native to the target location or ecosystem. Projects should, when ecologically beneficial, enhance habitat connectivity to promote free migration and movement of native species between and through natural landscapes. Enhanced connectivity does not preclude future active management.*

The purpose and need of the project specifically includes the improvement of big game winter range and aquatic habitat. Activities would improve big game winter range, reduce sediment in Clear Creek, and improve stream stability and function. In addition, culvert removals and

upgrades would remedy fish passage barriers and improve stream connectivity by providing additional upstream habitat for native fish.

Vegetation restoration treatments are proposed in areas with low to mixed severity fire regimes to which wildlife has adapted. These treatments would result in a mix of stand structure and composition across the landscape similar to natural disturbance patterns, consistent with these fire regimes. Because wildlife habitat in this area is naturally fragmented by wildfires, insects, disease and other natural disturbance factors, treated areas would continue to be within a range of conditions that would naturally occur over time. The Clear Creek project area would continue to provide a variety of habitat components (e.g. food, cover, etc.) across the landscape to meet the needs of wildlife species.

9) Emphasize ecosystem goods and services and sustainable land management: *Restoration activities should lead to the sustained abundance of ecosystem goods and services within the landscape. Ecosystem goods and services encompass human-derived goods and services from ecological landscapes and sustainable ecosystems. Restoration activities should be evaluated for the potential to influence these services and provide goods.*

The Clear Creek project would provide ecosystem goods and services through sustainable land management. The project would provide:

- wood products in the short-term and the resulting resilient forests would continue to grow and maintain opportunities for sustainable products removal in the future.
- improved forage conditions for deer and elk, which would sustain healthy populations of big game species and maintain hunter success.
- enhanced recreation opportunities for forest visitors

10) Integrate restoration with socioeconomic well-being: *Restoration efforts must enhance long-term social benefits and be economically feasible to ensure success. Restoration activities should emphasize landscapes that provide sustained employment opportunities and maintain thriving communities, both rural and supporting urban areas. Communities should benefit from restoration in numerous ways including employment opportunities, healthy living environments, and intact infrastructures. A sustainable, vibrant, integrated forest industry infrastructure is critical to implementation of viable restoration projects involved in vegetative management by providing necessary equipment, expertise, and markets to help offset restoration costs.*

As discussed above under Principle 9, ecosystem goods and services produced from this project would benefit communities in numerous ways. A portion of the vegetation restoration treatments would yield wood products to local and regional industries in the short term and maintain a long-term sustainable economic resource for the community. The project would maintain an appropriately located and sized transportation system to continue to provide access for the future tending of forest vegetation to meet social and ecological needs. Project proposals also promote healthy living environments by improving water quality and enhancing recreation opportunities to meet current needs. In addition, project restoration would provide employment opportunities.

11) Enhance education and recreation activities to build support for restoration: *Promote education and recreation activities and facilities which interpret and complement the natural function of the ecosystem. Education and recreation activities on national forest lands are highly important and can provide opportunities for people to both observe and appreciate restoration efforts.*

Information sharing conducted during the collaborative process that was used to develop the Clear Creek project enhanced public understanding of restoration efforts.

Due to the area's close proximity to the community of Thompson Falls, the Clear Creek area offers a good opportunity to educate forest visitors about restoration activities. Many restoration projects would be easily viewed from roads that are open to public motorized use and interpretive signs are planned for some of these sites.

12) Protect and improve overall watershed health, including stream health, soil quality and function, and riparian function: *Restoration activities should focus on restoring and maintaining properly functioning conditions in high value watersheds and riparian areas. Stream bank, stream channel and stream crossing restoration and improvements in priority watersheds are critical to achieving watershed health and resiliency to that allows for functioning hydrologic conditions and aquatic habitat. Restoration projects should include efforts to minimize long-term soil degradation and erosion and should strive to improve soil productivity increase soil water infiltration rates and water holding capacity.*

Improving watershed health is one of the objectives of the Clear Creek project (refer to the EA, pages 14-15). The project contains watershed restoration activities including applying heavy maintenance to Road 153 where it encroaches on Clear Creek; stabilizing specific stream segments to keep water within the channel during spring flows; upsizing culverts on roads to allow fish passage and improve stream flow; decommissioning unneeded roads; maintaining existing roads to improve drainage and reduce potential sediment delivery to area streams; and planting riparian vegetation to improve streambank stability and provide overhead cover for fish. The realignment of 4 segments of Road #153 totaling 1200 feet where it is located adjacent to Clear Creek to move and elevate the road further away from the creek has already been completed. Gravel surfacing has also been applied to these road segments to reduce sediment delivery. The Clear Creek project would complement the improvements already made and enhance water quality in the long-term by reducing existing sediment yields to area streams and provide an additional 1 mile of upstream habitat for native fish.

Approximately 200 acres in the Clear Creek valley bottom (units W1 and W2) would be treated to improve soil conditions and enhance the stability of the floodplain. Treatments include weed treatments; planting of grasses, shrubs, and trees; soil decompaction; and individual tree thinning where it meets restoration goals.

Project design and implementation of resource protection measures (EA, Table 8) would protect soils and water quality during vegetation activities. The soil assessment, which is summarized

in the EA (pages 75-79) and the Soils report in the Project File, indicates that all vegetation treatment areas involving mechanical treatments would meet Regional soil quality standards.

13) Establish and maintain a safe road and trail system that is ecologically sustainable: *National Forest System roads and trails provide important access for land management activities and public use. However, many national forests currently have some roads and trails that are adversely impacting watersheds and wildlife. The Forest Service, along with local communities and interested parties, should analyze which roads and trails will be maintained, constructed, reconstructed, or decommissioned to address ecological concerns and access needs. Road and trail restoration and maintenance can improve wildlife and fisheries habitat, protect watersheds, and improve public access.*

During the development of the proposed action for the Clear Creek project, the Forest Service conducted a Travel Analysis to identify which roads are needed for future management as outlined in the Forest Plan and which ones are not. Through this process, an interdisciplinary team of Forest Service resource specialists determined the risks (e.g. environmental impacts to water quality and wildlife security) and benefits (e.g. access for recreation, fire suppression and other land management actions) of each road within the project area. Using this information and the known conditions of the roads identified through field surveys, Forest Service personnel determined which roads were needed for long-term access and which ones were not. The final result of this analysis was a recommended disposition for each road (e.g. decommission, store, keep, etc.) (see the Transportation report in the Project File for more information). Approximately 24 percent of the road miles under Forest Service jurisdiction within the project area were determined to not be needed for future access and are proposed for decommissioning.

Approximately 31 miles of road would be decommissioned. Field surveys have indicated that approximately 26 miles of those roads are causing no environmental impacts, are stable, and are naturally recovering with vegetation. These roads would be administratively decommissioned, meaning that no physical treatments will be applied. The remaining 5 miles would have various treatments applied to address existing water and/or soil concerns. There would be no net change in the miles of road that the public can legally and physically drive.

Approximately 43 miles of road determined to be needed for long-term access, but not in the short-term are proposed for storage. Storage treatments would place the roads in a stabilized condition that will pose little to no resource risks. Storage treatments would occur on roads that are closed yearlong to public motorized use and/or are impassable due to vegetation. Thus, this activity would have no effect on public access.

Maintenance activities would occur on 33 miles of road. Roads would be improved to Best Management Practice standards which would minimize potential sediment delivery to area streams. Road/stream interface issues have already been addressed on Road 153 where it encroaches on Clear Creek. Completed activities on Road 153 included realignment of specific road segments; reinforcement of downstream streambanks with rootwads, establishment of a bankfull bench, and planting riparian vegetation; and application of gravel surfacing to the road.

Approximately 1000 feet of long-term specified road would be constructed to connect two existing roads to facilitate the decommissioning of about a mile of existing road (see Map 2 in Appendix A). This new road segment would be located in an upper slope location, well away from any live water. The road would be stored after use for this project.

Portions of the Clear Creek trail would be rerouted to avoid wet areas and reduce grade.

Appendix E

Science Basis for Restoration Treatments

All vegetation treatments are designed to be consistent with the restoration scientific literature, local experience with similar treatments in similar forest types, and consultation with others. The following sections discuss the scientific basis for the proposed vegetation restoration treatments.

Ponderosa pine/Douglas-fir restoration

The primary vegetation restoration objective in the ponderosa pine/Douglas-fir types is to restore stand structures and compositions more likely to support low- and mixed-severity wildfire so the landscape as a whole can experience the full spectrum of wildfire intensities as it did in the past. These stand structures and compositions also reduce susceptibility to bark beetles. The discussion below discusses scientific literature regarding fire behavior, bark beetles, and treatments to modify fire behavior, bark beetle susceptibility, and effects.

Basic fire behavior

There is abundant literature on fire behavior, forest structure, forest fuels, fire weather, and other aspects of fuels management. References for this discussion of effects have been limited to some of the more recent publications that for the most part summarize generally accepted principles and caveats from other research study-based and peer reviewed publications. This is appropriate because short of removing all potential fuel from a site, potential fire behavior (intensity) and severity (effect) are dependent on the interaction between fuel, weather, and physical setting (Jain and Graham 2004; Graham et al. 2004). Of those three factors, the only thing humans can alter through management is fuel.

Any particular wildfire's growth and behavior is unique because of the infinite combinations of weather, fuels, and physical settings that can occur over spatial and temporal scales (Graham et al. 2004). Fire behavior is typically described at the stand level, but the spatial arrangement of stands across landscapes affects the growth of large fires (Graham et al. 2004). These variables make it difficult to speak to fire behavior with specificity and certainty. Models exist to predict fire behavior under specific defined conditions, but for each modeled condition there exists infinite unmodeled conditions that may occur when a fire actually starts or spreads to an area. There are, however, useful general concepts concerning the effects of fuels on fire behavior (Agee and Skinner 2005; Graham et al. 1999; Graham et al. 2004; Peterson et al. 2005) as discussed below.

Forest fuel structures typically can be classified as three strata: ground fuel, surface fuel, and crown or canopy fuel (Graham et al. 2004; Agee and Skinner 2005; Peterson et al. 2005; Graham et al. 1999).

Ground fuel consists of duff, roots, buried woody material, and accumulations of needle fall and bark sloughs (Graham et al. 2004). Ground fuels typically burn by smoldering that may last many hours to months (Peterson et al. 2005), leading to soil damage and tree mortality (Graham

et al. 2004; Peterson et al. 2005). Rotten ground fuel is ignitable by firebrands thrown ahead of a fire front, which increases spotting of small fires (Graham et al. 2004).

Surface fuel consists of grasses, shrubs, litter, and woody material (Graham et al. 2004) such as sound and rotten logs and stumps (Peterson et al. 2005). Surface fuels release energy at highly variable rates ranging from high rates during a relatively short period when fine fuels are flaming and low rates during a longer period when smoldering and glowing combustion consumes larger fuel (Graham et al. 2004). High loadings of surface fuel resulting from blowdown, ice storms, timber harvest, or precommercial thinnings have high surface fire intensity that increases the likelihood for igniting overstory crown fuels either through direct ignition or by drying overstory fuels, which leads to torching (Graham et al. 2004).

Crown fuel consists of vines, mosses, needles, branches, and so forth suspended above the ground in trees or other vegetation (Graham et al. 2004). This material is available for crown fires that can be propagated from surface fires through fuel ladders of vertically continuous surface and crown fuels or from crown to crown fire spread (Graham et al. 2004). Crown fuels separated from surface fuels by large gaps are more difficult to ignite because of the distance above surface fires (Graham et al. 2004). Crown fuels require higher intensity surface fires, long duration surface fires that dry the crown fuels, or mass spotting over a large area to ignite (Graham et al. 2004; Agee and Skinner 2005). Once ignited, high density crown fuels are more likely to spread than low density crown fuels (Graham et al. 2004; Agee and Skinner 2005; Peterson et al. 2005).

The presence and density of overstory tree canopies influence surface fuel conditions and burning. Fires burning in open stands have increased rate of spread compared to fires in dense stands under similar conditions due to fine fuel moisture content, surface air temperature, and shading (Graham et al. 2004). Open stands also develop fine fuels such as grasses, forbs and small shrubs more readily than dense stands. These fine fuels can support more rapid fire spread compared to large woody fuels in dense stands (Graham et al. 2004).

The continuity and density of tree canopies combined with wind and physical setting provide conditions for rapidly moving crown fires that consume needles and branches over large areas (Graham et al. 2004). Initiation and propagation of crown fires is related to canopy base height, canopy bulk density (weight for a given volume), and canopy continuity (Graham et al. 2004). Canopy base height affects how readily fire can transition from surface fire to crown fire (Graham.et al. 2004). Patchiness of the canopy can reduce fire spread (Graham et al. 2004).

Depending on weather and physical setting, surface fires can rapidly spread through dry grass and other surface fuels igniting tree crowns, especially those with low crowns. This torching can progress from individual and small clumps of trees to large groups within a few hours (Graham et al. 2004). Torching and crown fires produce firebrands that are carried by winds hundreds of feet and even miles (Graham et al. 2004). Subsequent ignitions from firebrands can occur in a process that can be repeated numerous times, producing fire fronts that move many miles in a day (Graham et al. 2004).

The intent of fuel reduction in restoration projects is to modify fuels to reduce fire severity so live trees and understory vegetation are retained to provide resilient recovery of the site. To accomplish this, fuels are manipulated to reduce the likelihood of crown fires and reduce the intensity (the rate fuel is consumed and the amount of heat generated) of surface fires.

Agee and Skinner (2005) summarized the principles of fire hazard reduction in a table reproduced below:

Table E-1: Principles of Fire Hazard Reduction Treatments

Principle	Effect	Advantage	Concerns
Reduce surface fuels	Reduces potential flame length	Control easier; less torching	Surface disturbance is less with fire than other techniques
Increase height to live crown	Requires longer flame length to begin torching	Less torching	Opens understory; may allow surface wind to increase.
Decrease crown density	Makes tree-to-tree crown fire less probable	Reduces crown fire potential	Surface wind may increase and surface fuels become drier.
Keep big trees of resistant species	Less mortality for the same fire intensity	Generally restores historic structure	Less economical; may keep trees at risk of insect attack

Graham et al. (2004) adds “reduce continuity of the forest canopy” to the list of objective, quantifiable fuel treatment criteria (principles). Peterson et al. (2005) concurs that potentially effective techniques for reducing crown fire occurrence and severity are to reduce surface fuels, increase canopy base height, reduce canopy bulk density, and reduce forest continuity. Jain and Graham (2007) found some notable exceptions to these general concepts when studying over 900 observations in 73 wildfires in the Rocky Mountains. Trees with low canopy base heights (height to live crown) did not have high severity fires in thinned stands, plantations, and other managed stands where surface fuel was modified through slash disposal and site preparation activities. In dense subalpine fir dominated forests with high canopy base heights, burn severity was high because the crowns tend to intercept precipitation and evapotranspiration depletes floor moisture, resulting in dry forest floor conditions. These dry conditions coupled with high surface fuel loads caused crown fires.

There is a wide variety of well-documented and contrasting views on the effects of thinning on fire behavior (Graham et al. 1999; Carey and Schumann 2003). The contradictory views can be explained in part by the loose use of the term “thinning.” Knowing exactly what forest treatments are called “thinnings” can provide more precise predictive power to describe how fires would behave in the resulting stands structures, compositions, and fuels (Graham et al. 1999). This project proposes thinning from below.

There are many different kinds of thinnings, thinning regimes, reserve tree regeneration harvests, and combinations that create a wide variety of stand structures or compositions to meet various objectives. Because there are so many possible stand structures and compositions, there are at least as many ways that stands would respond to fire (Graham et al. 1999). The many stand treatments that may or may not be thinnings but are similar to thinnings alter the stand

characteristics that directly influence fire behavior. The crowns of trees removed may significantly contribute to surface fuels with a major impact on expected fire intensities depending on whether and how they are treated. Crown bulk density, which depends on both species composition and stand density, is the primary controlling factor of crown fire behavior (Graham et al. 1999). Crown fires are often considered the primary threat to forest types and human values, and crown fires are the primary challenge for fire management (Graham et al. 2004). Depending on the type, intensity, and extent of thinning or other treatment, fire behavior can be improved or exacerbated (Graham et al. 1999; Graham et al. 2004; Peterson et al. 2005). Thinnings in general would lower crown bulk densities and redistribute fuel loads, thus decreasing fire intensities if the surface fuels are treated. Extreme weather conditions can create fire behavior that would burn through or breach most fuel treatments (Graham et al. 2004). Realistic objectives for fuel treatments include reducing the likelihood of crown fire and other fire behavior that would lead to undesirable future conditions (Graham et al. 2004).

Because surface fuels are drier because of exposure to heat and wind and wind speed is increased in thinned stands, it is critical that surface fuels be treated to minimize fire intensity (Graham et al. 1999; Agee and Skinner 2005; Graham et al. 2004; Peterson et al. 2005). There are numerous studies supporting this. More recent studies include Cram et al. (2006), which found that in ponderosa pine forests of New Mexico and Arizona, wildfire severity was reduced in all treated stands compared to untreated stands. Thinning followed by burning was most effective at reducing fire intensity, followed by piling and burning. Lopping and scattering slash had the least effect on reducing fire intensity. Omi et al. (2006) found wildfire severity was often reduced by treatments in Colorado, Arizona, California, Oregon, and Washington. Treatments that included reduction of surface fuels were generally effective, with or without treatment of canopy fuels, but thinning followed by slash treatments produced the most impressive reduction in fire intensity and severity. Thin-only treatments were generally ineffective and in some cases produced greater fire severity than untreated areas. Treatments that included reducing surface fuels were effective up to ten years. On the other hand, Raymond and Peterson (2005) studied two sites burned in the Biscuit Fire in southwest Oregon and found that thinning without treating surface fuels resulted in the highest mortality, lower mortality was found in untreated stands, and the least mortality was found in stands that were thinned and underburned. Carey and Schumann (2003) summarize a number of studies pointing out the effectiveness of thinning with effective surface fuel treatments and the mixed results of thinning without surface fuel treatments.

Thinning from below (as proposed in this project) and possibly free thinning can most effectively alter fire behavior by decreasing fire intensity (Graham et al. 1999). Low thinning (thinning from below) removes trees from the lower canopy, leaving large trees. Free thinning (crop-tree thinning) releases selected trees while not treating the rest of the stand.

Crown thinning and selection thinning would not reduce crown fire potential because they leave multiple canopy layers (Graham et al. 1999). Crown thinning (thinning from above) removes dominant and codominant trees from the canopy to favor residual trees in the same classes. Selection thinning removes dominant trees to favor smaller trees.

Peterson et al. (2005) summarized the effects of thinning treatments on key components of canopy structure related to crown fire hazard in the table reproduced below:

Table E-2: Effects of Thinning on Key Components of Canopy Structure

Thinning Treatment	Canopy Base Height	Canopy Bulk Density	Canopy Continuity	Overall Effectiveness
Crown	Minimal	Lower in upper canopy but minimal effect in lower canopy	Lower continuity in upper canopy, but minimal effect in lower canopy	May reduce crown fire spread slightly but torching unaffected
Low	Large increase	Large effect in lower canopy, some effect in upper canopy depending on tree sizes removed	Large effect in lower canopy, some effect in upper canopy depending on tree sizes removed	Will greatly reduce crown fire initiation and torching
Selection	None	Lower in upper canopy but minimal effect in lower canopy	Lower continuity in upper canopy but minimal effect in lower canopy	May reduce crown fire spread slightly if many trees removed but torching unaffected
Free	Small to moderate increase, depending on trees removed	Small to moderate decrease throughout canopy, depending on trees removed	Small to moderate decrease throughout canopy, depending on trees removed	May reduce crown fire spread slightly if many trees removed; torching reduced slightly
Geometric (Mechanical*)	None	Small to moderate decrease throughout canopy, depending on spacing and species composition	Small to moderate decrease throughout canopy, depending on spacing and species composition	Crown fire spread and initiation reduced if spacing is sufficiently wide; torching reduced
Variable Density	Increase in patches where trees are removed	Decrease in patches where trees are removed	Moderate to large decrease	Crown fire spread reduced, crown fire initiation reduced somewhat; torching reduced somewhat

*Referred to as 'Mechanical' in Graham et al. 1999

Non-commercial thinning in sapling-size stands can influence fire behavior by favoring species with light crowns like larch and white pine or by favoring fire-tolerant ponderosa pine over Douglas-fir and grand fir (Graham et al. 1999). The non-commercial thinning proposed in this project is designed to affect fire behavior in the long-term by favoring fire-tolerant ponderosa pine and larch. Non-commercial thinning produces large quantities of fine fuels. These fuels would be disposed of through some combination of piling, burning, or limbing and bucking to increase contact with the ground to maintain higher fuel moisture content and encourage decay.

Prescribed burning reduces loading of fine fuels, duff, large woody fuels, rotten material, shrubs, and other live surface fuels that affect spread rate and intensity (Graham et al. 2004). Burning reduces horizontal fuel continuity and disrupts growth, intensity, and spot fire ignition probability of surface fires. Prescribed burning designed to reduce ladder fuels decreases the vertical continuity between surface and canopy fuels. It also scorches the lower branches of trees and effectively raises the live crown base height. Prescribed burning has potential challenges, too (Peterson et al. 2005). Individual and clumps of trees may be killed that were not targeted. Fallen dead branches and boles then can increase surface fuel loads.

Thinning and prescribed burning can modify understory microclimate by allowing increased solar radiation to reach the forest floor, which increases surface temperatures, decreases fine fuel moisture, and decreases relative humidity compared to untreated stands (Graham et al. 2004). These conditions can increase surface fire intensity. All fuel strata need to be managed over time and space to minimize unwanted consequences of wildfire (Graham et al. 2004).

There are few studies evaluating the longevity of fuel treatments and their effectiveness at altering fire behavior over time. Various studies have shown that effectiveness of prescribed burning alone decreases significantly over 10 to 20 years (Graham et al. 2004). The longevity of fuel treatments varies with climate, soils, and other factors. The longevity of fine woody fuels from thinning slash is greater on drier sites than on moister sites. Effects likely last longer in areas where vegetation development is slower than in highly productive areas (Graham et al. 2004).

There are several ways fuel treatments could exacerbate wildfire hazard (Keyes and Varner, 2006). Thinning transforms live canopy fuels to dead surface fuels that must be burned or removed. Slash generated from thinning inflates fuelbed depth unless treated. Reducing canopy cover can facilitate drying of dead surface fuels. Thinning can increase subcanopy wind speed, resulting in higher rates of spread and potentially erratic fire behavior. Thinning increases sunlight and wind on the forest floor, resulting in drier duff. Hardwoods and shrubs can stump sprout prolifically, effectively relocating elevated live fuels to the forest floor level. Soil disturbance from thinning can disturb soils and encourage seedling regeneration. Advance regeneration can be released after thinning, resulting in greater vertical continuity of fuels. Thinning increases light available to overstory trees, so lower branches are retained longer instead of dying and effectively raising crown base height. Fuel management treatments should be designed to minimize these adverse effects, and they should be designed with future maintenance treatments in mind (Keyes and Varner, 2006).

Although there is a good general understanding of the factors that govern fire behavior, the interactions between the factors and the way fire behaves on a landscape are complex. Fire behavior and severity can be understood and predicted in general terms, but exact predictions are not possible (Graham et al. 2004). Given this complexity, focusing on basic scientific principles is important for decision-making and adaptive management over time (Peterson et al. 2005).

Bark beetles

Western pine beetle populations can reach outbreak levels when ponderosa pine is moisture stressed (Randall 2004). In the first half of the twentieth century, stands of large, old, decadent ponderosa pine were killed by western pine beetles. Large, old, slow-growing ponderosa pine trees are very susceptible to attack. Large old ponderosa pines surrounded by second growth mixed conifer stands are susceptible. Lately western pine beetles have been aggressively attacking young second growth stands. Trees are usually killed in groups, usually in stands of dense, over-stocked, even-age ponderosa pine but also in clumps of ponderosa pine in mixed-conifer stands.

Two systems to identify western pine beetle hazard have been developed, one to identify susceptible trees and one to identify susceptible stands (Randall 2004). Individual tree hazard is

based on age, crown size, and dominance. Older trees with poor thin crowns and slow growth rates are most likely to be attacked and killed by the beetle. Stand hazard is based on the average diameter of ponderosa pine trees over 5 inches at dbh (diameter at breast height: 4.5 feet above the ground), stand structure, and the percent basal area of ponderosa pine in the stand. Even-aged stands with more than 120 square feet of basal area per acre of ponderosa pine trees averaging over 10 inches dbh are most likely to be attacked and killed by the beetle.

Douglas-fir beetles are attracted to wind-throw and trees weakened by fire, drought, defoliation, or root disease (Kegley 2004). Douglas-fir beetle populations expand rapidly in these conditions and subsequent generations attack and kill surrounding healthy green trees. As beetles are forced into increasingly healthier trees, populations decline. Outbreaks typically last from 2 to 4 years. Outbreaks are associated with dense stands, usually with trees over 120 years old. There is a relationship between root-diseased Douglas-fir and endemic populations, but that relationship is not evident during outbreaks of Douglas-fir beetles.

Stand-level Douglas-fir beetle hazard is based on stand density, percent of Douglas-fir, average stand age, and the average diameter of the Douglas-fir (Kegley 2004). Highest hazard stands are more than 250 square feet of basal area per acre, more than 50 percent Douglas-fir, greater than 120 years old, and greater than 14 inches dbh.

Treatments to modify bark beetle susceptibility

Preventing western pine beetle-caused damage in ponderosa pine stands is accomplished by reducing the conditions considered as stand hazards (Randall 2004). Thinning to reduce the density and increase the vigor of the residual trees results in lower losses to western pine beetles. Thinning to about 90 to 100 square feet per acre is effective, which generally results in removing enough trees so the tree crowns don't touch. Tree removal should focus on trees weakened by defoliation, root disease, lightning, fire, mechanical injury, breakage, attack by other beetles, or root damage.

Preventing Douglas-fir beetle outbreaks is accomplished by reducing the conditions considered as stand hazards (Kegley 2004). This includes reducing stocking, reducing the proportion of Douglas-fir, or reducing average stand age or size. Treatments in the Clear Creek project have the objective of reducing the stocking and proportion of Douglas-fir. The average stand age would not be changed, but the average tree size would be increased. The improved tree health and vigor and reduced moisture stress provided by reducing stocking would reduce the hazard presented by the larger average size.

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Appendix F

Project Consistency with the Northern Rockies Lynx Amendment

The Upper Prospect Lynx Analysis Unit overlaps a portion of the Clear Creek project area.

ALL MANAGEMENT PRACTICES AND ACTIVITIES: apply to lynx habitat in LAUs and Linkage Areas	Project Compliance
Standard ALL S1: Apply to new or expanded developments and vegetation management projects.	
New or expanded permanent developments and vegetation management projects must maintain habitat connectivity. Exception: Wildfire suppression or wildland fire use.	No new developments would occur. Habitat connectivity would not be affected by vegetation management because vegetative cover would be left in all treatment units that would facilitate lynx movement if they were to pass through the area.
Guideline ALL G1: Apply to highway or forest highway projects on federal lands.	
Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forests highways across federal land. Methods could include fencing, underpasses, or overpasses.	NA

VEGETATION (VEG) MANAGEMENT ACTIVITIES AND PROJECTS: apply to lynx habitat in LAUs only. (Also see HU H6 and G9 below.)	Project Compliance
Standard VEG S1: Apply to all vegetation management that regenerates forests.	
In the absence of a broad-scale assessment that substantiates different historic levels of unsuitable habitat, limit disturbance as follows: If more than 30% of lynx habitat in a LAU is in a stand initiation structural stage, no additional lynx habitat may be regenerated by vegetation management projects. Exception: fuel treatment projects under HFRA located in WUI that do not meet VEG S1, S2, S5 and S6 may occur on no more than 6% (cumulatively) of lynx habitat on the Forest. See VEG G10.	NA. No vegetation treatments are proposed within lynx habitat.
Standard VEG S2: Apply to all vegetation management projects that regenerate forests.	
Timber management projects shall not regenerate more than 15% of lynx habitat on NFS lands within an LAU in a 10-year period. Exception: fuel treatment projects under HFRA located in WUI that do not meet VEG S1, S2, S5 and S6 may occur on no more than 6% (cumulatively) of lynx habitat on the Forest. See VEG G10.	NA. No timber harvest would occur within lynx habitat.
Standard VEG S5: Apply to all precommercial thinning projects (regen units)	
Precommercial thinning projects that reduce snowshoe hare habitat may occur from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat only in the following instances: 1. within 200 feet of administrative sites, dwellings, outbuildings; 2. for research studies or genetic tree tests evaluating genetically improved reforestation stock; 3. based on new information, peer reviewed and accepted by R1 and FWS, where a written determination states: a. a project is not likely to adversely affect lynx or lynx habitat; or b. a project is	NA. No precommercial thinning would occur within lynx habitat

VEGETATION (VEG) MANAGEMENT ACTIVITIES AND PROJECTS: apply to lynx habitat in LAUs only. (Also see HU H6 and G9 below.)	Project Compliance
likely to have short term adverse effects but would result in long-term benefits to lynx or lynx habitat. 4. for conifer removal in aspen or daylight thinning around individual aspen trees where aspen is in decline; 5. for daylight thinning of planted rust-resistant white pine where 80% of winter snowshoe hare habitat is retained; or 6. to restore whitebark pine. Exception: fuel treatment projects in WUI that use pre-commercial thinning as a tool and do not meet VEG S1, S2, S5 and S6 may occur on no more than 6% (cumulatively) of lynx habitat on the Forest. See VEG G10.	
Standard VEG S6. Apply to all vegetation management projects (multi-story stands)	
Vegetation management projects that reduce snowshoe hare habitat in multi-story mature or late successional forests may occur only, 1. within 200 feet of administrative sites, dwellings, outbuildings; recreation sites, special use improvements, including infrastructure in permitted ski area boundaries; 2. for research studies or genetic tree tests evaluating genetically improved reforestation stock; 3. incidental removal during salvage harvest (i.e. locating skid trails). Exception: fuel treatment projects in WUI that do not meet VEG S1, S2, S5 and S6 may occur on no more than 6% (cumulatively) of lynx habitat on the Forest. See VEG G10.	NA. Vegetation treatments are proposed in dry ponderosa pine and Douglas-fir forest types.
Guideline VEG G1. Apply to all vegetation management projects (stem exclusion, closed-canopy structural stage)	
Vegetation management projects should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority for treatment should be given to stem exclusion, closed-canopy structural stage stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.	NA. Vegetation treatments are proposed in dry ponderosa pine and Douglas-fir forest types.
Guideline VEG G4. Apply to prescribed fire	
Prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.	No permanent breaks would be constructed and no travel routes would be created
Guideline VEG G5. Apply to all vegetation management projects (alternate prey)	
Habitat for alternate prey species, primarily red squirrel, should be provided in each LAU.	Red squirrel habitat is abundant due to the variety of forest cover types and stand ages – especially the abundance of more moist forest types stands on the south side of Clear Creek where no vegetation activities would occur. These moist forest types would remain as they are currently.
Guideline VEG G10. Apply to fuel treatment projects in WUI	
Fuel treatment projects within the WUI as defined by HFRA should be designed considering Standards VEG S1, S2, S5, and S6 to promote lynx conservation.	NA. No fuel treatment is proposed within

VEGETATION (VEG) MANAGEMENT ACTIVITIES AND PROJECTS: apply to lynx habitat in LAUs only. (Also see HU H6 and G9 below.)	Project Compliance
	lynx habitat
Guideline VEG G11. Apply to all vegetation management projects (coarse woody debris component for denning habitat)	
Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.	The project would not affect denning habitat.

LIVESTOCK MANAGEMENT (GRAZ): Apply to grazing projects in lynx habitat in LAUs only.	Project Compliance
Guideline GRAZ G1: Apply to grazing in fire- and harvest-created openings	
In fire- and harvest-created openings, manage livestock grazing to make sure impacts do not prevent shrubs and trees from regenerating.	NA
Guideline GRAZ G2: Apply to grazing in aspen stands	
In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.	NA
Guideline GRAZ G3: Apply to grazing in riparian areas	
In riparian areas and willow carrs, manage livestock grazing to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.	NA
Guideline GRAZ G4: Apply to grazing in shrub-steppe habitats	
In shrub-steppe habitats, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs, to contribute to maintaining or achieving a preponderance of mid- or late seral stages, similar to conditions that would have occurred under historic disturbance regimes.	NA

HUMAN USE PROJECTS (HU): Apply to special uses, recreation management, roads, highways, and mineral and energy development projects in lynx habitat in LAUs only (does not include grazing or vegetation management projects)	Project Compliance
Guideline HU G1: Apply to ski area development or expansion (snowshoe hare habitat)	
When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris, so winter snowshoe hare habitat is maintained.	NA
Guideline HU G2: Apply to ski areas (foraging habitat)	
When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	NA
Guideline HU G3: Apply to recreational developments (lynx movement)	
Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat.	Improvements to these facilities are not likely to change winter use at all. The trailhead and much of the trail is not within lynx habitat
Guideline HU G4: Apply to mineral and energy development sites (snow compaction)	
For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.	NA
Guideline HU G5: Apply to mineral and energy development sites (reclamation)	
For mineral and energy development sites and facilities that are closed, a reclamation plan that restores lynx habitat should be developed.	NA

HUMAN USE PROJECTS (HU): Apply to special uses, recreation management, roads, highways, and mineral and energy development projects in lynx habitat in LAUs only (does not include grazing or vegetation management projects)	Project Compliance
Guideline HU G6: Apply to road upgrades (disturbance)	
Methods to avoid or reduce effects on lynx should be used in lynx habitat when upgrading unpaved roads to maintenance levels 4 or 5, if the result would be increased traffic speeds and volumes, or a foreseeable contribution to increases in human activity or development.	NA
Guideline HU G7: Apply to permanent road building (connectivity)	
New permanent roads should not be built on ridge-tops and saddles, or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers.	0.25 miles of permanent road would be constructed and placed in to long-term storage following use for this project. This short segment of road is not located on a ridgetop, saddle, or area identified as important for lynx habitat connectivity.
Guideline HU G8: Apply to roadside brush removal	
Cutting brush along low speed, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.	Road maintenance would be completed as part of the project, but would not occur within lynx habitat. Brush cutting would be done on some roads to provide for safe vehicle passage.
Guideline HU G9: Apply to temporary roads for all project types	
On new roads built for projects, public motorized use should be restricted. Effective closures should be provided in road designs. When the project is over, these roads should be reclaimed or decommissioned, if not needed for other management objectives.	Temporary roads constructed for this project would be closed to public motorized use. Temporary roads would be decommissioned following use for this project.
Guideline HU G10: Apply to ski areas (lynx security habitat)	
When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat if it has been identified as a need.	NA
Guideline HU G11: Apply to designated snow routes or play areas	
Designated over-the-snow routes, or designated play areas, should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs. This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HUG12. Use the same analysis boundaries for all actions subject to this guideline.	NA
Guideline HU G12: Apply to winter access (non-recreation-related)	
Winter access for non-recreation special uses, and mineral and energy exploration and development, should be limited to designated routes or designated over-the-snow routes.	NA

LINKAGE AREAS (LINK): Apply to all project in linkage areas, subject to valid existing rights.	Project Compliance
Standard LINK S1: Apply to highway or forest highway	
When highway or forest highway construction or reconstruction is proposed in linkage areas, identify potential highway crossings.	NA
Guideline LINK G1: Apply to land conveyances	
NFS lands should be retained in public ownership.	NA
Guideline LINK G2: Apply to livestock grazing in shrub steppe habitats	
Livestock grazing in shrub steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late seral stages, similar to conditions that would have occurred under historic disturbance regimes.	NA