Joint Final Environmental Impact Statement

Montanore Project

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Cabinet Mountains *Photo by M. Holdeman*

Volume 3

Chapter 3: Affected Environment and Environmental Consequences

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United States Department of Agriculture
Forest Service
Northern Region
Kootenai National Forest

Montana Department of
Environmental Quality

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3.25.1 Introduction

The KNF provides habitat for more than 300 different species of wildlife (USDA Forest Service 2003c), many of which occur on the Libby Ranger District (District) and within the Montanore Project analysis area. The presence or absence of wildlife species depends in part on the amount, distribution, and quality of habitat used by each species. Successional and structural changes in habitat, as well as natural predation, hunting or trapping can impact species distribution and population numbers.

This section is comprised of six subsections: 1) key habitats; 2) elk security, big game (elk and deer) habitat, mountain goat, and pileated woodpecker; 3) Forest Service sensitive species; 4) federal threatened and endangered species; 5) migratory birds; and 6) other species of interest, namely moose and Montana Species of Concern. The evaluation of wildlife effects in the analysis area is concurrent and interdependent with the ESA Section 7 consultation process. The effect of a proposed activity on any wildlife species is largely dependent on the duration of its effects. Three potential categories of effects are: (1) a short-term event whose effects are relaxed almost immediately (pulse effect), (2) a sustained, long-term, or chronic event whose effects are not relaxed (press effect), or (3) a permanent event that sets a new threshold for some feature of a species' environment (threshold effect) (USFWS and National Marine Fisheries Service 1998). For the wildlife subsections, short-term effects were considered to be 2 to 5 years, while long-term effects would last for the life of the mine (30 years) or longer. These definitions are not consistent with those provided in section 3.1.1, *Direct, Indirect, and Cumulative Effects* (p. 273), but are more appropriate for analysis of wildlife in general due to life history, reproductive cycles, and population dynamics specific to each species. The evaluation of impacts on Montana Species of Concern is part of the MFSA transmission line certification process.

The analysis area for sensitive species was determined based on viability analysis and concepts described by Ruggiero *et al.* 1994, which considers biological populations and ecological scale. Evaluation of species viability is based on concepts and direction provided in the 2015 KFP FEIS wildlife specialist report (Anderson 2014), and the Wildlife Habitat Assessment for the Kootenai and Idaho Panhandle Plan Revision Zone (Ecosystem Research Group 2012). The analysis area used for an individual species may vary from other resource sections, or between different species of wildlife, based on biological needs and/or direction provided for T&E species under the ESA.

Depending on the wildlife resource, the analysis area considers all or portions of the seven PSUs impacted by the proposed activity: Crazy, McElk, McSwede, Riverview, Rock, Silverfish, and Treasure PSUs. The size of a PSU is sufficient to cover home ranges of wildlife species considered in this analysis and to determine the effects of the mine and transmission line alternatives. The majority of the proposed and alternative mine facilities, as well as a portion of the proposed and alternative transmission line alignments would be within the Crazy PSU while most of the remaining segments of the transmission line alignments would be within the Silverfish PSU. Except where noted in the *Analysis Area and Methods* subsection, such as for snags, woody debris, and T&E species, only the Crazy and Silverfish PSUs were evaluated for direct, indirect, and cumulative effects to individuals and their habitat on the KNF.

In PSUs other than Crazy and Silverfish, effects would be minor. One acre or less of private land in the Rock PSU would be impacted by the Rock Lake Ventilation Adit. A short segment of the

Bear Creek Road, which would be widened for its proposed as the main access road, would pass through the southeast tip of the Treasure PSU on National Forest System lands. Only private land within the McElk and Riverview PSUs would be physically affected (vegetation clearing or road construction) by the eastern segments of the transmission line alternatives. A small portion of the McSwede PSU is within 1 mile of two transmission line alternatives. Effects in the Rock, Treasure, McElk, McSwede, and Riverview PSUs will also be quantified if those effects are important to the species or their habitat.

To evaluate potential direct, indirect, and cumulative impacts of the transmission line on private and State lands outside of the Crazy and Silverfish PSUs, the analysis area includes all land within a corridor 1 mile on each side of the alternative transmission line alignments. The 1-mile buffer adjacent to the transmission line alignments was guided by Circular MFSA-2 (DEQ 2004). Potential impacts on wildlife resources on private land are evaluated qualitatively in each subsection and are not included in most habitat calculations conducted to assess compliance with numeric standards, objectives, and guidelines in the 2015 KFP. Habitat data on private land were considered in the analysis where available.

Analysis areas for threatened and endangered species are based on management areas defined in recovery plans or other areas, such as those defined by the NRLMD or Grizzly Bear Access Amendment. To provide information about the relative magnitude of anticipated effects of the Montanore Project alternatives, impacts on wildlife habitat were estimated to the nearest acre; uncertainties in the habitat mapping and impact analysis models are beyond this level of precision.

The data available and methods used are adequate to evaluate and disclose reasonably foreseeable significant adverse effects on wildlife resources in the analysis area and to enable the decision makers to make a reasoned choice among alternatives. The agencies did not identify any incomplete or unavailable information, as described in section 3.1.3, *Incomplete and Unavailable Information*.

3.25.2 Key Habitats

Key habitats provide aquatic and/or vegetative characteristics, or combinations of characteristics, which may distinguish them from surrounding habitats or may be found as a component within a variety of broader habitat types. The characteristics of these habitats play a role in the survival and success of many wildlife species, although their importance varies by species. This section describes the characteristics and importance of cavity habitat provided by snags and down woody debris and analysis of effects based on the proposed alternatives. Old growth forests, riparian areas, and wetlands, which are also key habitats for some species, are discussed in sections 3.22, *Vegetation*, 3.6, *Aquatic Life and Fisheries*, and 3.23, *Wetlands and Other Waters of the U.S.* Effects to wildlife regarding the availability of cavity habitat and down woody debris are evaluated within the analyses for species associated with these key habitats, such as pileated woodpecker discussed in section 3.25.3.4, *Pileated Woodpecker* and flammulated owl, fisher, and western toad discussed in section 3.25.4, *Forest Service Sensitive Species*.

3.25.2.1 Regulatory Framework

3.25.2.1.1 Organic Administration Act and Forest Service Locatable Minerals Regulations

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

3.25.2.1.2 National Forest Management Act/Kootenai Forest Plan

The National Forest Management Act requires the Secretary of Agriculture to promulgate regulations specifying guidelines under the principles of the Multiple-Use Sustained Yield Act of 1960, to "provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the Plan" (P.L. 94-588, Sec.5 (g)(s)(B)). The 2015 KFP was developed under the 1982 Planning Regulations (36 CFR 219.9, 1982) that also state that fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.

Accordingly, the vegetation management approach in the 2015 KFP is one that provides for ecosystem diversity by providing the ecological components, patterns, and processes at multiple scales on the landscape, and thereby provides the full spectrum of habitats and conditions needed for all of the biological organisms associated with the various ecosystems (USDA Forest Service 2013c). This includes the goal that "the KNF manages wildlife habitat through a variety of methods (*e.g.*, vegetation alteration, prescribed burning, invasive species treatments, etc.) to promote the diversity of species and communities and to contribute toward the recovery of threatened and endangered terrestrial wildlife species" (GOAL-WL-01).

In addition, the 2015 KFP provides management direction in the form of vegetation and wildlife desired conditions, coarse woody debris and snag guidelines, and old growth standards and guidelines. The companion approach to ecosystem diversity (coarse filter) is the "fine filter" approach in which conservation strategies are used to for individual species or groups of species to contribute to species diversity. The fine filter approach narrows the focus to those species that require habitat that maybe outside the range of variation and are not covered under the coarse filter. The 2015 KFP provides fine filter management direction in the form of grizzly bear, lynx, and other species-specific standards and guidelines.

3.25.2.1.3 Major Facility Siting Act

The MFSA directs the DEQ to approve a facility if, in conjunction with other findings, the DEQ finds and determines that the facility would minimize adverse environmental impacts, considering the state of available technology and the nature and economics of the various alternatives. The DNRC and FWP are required to report to DEQ information relating to the impact of the proposed site on FWP's area of expertise. The report may include opinions as to the advisability of granting, denying, or modifying the certificate.

3.25.2.2 Snags and Woody Debris

The 2015 KFP includes a desired condition that "down wood occurs throughout the forest in various amounts, sizes, species, and stages of decay. The larger down wood (*i.e.*, coarse woody debris) provides habitat for wildlife species and other organisms, as well as serving important functions for soil productivity" (FW-DC-VEG-08). Table 3 of FW-GDL-VEG-03 describes the specific amounts of coarse woody debris that should be retained following vegetation management activities.

The 2015 KFP also includes a desired condition that "snags occur throughout the forest in an uneven pattern, provide a diversity of habitats for wildlife species, and contribute to the sustainability of snag dependent species. Snag numbers, sizes, and species vary by biophysical setting and dominance group… Over time, the number of large-diameter snags (20 inches in DBH or greater) increases in all biophysical settings" (FW-DC-VEG-07).

Tree mortality is an inevitable outcome within a forested stand. The agent of mortality as well as age, size, distribution, and longevity of the resulting snags are not as predictable. Snags are created by events such as insect and disease, wildfire, physical damage, weather, over-crowding, or simply from old age. They are lost by falling down, through both natural (*e.g.,* decomposition and wind) and human mechanisms (*e.g.*, woodcutting, and timber harvest).

Snags (standing dead trees) are ecologically important for a number of reasons. They are important habitat structures (for nesting, feeding, perching, and/or roosting) for a wide variety of wildlife species. They provide substrate for some mosses and lichens and also serve to improve environmental conditions on harsh sites. Once they fall, snags become down wood that provides habitat structures (including den sites) for a different and very wide suite of wildlife and some plant species. Down woody debris is an important component of forest ecosystems, providing for soil protection and productivity as well as wildlife habitat (*e.g.*, cover, reproduction, and foraging opportunities) for a wide variety of birds, mammals, reptiles, and amphibians. This dead, woody material is derived from trees in various stages of decay and any material larger than 3 inches in diameter is considered coarse woody debris (Graham *et al*. 1994). The most beneficial form of woody debris for wildlife is logs, which to qualify as a log must measure a minimum of 8 feet long with a large-end diameter of 6 inches or more (Bull *et al*. 1997). The larger the log, the greater the longevity and opportunities it provides for wildlife (Thomas 1979; Bull *et al*. 1997; Brown *et al*. 2003) although the retention of small material is better than none (Thomas 1979). The ecological processes and functions of down wood material are discussed in many research papers (*e.g.*, Bull *et al*. 1997; Graham *et al*. 1994; Maser and Trappe 1984; Maser *et al*. 1988).

In summary, snags and down woody debris would be maintained at a sufficient level within the impacted PSUs to provide ample habitat for species that require or use snags during their lifecycle. In addition, the agencies' alternatives would retain snags unless required to be removed for safety or operational reasons within the disturbance areas as well as down woody materials beneath the transmission lines at levels consistent with the 2015 KFP desired conditions and guidelines for both soil productivity and wildlife habitat as appropriate for the habitat type.

3.25.2.2.1 Analysis Area and Methods

The analysis area for snags includes the four PSUs impacted by proposed activities: the Crazy, McElk, Riverview, and Silverfish PSUs. The majority of the proposed and alternative mine facilities, as well as a portion of the proposed and alternative transmission line alignments would be within the Crazy PSU while the remaining segments of the transmission line alignments on National Forest System lands would be within the Silverfish PSU. Therefore, the bulk of the following analysis focuses on these two PSUs. Some segments of the transmission line alignments, substation and loop line would occur within small areas on private land of the McElk and Riverview PSUs. Using the PSU to analyze the potential effects to snag and down wood habitat on private lands provides for both consistency with the scale of analysis used for effects occurring on National Forest System lands as well as context for how many acres of private lands are being impacted compared to what is available within a similar sized analysis area. None of the mine or transmission line alternatives would affect snag and down wood habitats within the Treasure PSU because only road improvement work on an existing open road would occur within it. Therefore, this PSU has been eliminated from further analysis and the proposed road location can be found in the project record. Also eliminated from further analysis was the Rock PSU as less than 1 acre of private land on steep, rocky ground would be affected by the Rock Lake Ventilation Adit.

The analysis area includes National Forest System land as well as private and State lands. Estimates of the impacts to snags and down woody material on National Forest System lands are based on forest vegetation data, past vegetation management treatments (type and date of implementation), the restricted and open road system, and disturbance area boundaries of each of the mine and transmission line alternatives. Information from FACTS, including treatment type and year of completion, and summaries of Vegetation Response Units (USDA Forest Service 1999c) were also used to estimate snag densities. District surveys for old growth and post-harvest units provide additional data sources for cavity and down wood habitat conditions. For the Crazy PSU, data sources for snag and down wood habitat include District surveys for old growth and harvested units that cover about 7,502 acres. Survey methods/procedures for old growth and harvest units are found in section 3.22, *Vegetation*, and the project record, respectively. Quantitative snag and down wood information is not as readily available for private or state-owned lands in the analysis area, much of which has been logged in the past 20 to 30 years. Current snag and down wood availability on private and State land was estimated based on vegetation mapping shown on Figure 85 and likely past and current land use practices.

Thomas (1979) was used to determine the percent potential population level (PPL) of National Forest System lands within the analysis area. This process uses a weighted calculation (percent snag level X percent of the PSU with that snag level) that considers management and other activities as well as natural events (*e.g.*, wildfire, insect and disease outbreaks, etc.) to estimate current PPL and change due to proposed activities as displayed in Table 192. Old growth existing condition acres and acres impacted by proposed activities are not directly comparable to those found within section 3.22.2, *Old Growth Ecosystems*, due to different analysis methods. This analysis includes 100 percent of all identified old growth acres regardless of classification, includes acres above 5,500 feet, and does not include acres within close proximity of open roads to account for snag loss to firewood gathering. Meeting the 2015 KFP riparian standards and guidelines (USDA Forest Service 2015b), would ensure provision of large woody debris and vertical structure per FW-DC-RIP-05.

The value applied to an activity type is founded on the following assumptions based on Thomas (1979) and KNF snag data analyses. These assumptions are applied as a worst-case scenario and described below and in the footnotes of Table 192. See Table 192 for snag levels applied to activity type and references. Harvest type and period of implementation influence the number of snags left standing in the treated area. Unharvested and old growth stands provide 100-percent snag levels. For the Supplemental Draft EIS and Final EIS, the areas of overlap between mapped old growth and harvest stands were considered old growth. As a result, the area of partial cut stands differs from the Draft EIS. Partial cut stands provide a higher snag level than regeneration harvest methods and regeneration harvests implemented since adoption of the first KFP (1987), as they retain more snags than those implemented prior (Johnson and Lamb 1998). Firewood cutting within 200 feet of open roads has resulted in some snag loss. However, Tincher (1998) reported this impacted area still provides at least 40 percent snag level compared to unroaded areas of similar habitat type. Similarly, Bate and Wisdom (2004) and Wisdom and Bate (2008) found no difference in snag density adjacent to open and closed roads, although densities were lower in areas closer to a town. Forestwide, visual observations suggest that snag levels adjacent to roads can be as low as zero. Since firewood cutting is allowed from any open road, retention of snags within 200 feet of the road over time is highly unlikely. Therefore, a worst-case scenario was used where areas within 200 feet of open roads were considered to have total snag loss. Snag loss associated with restricted roads was limited to the roadbed itself.

Impacts on snags and down wood habitats discussed in the Environmental Consequences section are based on the expected disturbance areas associated with the various project features of the mine and transmission line alternatives. Not all proposed disturbance acres would result in a reduction in the cavity habitat PPL as it depends on the habitat condition in which the clearings would take place. For example, road improvements occurring within existing open road prisms likely would not reduce snags and down wood habitat and these disturbance acres would not be counted again. Conversely, clearings occurring in old growth or previously untreated stands would have the greatest potential reduction in cavity and down wood habitat changing the snag level from 100 to 0 percent. Those acres determined to affect the PPL are the “disturbance acres” associated with each habitat condition in Table 193; total disturbance acreage is also provided for each alternative. The effect indicators for management level includes the percent of the maximum PPL by PSU and acres impacted that reduce snag levels. Although 2015 KFP direction has changed and there are no standards related to PPL for snag habitat, the information still provides information relative to effects between alternatives.

Since Thomas (1979), new science as summarized in Bull *et al*. (1997) indicate that snag densities need to be increased for variables such as larger woodpecker home ranges, foraging structure, and other secondary uses such as loose bark that Thomas (1979) did not account for. New Forest Inventory and Analysis (FIA) data since implementation of the 2015 KFP have been incorporated into a Region One report on snag densities for western Montana (Bollenbacher *et al.* 2009). Bollenbacher *et al*. (2009) used FIA data to estimate snag density based on habitat type groups. These snag densities were considered in this analysis. Analysis for the 2015 KFP indicates that wildlife species that tend to require or use snags during their lifecycles will likely have ample habitat in the future on the Forest (USDA Forest Service 2013c). The analysis considered natural disturbance events and processes as well as management activities.
Data sources for down woody debris consist of District old growth and harvest unit associated surveys and predominant habitat type groups (correlated with VRUs) within the PSUs. Untreated stands would generate down woody material associated with the habitat type. However, in general, current down wood levels are generally considered to exceed historical levels due to longer fire return intervals within stands (Graham *et al.* 1994, Brown *et al*. 2003). Moist VRUs provide productive conditions for tree establishment and growth, which contribute to future down wood materials. This coupled with fire suppression, which has produced an accumulation of both down and standing materials, can result in high level of woody debris within forested stands.

Based on the growing conditions and lack of large fires due to fire suppression, and high levels of down wood debris found within survey units it can be inferred that high levels of down wood material is available within the PSUs. Issue indicators are the relative reduction in expected down woody debris based on existing down woody debris available and design features for retaining down wood material within proposed activity areas.

3.25.2.2.2 Affected Environment

Three habitat type groups are found on the KNF and in the impacted PSUs: dry, low to mid elevation moist, and subalpine. The habitat type groups are described in Bollenbacher *et al*. (2009). The dry habitat type has the lowest density of snags, especially in the larger diameter classes due to more frequent, low- to mid-severity fires. Predominant trees are ponderosa pine and Douglas-fir on the drier sites with western larch found within the moister range of this type, all of which are preferred species for primary excavators and secondary cavity nesters. The low and mid moist habitat type is diverse in conifer species and include western larch snags in the early and late seral forest condition, with cedar and grand-fir also providing cavity habitat. This group has the highest density of snags of all size classes. The wet sites increase productivity and periodic mixed severity fires between stand replacing fires encourages the growth of large trees. Finally, the subalpine habitat type has high diversity of species depending on elevation and cold tolerance. Some sites are too cold for western larch and Douglas-fir. Fire frequencies can vary depending on the site composition and location. Snag density is high in the small diameter class and moderate in the larger classes compared to the other habitat types. Snag density, distribution, and longevity can be affected by timber harvest and human access in timber managed areas and possibly climate change and fire suppression in unmanaged areas (*e.g.*, wilderness or roadless) (Bollenbacher *et al*. 2009).

Stands experiencing insect, disease, or severe wildfire could have more than 2.25 snags per acre depending on the severity of the outbreak or fire that the stand receives. Within the analysis area, insect and disease generally appear to be at an endemic level with some slightly larger areas of activity at the southern end of the Silverfish PSU (USDA Forest Service *et al*. 2013) and there are no large areas of snags resulting from these processes. The last large fires occurred between 1885 and 1939, with the 1910 fires affecting large areas of the Crazy and Silverfish PSU leaving limited large tree component and little diversity or heterogeneity across the landscape. Snag levels within the fire perimeter would have been relatively high immediately following the fires, especially in high severity fire areas. However, snag longevity following fires depends on the species, size, and density and most are gone within 20 years (Bull *et al*. 1997, Morrison and Raphael 1993, Harris 1999, Russell *et al*. 2006). Estimating snag densities in these areas is difficult as the fire severity would not be the same throughout the fire perimeter. Some trees would have fallen, others remain, new snags would have been created from remaining trees, and newly established seedlings could reach 10 inches dbh by 60 years (USDA Forest Service 1993b). Harris (1999) included areas where the primary action on the stand is a natural process such as these as “uncut.” Also, potentially high levels initially, followed by potentially low levels, would also likely be averaged out across the analysis area depending on the acres impacted. Therefore, fire areas where past timber harvest has not occurred were included in the old growth and unharvested acres in Table 192 and received a managed snag level of 100 percent.

Table 192 summarizes the existing PPL on National Forest System lands in the analysis area PSUs. Snag levels were determined based on the assumptions from the analysis method section above. The existing snag level on National Forest System lands in the analysis area range from about 73 to 91 percent. Refer to the project record for details.

Table 192. Existing Potential Population Level on Timbered National Forest System Lands in the Analysis Area.

Habitat Condition[1]	Acres	Proportion of National Forest System Lands (%)	Total Snags per Acre[2]	Snag Level (%)	PPL[3] (%)
Crazy					
Old Growth	7,657	12.7	2.25	100[4]	12.7
Untreated Forest	34,548	57.3	2.25	100[4]	57.3
Partial Cut Forest[6]	2,722	4.5	1.35	60[5]	2.7
Past Regeneration Harvest (1990-2013)[7]	786	1.3	0.9	40[5]	0.5
Past Regeneration Harvest (thru 1989)[7]	7,046	11.7	0[5]	0	0
Roads[8]	7,454	12.3	0[9]	0	0
Total PSU	60,213	99.8	—	—	73.2
Silverfish					
Old Growth	7,279	12.0	2.25	100[4]	12.0
Untreated Forest	45,378	74.9	2.25	100[4]	74.9
Partial Cut Forest[6]	3,289	5.4	1.35	60[5]	3.2
Past Regeneration Harvest (1990-2013)[7]	725	1.1	0.9	40[5]	0.4
Past Regeneration Harvest (thru 1989)[7]	1,076	1.7	0[5]	0	0
Roads[8]	2,775	4.5	0[9]	0	0
Total PSU	60,521	99.6	—	—	90.5
McElk					
Old Growth	6,419	22.4	2.25	100[4]	22.4
Untreated Forest	16,698	58.4	2.25	100[4]	58.4
Partial Cut Forest[6]	1,427	4.9	1.35	60[5]	2.9
Past Regeneration Harvest (1990-2013)[7]	492	1.7	0.9	40[5]	0.6
Past Regeneration Harvest (thru 1989)[7]	1,489	5.2	0[5]	0	0
Roads[8]	2,035	7.1	0[9]	0	0
Total PSU	28,560	99.7	—	—	84.3
Riverview					
Old Growth	5,590	17.4	2.25	100[4]	17.4
Untreated Forest	16,897	52.8	2.25	100[4]	52.8
Partial Cut Forest[6]	2,313	7.4	1.35	60[5]	4.4
Past Regeneration Harvest (1990-2013)[7]	1,922	6.2	0.9	40[5]	2.4
Past Regeneration Harvest (thru 1989)[7]	2,004	6.2	0[5]	0	0
Roads[8]	3,269	10.2	0[9]	0	0
Total PSU	31,995	100.2	—	—	77.0

[1] Includes VRUs 1, 2, 3, 4, 5, 6, 7, 9, 10, and 11. Based on timbered lands and does not include the following habitat types: grassland steppe, mountain bottomlands, agricultural lands, rural/urban, rock/scree/ice, and water.
[2] Snag density includes all snags $\geq$ 10” dbh (Thomas 1979). This density is needed to achieve the corresponding snag level value. These numbers represent the minimum number of snags per acre to manage for the respective percent snag level (e.g., 40 percent) per Thomas 1979 methodology and do not represent either the actual estimated number of snags per acre in the PSU per Bollenbacher *et al*. 2009 or the desired conditions under the 2015 Forest Plan.
[3] Proportionate PPL equals percent National Forest System lands multiplied by percent snag level. Sum of proportionate PPLs from all habitat conditions equals the PSU PPL (Thomas 1979).
[4] Based on Tincher (2003).
[5] Based on Johnson and Lamb (1998).
[6] Partial cut harvests include, but are not limited to, improvement harvest treatments.
[7] Regeneration harvest includes, but is not limited to, clear cut with reserves, seed tree, and shelterwood harvest treatments.
[8] Roads include an average width of 33 feet; open roads were buffered by 200 feet to account for loss due to firewood gathering.
[9] Based on Tincher (1988), Bate and Wisdom (2004), and KNF forestwide observations for worst case scenario.

The major VRU found in the vegetation analysis area is VRU5 (both VRS5S and VRU5N), which are moderately cool and moist ecosystems (see section 3.22, *Vegetation*). This VRU contains productive land types and moderate to high precipitation, providing environmental conditions favorable to vegetative growth (Gautreaux 1999) and, therefore, potential volumes of down woody debris. Both wildfire and vegetation management influence the levels of down wood debris within treated stands.

Historically, wildfires have played a large role in the amount of down wood in the forests (Graham *et al.* 1994). Depending on the frequency, intensity, and magnitude of fires, ponderosa pine forests could have more than 45 tons per acre of down wood while western white pine forests could have more than 268 tons per acre of down wood. The longer period of time between fires, the longer the down wood would remain. During the last 100 years, the frequency of fires in the northern Rocky Mountains has been greatly reduced, potentially resulting in larger amounts of down wood. Vegetation management treatments, primarily timber harvest, before the 1987 KFP would have reduced the amount of down woody debris available within the treated stands whereas vegetation management occurring post-implementation of both KFPs have been designed to maintain the recommended tons per acre. Results of down wood surveys in the Crazy and Silverfish PSUs suggest that the 2015 KFP guidelines of down wood per acre are being met in old growth and past harvest areas. Surveyed old growth stands average over 23 tons per acre and past harvest units averaged 41 tons per acre in the Crazy PSU. These estimates only included materials greater than 10 inches dbh, which identified the larger material more beneficial for wildlife use. It is likely that smaller materials were also present, contributing to a higher level of down wood available across the landscape than what was estimated. Therefore, the National Forest System lands within the analysis area currently provide for a variety of species that use down woody habitat.

The majority of the private and State lands impacted by the proposed transmission line, substation and loop line is heavily roaded and has been logged in the past 20 to 30 years (Figure 85 and project record). Also, the protection of riparian habitats on these lands is likely less stringent or may not occur compared to vegetation management activities on National Forest System lands and the retention of snags and down wood material is not expected to occur to the same level. As a result, existing levels of cavity and down wood habitat is likely to be less available on private and State lands.

3.25.2.2.3 Environmental Consequences

The Montanore Project's mine and transmission action alternatives would generally result in the clearing of vegetation to allow for the construction of proposed infrastructure. The reduction in snags and amount of down wood debris depends on where the activities would occur and what the existing habitat condition is there. Overall, proposed activities that result in the reduction of forested stands are expected to slightly reduce both snag and down wood debris levels within the impacted PSUs. As a worst case scenario, it was assumed that the clearings would result in a snag level of 0 percent and that all down wood debris would be removed. Mitigation for the agencies' alternatives would maintain some level of existing cavity and down wood habitat within clearings (see section 2.5.7.4.4, *Key Habitats* and section 2.9.6.1, *Down Wood Habitat*).

Clearing of all snags within the disturbance area would result in the site-specific loss of cavity habitat for the life of the mine and for some time following reclamation. For wildlife species that use large-diameter snags and heavier canopy cover, it would take an estimated 125 to 150 years for the local cavity habitat to recover to a condition where it may be used. For other species that will use smaller trees and a more open canopy condition, local recovery and use would likely occur within 60 years. Similarly, for those species that require large amounts of down wood, especially large-diameter wood structure, it would take many years for disturbed sites to grow and accumulate this material on the forest floor. For effects to wildlife associated with these habitat types, please see the following species' analyses.

The effects to cavity habitat and the change to the PPL on National Forest System lands within the Crazy and Silverfish PSUs are displayed in Table 193 and Table 194 for the mine and transmission line alternatives, respectively, and are further described in the following subsections. No activities would occur on National Forest System lands within the McElk and Riverview PSUs (see project record). Within the Crazy, Silverfish, McElk, and Riverview PSUs, private and State lands impacted by the transmission line, substation and loop line are discussed separately.

Alternative 1 – No Mine

No direct effects from federal actions would occur. The No Mine Alternative would maintain the existing vegetative condition on the landscape and wildlife use of snag and down wood habitat would continue at current levels. Although past timber harvests and other vegetation management treatments resulted in site-specific decreases in the amount of both habitats available, especially in some existing regeneration harvest units, overall there is an abundance of snag habitat throughout the forest (USDA Forest Service 2013c). Also, current down wood levels are generally considered to exceed historical levels due to longer fire return intervals within stands (Graham *et al*. 1994, Brown *et al*. 2003). The addition or loss of snags would depend on other factors, such as firewood cutting, wind events, natural attrition, or wildfire. The level of impact from these factors cannot be calculated due to the high uncertainty in predicting occurrence and intensity levels. Similarly, this alternative would not change the current condition or availability of down woody debris within the PSUs.

Alternative 2 – MMC Proposed Mine

All proposed mine activities that would impact snags and down wood debris would occur within the Crazy PSU. Disturbance for Alternative 2 would include facility (tailings impoundment, plant site, and other) and road construction. Most of the disturbance would occur on National Forest System lands, although some private land owned by the mine would be disturbed (Figure 78). Approximately 2,282 acres of the total 2,582 acres would occur within the habitat conditions identified in Table 193. Snags would be cleared within the disturbance boundaries for Alternative 2 and result in a snag level of 0 percent; however, not all proposed clearing acres would affect the cavity habitat PPL due to their location within a previously managed area.

Table 193. Impacts on Cavity Habitat and Potential Population Level on Timbered National Forest System Lands in the Crazy PSU by Mine Alternative.

Habitat Condition[1]	Existing Acres	Disturb-ance Acres	Post Activity Acres	Proportion of NFS Lands (%)	Total Snags per Acre[2]	Snag Level (%)	PPL[3] (%)
Alternative 2							
Old Growth	7,657	303	7,354	12.2	2.25	100[4]	12.2 (-0.5)
Untreated Forest	34,548	341	34,207	56.8	2.25	100[4]	56.8 (-0.5)
Partial Cut Forest[6]	2,722	192	2,530	4.2	1.35	60[5]	2.5 (-0.2)
Past Regeneration Harvest (1990-2013)[7]	786	0	786	1.3	0.9	40[5]	0.5 (0)
Past Regeneration Harvest (thru 1989)[7]	7,046	1,016	6,030	10.0	0[5]	0	0
Roads[8]	7,454	430	7,024[10]	11.6	0[9]	0	0
Total Alternative 2 Acres	—	2,282	2,282	3.7	0[11]	0	0
Total PSU	60,213		60,213	99.8	—	—	72.0 (-1.2)
Alternative 3							
Old Growth	7,657	138	7,519	12.4	2.25	100[4]	12.4 (-0.3)
Untreated Forest	34,548	306	34,242	56.8	2.25	100[4]	56.8 (-0.5)
Partial Cut Forest[6]	2,722	184	2,538	4.2	1.35	60[5]	2.5 (-0.2)
Past Regeneration Harvest (1990-2013)[7]	786	0	786	1.3	0.9	40[5]	0.5 (0)
Past Regeneration Harvest (thru 1989)[7]	7,046	513	6,533	10.8	0[5]	0	0
Roads[8]	7,454	394	7,060[10]	11.7	0[9]	0	0
Alternative 3 Acres	—	1,535	1,535	2.5	0[11]	0	0
Total PSU	60,213		60,213	99.7	—	—	72.2 (-1.0)
Alternative 4							
Old Growth	7,657	159	7,498	12.4	2.25	100[4]	12.4 (-0.3)
Untreated Forest	34,548	281	34,267	56.9	2.25	100[4]	56.9 (-0.4)
Partial Cut Forest[6]	2,722	101	2,621	4.3	1.35	60[5]	2.5 (-0.2)
Past Regeneration Harvest (1990-2013)[7]	786	0	786	1.3	0.9	40[5]	0.5 (0)
Past Regeneration Harvest (thru 1989)[7]	7,046	656	6,390	10.6	0[5]	0	0
Roads[8]	7,454	437	7,017[10]	11.6	0[9]	0	0
Alternative 3 Acres	--	1,634	1,634	2.7	0[11]	0	0
Total PSU	60,213		60,213	99.8	—	—	72.3 (-0.9)

[1] Includes VRUs 1, 2, 3, 4, 5, 6, 7, 9, 10, and 11 and does not include the following habitat types: grassland steppe, mountain bottomlands, agricultural lands, rural/urban, rock/scree/ice, and water.
[2] Snag density includes all snags $\geq$ 10" dbh (Thomas 1979). This density is needed to achieve the corresponding snag level value. These numbers represent the minimum number of snags per acre to manage for the respective percent snag level (e.g., 40 percent) per Thomas 1979 methodology and do not represent either the actual estimated number of snags per acre in the PSU per Bollenbacher *et al.* 2009 or the desired conditions under the 2015 Forest Plan.
[3] Proportionate PPL equals percent National Forest System lands multiplied by percent snag level. Sum of proportionate PPLs from all habitat conditions equals the PSU PPL (Thomas 1979).
[4] Based on Tincher (2003); [5] Based on Johnson and Lamb (1998).
[6] Partial cut harvests include, but are not limited to, improvement harvest treatments.
[7] Regeneration harvest includes, but is not limited to, clear cut with reserves, seed tree, and shelterwood harvest treatments.
[8] Roads include an average width of 33 feet and were buffered by 200 feet to account for loss due to firewood gathering.
[9] Based on Tincher (1988), Bate and Wisdom (2004), and KNF forestwide observations for worst case scenario.
[10] Existing restricted and open roads would generally still be located on the landscape; the displayed reduction in acres is to reflect the overlap in disturbance area and reallocation to the alternative's disturbance acres.
[11] Worst-case scenario that assumes all snags would be removed with the vegetation clearing, although mitigation plans would be implemented under the agencies' alternatives to maintain snags, unless required to be removed for safety reasons.

The effect of the vegetative clearing in Alternative 2 within the Crazy PSU would be a reduction in the PPL of 1.2 percent from 73.2 to 72.0 percent. Approximately 644 acres of disturbance would occur within old growth and untreated stands, resulting in a change in the snag level from 100 to 0 percent on these acres. These two habitat conditions would continue to comprise 69.0 percent of the PSU and these moist habitats provide snag levels on the KNF in the range of 6.3 to 17.1 per acre (Bollenbacher *et al*. 2009). Alternative 2 would result in the loss of all down wood on 2,282 acres on National Forest System land in the Crazy PSU. This estimated reduction of down woody material would be minor as it would occur on 3.7 percent of the timbered lands within the PSU (Table 193). Down wood levels, on average, is expected to meet KFP desired conditions within the Crazy PSU based on: 1) the predominant habitat type within the disturbance area, 2) the amount of old growth and untreated stands within the PSU, 3) the existing level of down wood as supported by District surveys, and 4) because current down woody debris levels are generally considered to exceed historical levels due longer fire return intervals within stands (Graham *et al*. 1994; Brown *et al*. 2003).

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

The types of activities proposed under this alternative are similar to Alternative 2. Similar facility and road construction activities would occur, but there would be no LAD Areas associated with Alternative 3 and the tailings impoundment would be located slightly to the south and found entirely on National Forest System lands. The disturbance area surrounding the Poorman tailings impoundment would be smaller than the Little Cherry Creek impoundment disturbance area proposed in Alternative 2 by 656 acres.

Within the Crazy PSU, 1,535 acres within the disturbance area boundary would occur within the habitat conditions identified in Table 193 for Alternative 3. Not all proposed clearing acres affect the cavity habitat PPL due to their location within a previously managed area. The effect of the vegetative clearing to the PPL in Alternative 3 is similar to Alternative 2 with a 1.0 percent reduction from 73.2 to 72.2 percent. Also, old growth and untreated stands would continue to be found within a majority of the PSU (69.2 percent) and provide a 100 percent snag level. Therefore, there would continue to be adequate habitat for wildlife species that use snags during their lifecycles.

In comparison to Alternative 2, Alternative 3 would result in fewer acres that would be disturbed by clearing activities. This includes fewer acres being disturbed within riparian habitat and old growth and untreated stands. This includes 200 more acres of old growth and untreated stands that would be maintained with a 100 percent snag level in the vicinity of the mine for wildlife use. In addition, implementation of project design features would help to maintain or improve cavity habitat within the disturbance area. Also, mitigation plans, including the Vegetation Removal and Disposition Plan (discussed in section 2.5.2.6.2), require snags to be left in disturbance areas unless required to be removed for safety reasons. Therefore, the snag level would not be 0 percent on all cleared acres and at least portions of the disturbance areas may provide for some use by wildlife species both during mining operations and following reclamation. Effects of reduced cavity habitat with the Crazy PSU would be less in Alternative 3 compared to Alternative 2.

Alternative 3 would result in the loss of all down wood on 1,535 acres on National Forest System land in the Crazy PSU. This estimated reduction of down woody material would be minor as it would occur on 2.5 percent of the timbered lands within the PSU (Table 193). The effect to the availability of down wood from proposed vegetation clearing would be less than Alternative 2 by

1.2 percent. Also, estimated effects to down wood would be minimized in Alternative 3 through implementation of the Vegetation Removal and Disposition Plan developed for agencies' alternatives discussed in section 2.5.2.6.2. Down wood levels, on average, is expected to meet KFP desired conditions within the Crazy PSU.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

The types of activities proposed under this alternative are similar to Alternatives 2 and 3. Similar facility and road construction activities would occur, but there are no LAD sites associated with Alternative 4 and the tailings impoundment has been modified from Alternative 2 to avoid RHCAs and old growth. The disturbance area around the Little Cherry Creek Tailings Impoundment Site would be 310 acres smaller than the Little Cherry Creek Impoundment disturbance area proposed in Alternative 2.

Within the Crazy PSU, 1,634 acres within the disturbance area boundary would occur within the habitat conditions identified in Table 193 in Alternative 4. Not all proposed clearing acres affect the cavity habitat PPL due to their location within a previously managed area. The effect of the vegetative clearing to the PPL in Alternative 4 would be similar to Alternatives 2 and 3 with a 0.9 percent reduction from 73.2 to 72.3 percent. Also, old growth and untreated stands would continue to be found within a majority of the PSU (69.3 percent) and provide a 100 percent snag level. Therefore, there would continue to be adequate habitat for wildlife species that use snags during their lifecycles.

In comparison to Alternatives 2 and 3, Alternative 4 would result in a moderate reduction in cavity habitat acres due to proposed clearing activities. This includes fewer acres being disturbed within riparian habitat and old growth and untreated stands than Alternative 2 and is similar to Alternative 3. Approximately 204 acres of old growth and untreated stands would be maintained with a 100 percent snag level in the vicinity of the mine for wildlife use. In addition, implementation of project design features would help to maintain or improve cavity habitat within the disturbance area. Also, mitigation plans, including the Vegetation Removal and Disposition Plan (discussed in section 2.5.2.6.2), require snags to be left in disturbance areas, unless required to be removed for safety reasons (see section 2.5.7.4.4, *Key Habitats*). Therefore, the snag level would not be 0 percent on all cleared acres and at least portions of the disturbance areas could provide for some use by wildlife species both during mining operations and following reclamation. Effects of reduced cavity habitat with the Crazy PSU are reduced in Alternative 4 compared to Alternative 2.

Alternative 4 would result in the loss of all down wood on 1,634 acres on National Forest System land in the Crazy PSU. This estimated reduction of down woody debris would be minor as it would occur on 2.7 percent of the timbered lands within the PSU (Table 193). The effect to the availability of down wood from proposed vegetation clearing would be less than Alternative 2 by 1.0 percent and similar to Alternative 3. Also, estimated effects to down wood would be minimized in Alternative 4 through implementation of the Vegetation Removal and Disposition Plan developed for agencies' alternatives discussed in section 2.5.2.6.2. Down wood levels, on average, is expected to meet KFP desired conditions within the Crazy PSU.

Alternative A – No Transmission Line

No direct effects from federal actions would occur. The No Transmission Line Alternative would maintain existing vegetative condition on the landscape and wildlife use of cavity and down wood habitat would continue at current levels. Although past timber harvests and other vegetation management treatments often resulted in a site-specific decrease in the amount of both habitats available, especially in some existing regeneration harvest units, overall there is an abundance of snag habitat throughout the forest (USDA Forest Service 2013c). Current down wood levels are generally considered to exceed historical levels due to longer fire return intervals within stands (Graham *et al*. 1994, Brown *et al*. 2003). The addition or loss of snags would depend on other factors, such as firewood cutting, wind events, natural attrition, or wildfire. The level of impact from these factors cannot be calculated due to the high uncertainty in predicting occurrence and intensity levels. Similarly, this alternative would not change the current condition or availability of down wood within the PSUs.

Effects Common to All Transmission Line Action Alternatives

The Montanore Project has four transmission line action alternatives: MMC's Proposed Transmission Line (Alternative B), Modified North Miller Creek (Alternative C-R), Miller Creek (Alternative D-R), and West Fisher Creek (Alternative E-R). In general, vegetation would be cleared from access roads, pulling and tensioning sites, substation and loop line, and within the transmission line clearing area for all action alternatives. For all but Alternative B, alternative design and topography would help maintain some snags within the identified disturbance areas. For example, snags located outside of the transmission lines right-of-way would only be removed if deemed a safety hazard. Harvest would not occur and trees would be maintained in portions of the clearing area, such as within high spans across valleys. New roads would not be open to the public; therefore, areas adjacent to new transmission line access roads would not likely have reduced snag levels from firewood gathering. Also, impacts on cavity habitat in riparian areas in the agencies' alternatives would be minimized through implementation of KFP riparian standards and guidelines (USDA Forest Service 2015b) on National Forest System lands as well as the Environmental Specifications (Appendix D) on all lands impacted by the transmission line in the agencies' alternatives.

Transmission line clearing activities on National Forest System lands would occur within the Crazy and Silverfish PSUs. Clearing within old growth and untreated stands would have the most potential impact on the existing cavity habitat PPL and down wood debris levels. Disturbance would also occur within riparian habitat. However, due to the relatively few acres that would be cleared at the PSU scale within these habitat conditions and that a portion of the acres occur within stands that already have a reduced snag level, the effect of this clearing activity to the cavity habitat PPL and down wood levels would be negligible. Also, both old growth and untreated forest conditions would continue to comprise the majority of the PSUs (Table 194) and these moist habitats provide snag levels on the KNF in the range of 6.3 to 17.1 snags per acre (Bollenbacher *et al*. 2009), within KFP desired conditions. Down woody debris would be maintained in portions of the clearing area, such as within high spans across valleys. Also, impacts on down wood habitat in riparian areas in the agencies' alternatives would be minimized through implementation of KFP riparian standards and guidelines (USDA Forest Service 2015b) on National Forest System lands as well as the Environmental Specifications (Appendix D) on all lands impacted by the agencies' transmission line alternatives. Down wood levels, on average, is expected to meet KFP desired conditions within the Crazy and Silverfish PSUs for dependent wildlife species based on: 1) the predominant habitat type within the disturbance area, 2) the amount of old growth and untreated stands within the PSU, 3) the existing level of down wood as supported by District surveys, and 4) because current down woody debris levels are generally considered to exceed historical levels due longer fire return intervals within stands (Graham *et al*. 1994; Brown *et al*. 2003).

Clearing activities would also occur on private and State lands within the Silverfish PSU as well as the McElk and Riverview PSUs to the east. The majority of the private land that would be disturbed by the action alternatives, including the Sedlak Park Substation and loop line, is heavily roaded and has been logged in the past 20 to 30 years, and likely provides less cavity habitat than National Forest System lands. The amount of land on which these clearing acres would occur are negligible compared to the amount of private and State lands within the PSUs, for both upland and riparian habitats. Also, because of the low snag and down wood debris levels expected to currently exist on these lands, this reduction in cavity and down wood habitats on private and State lands, including the Sedlak Park Substation and loop line, would be negligible compared to the existing condition.

The subsections below describe the differences between the alternatives. The differences include total acres impacted, division of acres on National Forest System versus private and State lands, the types of habitat condition the clearing would occur in, and additional design features and mitigation measures that would be implemented. Table 194 summarizes the impacts of the transmission line alternatives on National Forest System lands and the change to the cavity habitat PPL within the Crazy and Silverfish PSUs. Impacts from all alternatives to habitat condition acres, proportion of National Forest System lands, and PPL have been calculated and are available in the project record. Table 195 displays the impacts of the alternatives on private and State lands within the Crazy, Silverfish, McElk, and Riverview PSUs. The impacts considered on private and State lands include the clearing areas associated with the transmission lines, and consider this impact in context with the amount of private and State lands available within the PSU.

Table 194. Impacts on Snag Habitat and Potential Population Level on National Forest System Lands in the Crazy and Silverfish PSUs by Transmission Line Alternative.

Activity	PSU	[A] No Transmission Line/Existing Conditions	[B] MMC's Proposed North Miller Creek Alternative	[C-R] Modified North Miller Creek Alternative	[D-R] Miller Creek Alternative	[E-R] West Fisher Creek Alternative
Total Clearing Acres	Crazy	0	114	73	73	73
	Silverfish	0	69	138	125	140
Acres Within Old Growth (% PPL)[1]	Crazy	0	24 (-0.1)	0 (0)	0 (0)	0 (0)
	Silverfish	0	8 (0)	18 (-0.1)	4 (0)	0 (0)
Acres Within Untreated Forest (% PPL)[1]	Crazy	0	39 (0)	36 (0)	26 (0)	26 (0)
	Silverfish	0	33 (0)	68 (-0.1)	37 (0)	9 (0)
Acres Within Past Harvest/ Road (% PPL)[1]	Crazy	0	51 (0)	37 (0)	47 (0)	47 (0)
	Silverfish	0	28 (0)	52 (0)	84 (0)	131 (-0.1)[2]
PPL (% Change)	Crazy	73.2	73.1 (-0.1)	73.2 (0)	73.2 (0)	73.2 (0)
	Silverfish	90.5	90.5 (0)	90.3 (-0.2)	90.5 (0)	90.4 (-0.1)

[1] % PPL: represents the percent change in the PPL from the existing condition.
[2] The one-tenth percent change due to clearing acres occurred within past partial cut forest condition.

Table 195. Private and State Lands within the PSU Impacted by the Transmission Line Alternative's Clearing Areas.

PSU	[B] MMC's Proposed North Miller Creek Alternative (Acres	%)	[C-R] Modified North Miller Creek Alternative (Acres	%)	[D-R] Miller Creek Alternative (Acres	%)	[E-R] West Fisher Creek Alternative (Acres	%)
Crazy	0	(0%)	0	(0%)	0	(0%)	0	(0%)
Silverfish	39	(0.4%)	35	(0.4%)	35	(0.4%)	86	(0.9%)
McElk	55	(0.1%)	72	(0.2%)	72	(0.2%)	72	(0.2%)
Riverview	39	(0%)	6	(0%)	6	(0%)	6	(0%)

Alternative B – MMC Proposed Transmission Line

This transmission line alternative would be 16.4 miles long with an associated clearing area of 150 feet. Alternative B would clear 153 acres on National Forest System lands, including 114 and 69 acres in the Crazy and Silverfish PSUs, respectively (Table 194). This includes impacts to 32 acres of old growth and 72 acres of untreated stands and these two habitat conditions would continue to comprise the majority of the PSUs (Table 192). This also includes disturbance to riparian habitat, including 20 acres within the Crazy PSU and 9 acres within the Silverfish PSU. This would amount to 0.1 to 0.2 percent of total riparian habitat available within the PSU and would be negligible at this scale. Although there would be site-specific loss of snags, there would be no effect to the cavity habitat PPLs and adequate snag habitat would remain within the PSU. Down wood habitat would be reduced on these 153 acres of National Forest System lands as well. Effects to the down wood habitat level within the Crazy and Silverfish PSUs would be negligible based on the existing high levels and the availability of old growth and untreated forest habitats.

An additional 133 acres of clearing would occur on private and State lands (Figure 78) within the impacted PSUs. As described above, the existing snag level is already reduced on much of these lands and the proposed clearing acres would small compared the amount of land available within the PSU; effects would be negligible. Disturbance to riparian habitats would occur on 2, 18, and 15 acres within the McElk, Riverview, and Silverfish PSUs, which account for ≤0.8 percent of the private and State lands. Similarly, removal of down woody debris would occur on ≤0.4 percent of the private and State lands within the PSUs. In addition, the proposed clearings would not be expected to reduce the available wood debris level to an extent different from the existing low level condition found within these areas. Effects would be negligible on private and State lands at the PSU scale.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

The location of this transmission line alignment was intended to increase the acreage located on National Forest System lands versus private and State lands. This transmission line is the shortest of all alternatives and would be 13.1 miles long with an associated clearing area of 200 feet due to the use of wooden H-frame structures that are wider than the steel monopoles used in Alternative B. Alternative C-R would clear 211 acres on National Forest System lands, including 73 and 138 acres in the Crazy and Silverfish PSUs, respectively (Table 194). This would amount to <0.1 and 0.2 percent of the PSUs, respectively, with negligible effects to the cavity habitat PPLs. Clearing would impact fewer acres of old growth, totaling only 18 acres of old growth found within the Silverfish PSU, but more acres of untreated stands at about 104 acres between the two PSUs. Additionally, the goal of the Vegetation Removal and Disposition Plan would be to reduce the amount of vegetation clearing associated with the lines. Alternative C-R would disturb 8 and 16 acres (0.1 to 0.2 percent) of riparian habitat of National Forest System lands in the Crazy and Silverfish PSU, respectively, and would be negligible at the PSU scale.

Alternative design and topography would help maintain some snags within the clearing and disturbance areas. In addition, the mitigation plan for this alternative calls snags to be left in clearing area unless required to be removed for safety reasons. Although slightly more acres of clearing would occur on National Forest System lands with this alternative compared to Alternative B, the amount of acres would still be very small compared to cavity habitat available within the PSU. Also, this alternative would reduce the impact on habitat conditions that provide 100 percent snag level through a reduction in the amount of clearing occurring within old growth and the retention of snags that do not pose a safety hazard within the clearing acres. Fewer acres would be cleared in riparian habitats with this alternative than Alternative B. Therefore, the effects of the vegetation clearing with the Crazy and Silverfish PSUs would be reduced in Alternative C-R compared to Alternative B.

Approximately 113 acres of clearings would occur on State and private lands (Figure 78) within the impacted PSUs. This is a reduction of 20 acres that would occur on State and private lands in Alternative B. Fewer acres would also be cleared within riparian habitats (13 compared to 35 acres). Overall, the effects would be the same to Alternative B and negligible as these lands already have reduced cavity habitat levels and activity would occur on ≤0.4 percent of private and State lands within each PSU.

Alternative C-R could impact the amount of down wood on 211 acres on National Forest System land in the Crazy and Silverfish PSUs. However, in contrast to Alternative B, alternative design and topography would help maintain some down wood debris within the identified clearing areas. In addition, the mitigation plan for this alternative calls for leaving up to 30 tons per acre of coarse woody debris within clearing area (Table 36). Therefore, potential effects to down wood debris under this alternative are negligible, reduced compared to Alternative B, and would maintain levels appropriate for the site for wildlife use.

As described for cavity habitat, potential impacts to down woody debris would occur on ≤0.4 percent of the private and State lands within the PSUs where it is expected that reduced levels of down wood material already exist. The mitigation plan would retain up to 30 tons per acres of coarse woody debris within these disturbance areas that could be acquired upon removal of the trees. Therefore, there is the potential for improvement in the down woody debris levels on State and private lands under this alternative and is an improvement compared to Alternative B.

Alternative D-R – Miller Creek Transmission Line Alternative

Similar to Alternative C-R, the location of this transmission line would increase the acreage located on National Forest System lands versus private and State lands but reduce the amount of vegetation clearing associated with the line through implementation of the Vegetation Removal and Disposition Plan. This transmission line alternative would have the same clearing area of 200 feet as Alternative C-R, but would be slightly longer at 13.7 miles. Alternative D-R would clear 198 acres on National Forest System lands, including 73 and 125 acres in the Crazy and Silverfish PSUs, respectively (Table 194). Although there would be site-specific loss of snags, there would be no effect to the cavity habitat PPLs and adequate snag habitat would remain within the PSU. Clearing would impact fewer acres of old growth and untreated forest than either Alternatives B or C-R, totaling only 4 acres of old growth within the Silverfish PSU, and 63 acres of untreated stands split between the two PSUs. Within the Crazy PSU, more riparian habitat would be impacted with this alternative than either Alternatives B or C-R with 26 acres proposed for clearing. This alternative proposes the clearing of 9 acres of riparian habitat in the Silverfish PSU. This is the same as Alternative B and slightly less than Alternative C-R and the effects would be negligible.

Similar to Alternative C-R, alternative design and topography would help maintain some snags within the clearing and other disturbance areas. In addition, the mitigation plan for this alternative calls snags to be left in clearing area unless required to be removed for safety reasons (Table 36). Although slightly more acres of clearing would occur on National Forest System lands with this alternative compared to Alternative B, the amount of acres is still very small compared to cavity habitat available within the PSU. Also, this alternative reduces the impact on habitat conditions that provide 100 percent snag level through a reduction in the amount of clearing occurring within old growth and the retention of snags that do not pose a safety hazard within the clearing acres. Therefore, the effects of the vegetation clearing with the Crazy and Silverfish PSUs are reduced in Alternative D-R compared to Alternatives B and C-R.

Approximately 113 acres of clearings would occur on State and private lands (Figure 78) within the impacted PSUs. This is a reduction of 20 acres that would occur on State and private lands than in Alternative B and is the same as Alternative C-R. Impacts to riparian habitat would be the same as Alternative C-R (13 acres) and less than Alternative B. Overall, the effects would be the same as Alternative C-R and negligible as these lands already have reduced cavity habitat levels and activity would occur on ≤0.4 percent of each PSU.

Alternative D-R would impact the amount of down wood on 198 acres on National Forest System land in the Crazy and Silverfish PSUs. However, similar to Alternative C-R, alternative design and topography would help maintain some down wood debris within the identified clearing areas. In addition, as for Alternative C-R the mitigation plan for this alternative calls for leaving up to 30 tons per acre of coarse woody debris within clearing area (Table 36). Therefore, potential effects to down wood debris under this alternative are reduced compared to Alternative B and similar to Alternative C-R, and would maintain levels appropriate for the site for wildlife use.

As described for cavity habitat, potential impacts to down woody debris would occur on ≤0.4 percent of the private and State lands within the PSUs where it is expected that reduced levels of down wood material already exist. The mitigation plan would retain up to 30 tons per acres of coarse woody debris within these clearing areas, assuming this level of debris is available for retention. Therefore, there is the potential for improvement in the down woody debris levels on State and private lands under this alternative and is an improvement compared to Alternative B and the same as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Similar to Alternatives C-R and D-R, the clearing for this transmission line would reduce the amount of vegetation cleared through implementation of the Vegetation Removal and Disposition Plan. However, the location of the transmission line would result in the most acres being impacted by clearing activities, both on National Forest System and private and State lands. This transmission line would have a mixed-width disturbance area depending on whether the section of line consisted of wooden H-frame structures (200-foot clearing area and majority of the line) or wooden monopoles (150-foot clearing area). The total length is 15.1 miles which is intermediate between Alternatives B and C-R. Alternative E-R would clear about 213 acres on

National Forest System lands, including 73 and 140 acres in the Crazy and Silverfish PSUs, respectively. This would amount to <0.1 and 0.1 percent and would be negligible at the PSU scale (Table 194). Clearing would not impact old growth with this alternative as compared to all other alternatives. This alternative would also impact the fewest acres of untreated forest compared to the other three action alternatives, totaling 35 acres between the two PSUs. This alternative would clear 26 acres within riparian habitats in the Crazy PSU, similar to Alternative D-R, but the fewest acres (6 acres) within the Silverfish PSU compared to all other alternatives and effects would be negligible.

Similar to Alternative C-R, alternative design and topography would help maintain some snags within the identified disturbance areas. In addition, the mitigation plan for this alternative calls for snags to be left in clearing area unless required to be removed for safety reasons (Table 36). Although slightly more acres of clearing would occur on National Forest System lands with this alternative compared to the other action alternatives, the amount of acres would be still very small compared to cavity habitat available within the PSU and Alternative E-R. Also, this alternative would reduce the impact on habitat conditions that provide 100 percent snag level through the elimination of clearing within old growth and the reduction of clearing within untreated forest, the designation of additional old growth acres, and the retention of snags that do not pose a safety hazard within the clearing acres. Therefore, the effects of the vegetation clearing under this alternative would be similar to Alternative C-R with respect to the amount of clearing that would occur but reduced effects within old growth and untreated forest that provide the highest snag levels compared all of the other action alternatives. More total acre would be cleared with this alternative than Alternative D-R, but more would occur within previously disturbed with similar or slightly less effects to old growth and untreated stands.

Approximately 164 acres of clearings would occur on State and private lands (Figure 78) within the impacted PSUs. This is an increase of 31 and 51 acres than would occur on State and private lands with Alternative B and Alternatives C-R and D-R, respectively. Impacts to riparian habitat ranges between 2 and 21 acres with this alternative, totaling 29 acres on private and State lands. This is more acres than Alternatives C-R and D-R but less than Alternative B. Overall, the effects would be similar to the other action alternatives and negligible as these lands already have reduced cavity habitat levels and activity would occur on ≤0.9 percent of each PSU.

Alternative E-R could impact the amount of down wood on about 213 acres on National Forest System land in the Crazy and Silverfish PSUs. However, similar to Alternative B, alternative design and topography would help maintain some down wood debris within the identified clearing areas. In addition, as for Alternatives C-R and D-R the mitigation plan for this alternative calls for leaving up to 30 tons per acre of coarse woody debris within clearing area (Table 36). Therefore, potential effects to down wood debris under this alternative are negligible, reduced compared to Alternative B and similar to Alternatives C-R and D-R, and would maintain levels appropriate for the site for wildlife use.

As described for cavity habitat, potential impacts to down woody debris would occur on ≤0.1 percent of the private and State lands within the PSUs where it is expected that reduced levels of down wood material already exist. The mitigation plan would retain up to 30 tons per acres of coarse woody debris within these clearing areas, assuming this level of debris is available for retention. Therefore, there would be no effect to down wood habitat on State and private lands under this alternative and is an improvement compared to Alternative B and the same as Alternatives C-R and D-R.

Combined Mine-Transmission Line Effects

When considering the mine and transmission lines in combination, only the Crazy PSU could have increased impacts as it is the only PSU where both mine facilities and the transmission line would be located. Some overlap of impact acres would occur where the transmission lines terminated at the plant site. These overlapping acreages are small, but were not double counted when assessing the combined acres in Table 196. Within the Crazy PSU, transmission lines D-R and E-R alignments would be the same and combined effects with the mine alternatives would be the same; therefore, these transmission line alternatives are shown in the same column in Table 196. For the other PSUs, the "combined effects" would be the same as those described above under the transmission line alternatives.

Table 196. Impacts of Combined Mine and Transmission Line Alternative on Cavity Habitat Population Level on National Forest System Land in the Crazy PSU.

Activity	[1A] Existing Condition	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative		[4] Agency Mitigated Little Cherry Creek Impoundment Alternative	
		[B]	[C-R]	[D-R] and [E-R]	[C-R]	[D-R] and [E-R]
Cavity Habitat Population Level						
Total Clearing Acres	0	2,378	1,605	1,605	1,704	1,704
Acres Within Old Growth (% PPL)[1]	0	319 (-0.5)	138 (-0.3)	138 (-0.3)	159 (-0.3)	159 (-0.3)
Acres Within Untreated Forest (% PPL)[1]	0	380 (-0.6)	342 (-0.5)	332 (-0.5)	317 (-0.5)	307 (-0.5)
Acres Within Partial Cut Forest (% PPL)[1]	0	199 (-0.3)	193 (-0.2)	191 (-0.2)	110 (-0.2)	108 (-0.2)
Acres Within Past Regeneration Harvest/Roads (% PPL)[1]	0	1,480 (0)	932 (0)	944 (0)	1,118 (0)	1,130 (0)
PPL (% Change)	73.2	71.8 (-1.4)	72.2 (-1.0)	72.2 (-1.0)	72.2 (-1.0)	72.2 (-1.0)

[1] % PPL: represents the percent change to the PPL from the existing condition.

Relative to other action alternatives, combined Alternative 2B would result in the greatest impacts on the availability of snags. This alternative would result in the disturbance/clearing of the most total acres, 2,378 acres, as well as impacting the most old growth and untreated forest (319 and 380 acres, respectively). Also, this alternative results in the disturbance of 252 acres (3.1 percent) of riparian habitat, which is more than any of the other alternatives. However, this combined reduction in acres only results in a negligible decrease in the cavity habitat PPL compared to the mine alternative alone and the PPL would be 71.8 percent in the Crazy PSU. The effects of other combined alternatives within National Forest System lands would be similar (Table 196). Alternative 3 combinations would have the least potential impact on cavity habitat (1,605 acres), acres occurring within an old growth condition (138 acres), and range of acres occurring in riparian habitat (203 to 221 acres). Alternative 4 combinations would result in intermediate impacts, although more similar to Alternative 3. This combination of alternatives would impact 1,704 acres in total with 159 occurring in old growth and 214 to 232 acres within riparian habitat. These alternatives have additional mitigation plans in place that would retain snags in the disturbance/clearing areas that would not occur under combined Alternative 2B. Similar to combined Alternative 2B, the proposed combined reductions in the PPL are negligible compared to the mine Alternatives 3 and 4 alone and would remain at 72.2 percent. In all combined action alternatives, the desired range of snags across the PSU would be maintained consistent with FW-DC-VEG-07.

Combined effects for the potential reduction of down wood debris would be similar to cavity habitat. The Alternative 3 combinations would have the least impact on down wood habitat as it proposes the fewest disturbance/clearing acres, followed by Alternative 4 combinations. In addition, the mitigation plan for the agencies' alternatives propose to leave up to 30 tons per acre of coarse woody debris under the transmission lines to maintain down wood habitat.

Cumulative Effects

The Affected Environment/Existing Condition section describes the past and present factors contributing to the existing cavity and down wood habitat conditions within the analysis area. This cumulative effects section summarizes the past actions as well as further describes ongoing and other reasonably foreseeable contributions potentially impacting cavity and down wood habitats. As described under the section "Analysis Areas and Methods," the PSU was chosen as the appropriate scale for cavity and down wood habitat cumulative effects analysis as this size is sufficient to cover home range sizes of species associated with cavity and down wood habitat as well as to be able to determine the effects of proposed management activities.

Past Actions

Past actions, including detailed descriptions of previous vegetation and road management activities, are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E. Cavity and down wood habitats are affected by various activities both directly and indirectly. Therefore, changes in the availability of cavity habitat and down wood habitat are the measure of effects. The Affected Environment section of this analysis summarizes the existing condition and Table 193 reflect the changes to the snag level and PPL under the mine and transmission line alternatives. Effects to down wood habitat were more qualitative in nature. Harvest and other vegetation management have occurred in the analysis area since the 1950s. Before the 1990s, these activities resulted directly in the loss of snags as well as indirectly through reductions in trees that would have become snags in the future. Similarly, past vegetation management often resulted in the direct loss of down woody debris as well as indirectly through reductions in trees and snags that would have become down woody materials in the future. Road construction and the amount of road open to public motorized use also reduced the availability of snags and down wood due to firewood collection. In unmanaged areas, natural disturbances such as wildfire would have resulted in the development of clusters of snags. Fires would have both reduced down woody debris as well as the development of snags that would come down in the future. In contrast, fire suppression since the early 1900s has altered stand structure resulting in reduced creation of snags and development of future snags. It has also resulted in the large accumulations of small down wood debris that does not persist on the landscape nor are as beneficial to wildlife. Since the 1990s, application of KFP direction has resulted in the better retention of snags, snag replacement trees, and existing and future down wood materials. There has been more reliance on intermediate harvest that leaves more trees that would become snags and down wood in the future. Also, there has been a reduction in roads available for public motorized use, which has affected the location and amount of snag habitat available for firewood gathering. Application of these standards and management trends has since provided better protection and maintenance of cavity and down wood habitat.

The No Action Alternatives (Alternatives 1 and A)

No direct effects from federal actions would occur; therefore, these alternatives would not contribute to cumulative losses of snags and down wood, and would not contribute to cumulative effects on cavity and down wood habitats. Implementation of these alternatives would maintain existing vegetative condition on the landscape and wildlife use of cavity and down wood habitat would continue at current levels. Although past timber harvests and other vegetation management treatments resulted in a decrease in the amount of both habitats available in some existing regeneration harvest units, overall there is an abundance of snag habitat throughout the forest (USDA Forest Service 2013c). Also, current down wood levels are generally considered to exceed historical levels due to longer fire return intervals within stands (Graham *et al*. 1994, Brown *et al*. 2003). The addition or loss of snags would depend on other factors, such as firewood cutting, wind events, natural attrition, or wildfire.

Mine Alternatives (2, 3, 4), Transmission Line Alternatives (B, C-R, D-R, E-R), and Combined Mine-Transmission Line Alternatives

Ongoing and Reasonably Foreseeable Actions

Reasonably foreseeable actions include those federal, state, or private activities that are ongoing or scheduled to occur within the next five years, independent of this federal action. Section 3.2, *Past and Current Actions* and Appendix E identify those current and foreseeable actions in the analysis area that were determined to be appropriate for inclusion in the analysis of environmental effects. As described above, cavity and down wood habitat has been reduced due to past actions that have occurred within the analysis area. However, abundant snags and down wood debris occur throughout the analysis area due the habitat types and moist environments found here. Changes in harvest methods and retention and protection of snags and down wood materials in recent years have maintained/created higher quality cavity and down wood habitat throughout the analysis area PSUs.

One active timber sale, Miller-West Fisher, occurs within the Silverfish PSU. The project includes commercial timber harvest, which was included in the existing condition PPL. Only the transmission line alternatives would occur within this PSU and the cumulative impact on the cavity habitat PPL would be a 0 to 0.2 percent reduction. This reduction would be negligible at the PSU scale. Prescribed fire units and post-harvest burning could kill or injure some of the live trees within the units, especially those harvest units with more western redcedar left, and create more snags. Cumulatively, the impacts of the two projects to snag level in the PSU would be negligible as only relatively few acres would be cleared under the transmission line alternatives, the agencies' alternatives would retain existing snags where possible to meet KFP recommendations, and the reduction to the high snag PPL within the PSU would be negligible. Project design would require that the down wood materials be left as appropriate for the habitat type; therefore, there would be no cumulative reduction in down wood on National Forest System lands.

The Coyote Improvement vegetation management project is in the planning stages and would take place within the Crazy PSU. The project would harvest 240 acres to increase stand resiliency to mountain pine beetles. If this harvest occurs within currently untreated forest stands, at most the PPL would be reduced by 0.4 percent within the PSU. In addition to the proposed activities, this would still result in a minor reduction in the PPL in the Crazy PSU and maintain a very high PPL above 71 percent. Also, the project would meet riparian standards. Project design would require that the down wood materials be left as appropriate for the habitat type; therefore, there would be no cumulative reduction in down wood on National Forest System lands.

Increased use of public lands is likely with population growth and development, but use is expected to be gradual and focused on areas along or near roads open to motorized traffic. Activities include firewood cutting which removes snags and down wood. Loss would be limited to individual trees and logs and to areas within about 150 to 200 feet of open roads and has been accounted for in available snag habitat. Also, the Montanore Project proposes no increase in the amount of roads open for public motorized use. However, new clearings within viewing distance of the open roads may make existing snags more visible for cutting. Therefore, cumulatively there would be a negligible increase in the expected loss of snags and down wood due to proposed activities and firewood gathering within the analysis area.

Development of private land within the analysis area likely resulted in the loss of both existing and future snags, including in riparian areas such as along the Fisher River. Also, as discussed above under “Environmental Consequences” much of the State and private lands within the project PSUs have been harvested within the past 20 to 30 years and already have a reduced cavity habitat PPL and down wood level. Further development would not be expected to reduce these habitats compared to the existing condition. In addition, high levels of both habitats currently exist on adjacent National Forest System lands that would continue to provide habitat for cavity and down wood dependent species.

Following implementation of any of the action alternatives and reasonably foreseeable Forest Service projects, the primary cavity excavator PPL on National Forest System lands would remain at ≥ 71 percent. Only the Crazy PSU would experience a 1 percent decrease in the PPL due to proposed mine and transmission line alternatives. The remaining PSUs would experience negligible to no effects to the PPL on National Forest System lands. This level of snag habitat is expected to provide for cavity habitat associated species PPL well above 40 percent, which is thought to be the minimum needed to maintain self-sustaining populations of snag-dependent wildlife (Thomas 1979). Additionally, due to the ongoing and future predicted bark beetle epidemics and fire, it is anticipated that the density of snags is increasing in all diameter classes over time (Bollenbacher *et al*. 2009). Productive growing conditions on impacted National Forest System lands have resulted in high existing levels of down wood materials. Proposed clearings would result in negligible reductions at the PSU scale. Also, mitigation plans under the agencies’ proposed alternatives would reduce this potential reduction level. Cumulatively, when proposed activities and all past, present, and reasonably foreseeable activities are considered, habitat on federal lands is considered sufficient to provide cavity and down wood habitat to cavity and down wood dependent species within the impacted PSUs. Proposed activities on State and private lands are expected to have negligible cumulative effects due to the reduced availability of these habitat types currently existing on these lands, the small amount of acres that would be cleared for the transmission line alternatives, and coarse woody would be retained up to 30 tons per acre under the agencies’ alternatives.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on key habitats or all practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. The agencies' alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit key habitats, including leaving snags in disturbance and clearing areas unless required to be removed for safety reasons, leaving down wood on National Forest System and State lands minimizing effects on riparian areas and complying with KFP riparian direction, and having a wetland mitigation plan more likely to replace lost wetland functions.

National Forest Management Act/Kootenai Forest Plan

FW-DC-VEG-07 (snags): Given the small amount of acres proposed to be impacted in the mine and transmission line alternatives compared to the overall size of the Crazy and Silverfish PSUs, none of the alternatives would hinder the availability of snags across the landscape. The snag direction in the 2015 KFP is based on historical snag amounts and distributions, and those are the conditions that native species that use snags evolved with on the KNF under natural disturbance processes. Providing those approximate amounts and distribution of snags across the analysis area would provide snag habitat amount and distribution similar to those found under natural disturbance processes and consequently provide adequate snag habitat into the future for those species that use that habitat.

National Forest System lands would not be impacted within the McElk and Riverview PSUs. In addition, under the agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R), snags would be left within the disturbance and clearing acres unless required to be removed for safety reasons.

Statement of Findings

Based on the analysis for cavity habitat, analyzing snags as the primary substrate, habitat for cavity dependent species would be maintained at a minimum PPL of about 72 percent in the impacted PSUs. Although up to 2,378 acres would be impacted under combined Alternative 2B in the Crazy PSU, the majority would occur within stands that already have a reduced snag level due to prior treatment or use as a road. Also, the overall acres proposed for reduction are small compared to the high levels of old growth and untreated habitats that would continue to provide a 100 percent snag level within the PSU; fewer acres would be disturbed and cleared under the combined Alternatives 3 and 4. The transmission line alternatives in the other PSUs would remove very few acres associated within the clearings relative to total acres available within the PSUs. In addition, under the agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R), snags would be left within the disturbance acres where they do not pose a safety hazard. The analysis area PSUs would continue to provide sufficient quality and quantity of snags and replacement snags for viable populations of cavity habitat dependent wildlife species. Where clearings would occur on private and State lands under the transmission line alternatives, the proposed clearings are expected to have negligible effects compared to the existing snag level conditions.

Maintenance of down wood habitat is beneficial to both forest health and various wildlife species that are dependent on down woody material to fulfill life requirements. Based on the predominant habitat types and district surveys within old growth and past harvest units, the analysis area PSUs currently have high levels of down woody debris. Removal associated with the disturbance areas is expected to remove very little compared to what would remain available within the surrounding forested habitats under all alternatives. In addition, the retention of 2015 KFP desired conditions (FW-DC-Veg-08) and guidelines (FW-GDL-VEG-03) for levels of down wood materials would occur through retention of existing logs and felled snags under the agencies' transmission line alternatives, which would occur on both National Forest System and private and State lands. Proposed activities and implementation of design features would maintain the availability and distribution of down wood materials within the impacted PSUs at levels beneficial to wildlife.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

3.25.3 Elk Security, Big Game Winter Range (Elk and Deer), Mountain Goat, and Pileated Woodpecker

3.25.3.1 Elk Security

3.25.3.1.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

The 2015 KFP direction considered in the analysis of elk security is:

> **FW-GDL-WL-10. Elk.** Management activities in planning subunits should maintain existing levels of elk security (see Glossary). Where possible, management activities in high and medium emphasis planning subunits (determined in cooperation with Montana Fish, Wildlife, and Parks; see FW-DC-WL-16) should improve elk security.
>
> **FW-OBJ-WL-02. Elk.** Over the life of the Plan, increase by 1 the number of planning subunits that provide at least 30 percent elk security (see Glossary) and increase by 1 the number of high emphasis planning subunits (determined in cooperation with FWP; see FW-DC-WL-16) that provide at least 50 percent elk security.

Each forest plan developed under the 1982 Planning Rule for the National Forest Management Act was required to identify certain vertebrate or invertebrate species as MIS as one of various elements to address the National Forest Management Act requirements related to diversity of plant and animal communities (36 CFR 219.19(a)). The direction for MIS is related to forest plan development, forest project implementation, and forest plan monitoring. This direction is described in the 1982 implementing regulations for the National Forest Management Act.

Elk security was identified by the Kootenai-Idaho Panhandle Planning Zone as a public concern due to the species' high profile and desirability as a big game animal. Elk was chosen as a MIS for the 2015 KFP because forest access management during the hunting season influences elk security. Elk fits the MIS selection category for a species commonly hunted (36 CFR 219.19(a)(1)). USDA Forest Service 2013c, 2014b, and Anderson 2014 identify elk as a MIS under the 2015 KFP, and Chapter 5 in the 2015 KFP (USDA Forest Service 2015a) and the 2015 KNF Monitoring Guide (USDA Forest Service 2015d) describe the 2015 KFP-level monitoring related to elk security levels across all planning subunits on the KNF.

For the transmission line alternatives, the MFSA directs the DEQ to approve a transmission line if, in conjunction with other findings, the DEQ finds and determines that the facility would minimize adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives. An assessment of effects on big game species is part of the transmission line certification process. FWP is required to report DEQ information relating to the impact of the proposed site on FWP's area of expertise. The report may include opinions as to the advisability of granting, denying, or modifying the certificate.

3.25.3.1.2 Analysis Area and Methods

Federal Requirements

The analysis area for elk security on National Forest System lands was the seven PSUs potentially affected by proposed activities. The majority of the proposed and alternative mine facilities, as well as a portion of the proposed and alternative transmission line alignments would be within the Crazy PSU while the remaining segments of the transmission line alignments on National Forest System lands would be within the Silverfish PSU. The Rock PSU was eliminated from further analysis as less than 1 acre of private land on steep, rocky ground would be affected by the Rock Lake Ventilation Adit. The McElk, McSwede, Riverview, Silverfish and Treasure PSUs were eliminated from further analysis because none of the mine or transmission line alternatives would affect elk security within them.

The indicator for elk security is the percentage of National Forest System lands within a planning subunit that provides security habitat for elk. The definition of elk security on National Forest System lands from the 2015 KFP is:

> Generally timbered stands on National Forest System lands at least 250 acres in size greater than 0.5 mile away from open motorized routes during the hunting season. Security is calculated for individual planning subunits. Roads not open to the public for motorized use during the hunting season are not included in this calculation. The effects of non-motorized use and/or administrative motorized use of closed or temporary roads during the hunting season are not included in this calculation and would instead be analyzed separately at the project level.

Elk security was calculated by buffering the roads and trails open to public motorized use during the general elk hunting season by 0.5 mile. Security areas must be at least 250 acres in size. Although roads and trails open to motorized use during the hunting season on other ownerships are also buffered during this calculation to determine elk security on National Forest System lands, any elk security on those other ownerships are not included in the percentage because the KNF has no control over access on those lands. The effect of openings and non-motorized access on the integrity of security habitat is also discussed.

State Requirements

To evaluate potential direct, indirect, and cumulative impacts of the transmission line, the analysis area includes all land within a corridor 1 mile on each side of the alternative transmission line alignments. The 1-mile buffer adjacent to the transmission line alignments was guided by Circular MFSA-2 (DEQ 2004). Circular MFSA-2 requires an assessment along the transmission line alternatives of major elk summer security areas, which are defined as any forested areas greater than 1/2 mile in minimum radius, more than 1/2 mile from an existing road, and identified through consultation with the Montana FWP and the USDA Forest Service as elk summer range (DEQ 2004). In consultation with the Forest Service, the DEQ used the KNF’s approach in calculating elk security.

3.25.3.1.3 Affected Environment

The existing condition of elk security on National Forest System lands in the planning subunits potentially impacted by the mine and transmission line alternatives was modified from the conditions described in the Final EIS for the 2015 KFP (USDA Forest Service 2013a). Two modifications were made. 1) The 2015 KFP Final EIS assumed NFS road #4778 was closed during general hunting season; it is only closed from April 1 to June 15 (Table 28 in Chapter 2). Consequently, less elk security habitat exists in upper Midas Creek and Miller Creek drainages than estimated in the 2015 KFP Final EIS. 2) The KNF only considers elk security on National Forest System lands. The DEQ requires an analysis of effects of the transmission line on elk security on all lands. The extent of existing elk security and the emphasis level in the Crazy and Silverfish PSUs are shown in Table 197. The KNF established the emphasis level for each planning subunit in cooperation with FWP during development of the 2015 KFP.

Table 197. Existing Elk Security on National Forest System lands and PSU Emphasis Level in Analysis Area.

Ownership	Crazy		Silverfish	
	Acres	Percent	Acres	Percent
Elk security (acres)				
National Forest System Lands	27,023	47%	34,561	57%
State Lands	0		145	
Private Lands	93		478	
Emphasis level	Medium		High	

Sources: USDA Forest Service 2013c; GIS analysis by ERO Resources Corp. using KNF data.

3.25.3.1.4 Environmental Consequences

Mine Alternatives

Alternative 1 – No Mine

No effects to elk security would occur under this alternative. No motorized access changes would occur.

Alternative 2 – MMC's Proposed Mine

A section of the NFS road #4781 in the vicinity of Ramsey and Poorman creeks would change from open to the public to mine access only. Because this road would no longer be open to motorized use by the public during the general elk hunting season, the buffer used to determine elk security would shift to the east and be based off NFS road #231. The change in road status of NFS roads #4781and #2316 would increase mapped elk security by 1,433 acres in the lower Ramsey Creek and Poorman Creek drainages. Slight re-alignment of NFS road #278 would reduce elk security habitat in the impoundment area. New roads built for the project and other roads that are currently restricted yearlong would be used by mine traffic only. Because those roads would not open for motorized use to the public, particularly during the general elk season, there would not be a reduction in mapped elk security due to changes in roads open to the public for motorized use. Employees would be prohibited from carrying firearms in all mine alternatives. The net result of these changes would be an increase in elk security in the Crazy PSU. Clearing of vegetation for the impoundment would only influence a small portion of security habitat. The Ramsey Plant Site would clear vegetation in an area within existing elk security habitat. Year-round activity 24 hours per day between the plant and impoundment sites would likely displace elk from the Ramsey Creek drainage and negate any beneficial effect of increased security on elk populations during the hunting season. After the plant site was reclaimed, the road status of NFS road #4781 would return to existing conditions and mapped elk security would return to existing conditions. Elk security in the Silverfish PSU would not change as a result of road changes in this alternative.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

A section of NFS road #4781 in the vicinity of Ramsey and Poorman creeks would change from open to the public to mine access only. Because this road would no longer be open to motorized use by the public during the general elk hunting season, the buffer used to determine elk security would shift to the east and be based off NFS road #231. This would increase elk security, although a smaller amount than Alternative 2. Also similar to Alternative 2, Alternative 3 would have slight realignment of NFS road #278 in the vicinity of Little Cherry Creek. This would result in a small shift in the buffer to the west and a slight reduction in elk security in this area. The change in road status of NFS roads #4781 would increase mapped elk security by 1,193 acres. Other wildlife mitigation road closures would not increase elk security areas greater than 250 acres in size due to the proximity of other roads that remain open. The net result of all the access changes in Alternative 3 would be an increase in elk security in the Crazy PSU. Clearing for project facilities would not be in mapped elk security. Year-round activity 24 hours per day between the plant and impoundment sites may displace elk from the lower Ramsey Creek and Poorman Creek drainages and partially negate any beneficial effect of increased security on elk populations during the hunting season. After the plant site was reclaimed, the road status of NFS road #4781 would return to existing conditions and mapped elk security would return to existing conditions. Elk security in the Silverfish PSU would not change as a result of road changes in this alternative.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Alternative 4 would be similar to Alternative 2 in the vicinity of Little Cherry Creek with slight realignment of NFS road #278 and therefore a slight decrease in security in this vicinity. Alternative 4 would be similar to Alternative 3 in the vicinity of Poorman and Ramsey creeks with the change in NFS road #4781 from open to mine use only. The net result of all the access changes in Alternative 3 would be an increase in elk security in the Crazy PSU. Clearing for project facilities would not be in mapped elk security. Year-round activity 24 hours per day between the plant and impoundment sites may displace elk from the lower Ramsey Creek and Poorman drainages and partially negate any beneficial effect of increased security on elk populations during the hunting season. After the plant site was reclaimed, the road status of NFS road #4781 would return to existing conditions and mapped elk security would return to existing conditions. Elk security in the Silverfish PSU would not change as a result of road changes in this alternative.

Transmission Line Alternatives

Alternative A – No Transmission Line

This alternative would not result in any motorized access changes and would not change elk security habitat.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would require construction of new roads and 1.9 miles of transmission line through a large block of security habitat that overlaps the Silverfish and Crazy PSUs. It would also go along Ramsey Creek along NFS road #4781 accessing the Ramsey Plant site. Alternative B would include the construction of new access roads and the use of existing gated and barriered roads. MMC would maintain access restriction to the general public as it currently exists on all roads planned for use. Roads currently open to the public would remain as such and those closed would remain closed. The use of gates and berms would be installed as appropriate to control access. Elk security in the Crazy and Silverfish PSUs would not change as a result of road use in this alternative.

Removal of vegetation to construct and maintain the transmission line may reduce the effectiveness of security habitat. Non-motorized use of the newly built access roads, if closed after construction, may also reduce the effectiveness of elk security habitat. Forage would potentially be increased by the vegetation clearing and may aid in retaining elk within the security area by providing nearby forage. Hillis *et al*. (1991) stated that the arrangement of security habitat should provide for the habitat needs of elk through the hunting season (*e.g.*, food and water).

The big game analysis in the 2015 KFP FEIS indicates that the desired conditions for vegetation in the 2015 KFP would benefit big game by providing more forage. Fire suppression has impacted the amount of forage on the landscape, and given how quickly vegetation grows on the Forest the amount of cover is artificially high in places. The desired conditions for vegetation and fire in the Plan are based on natural disturbance processes and the vegetative historic range of variability. Species native to the Forest evolved with those disturbance processes and the types of habitats and pattern found under those conditions. As the Forest trends toward those desired conditions, big game would find habitats similar to what they evolved with under natural disturbance processes (USDA Forest Service 2013c).

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would cross through the same block of security habitat that is shared between the Crazy and Silverfish PSUs. New roads would not be needed in this block because structures would be placed with a helicopter. Unlike Alternative B, it would not impact security habitat along Ramsey Creek. MMC would maintain access restriction to the general public as it currently exists on all roads planned for use. In addition, Alternative C-R would not allow motorized public access during the general hunting season along any new or existing road used during transmission line construction and decommissioning on National Forest System lands. Elk security in the Crazy and Silverfish PSUs would not change as a result of road use in this alternative.

Removal of vegetation to construct and maintain the transmission line may reduce the effectiveness of security habitat. In some locations, vegetation would be retained and would continue to contribute cover. Non-motorized use of the newly built access roads may also reduce the effectiveness of elk security habitat. Forage would potentially be increased by the vegetation clearing and may aid in retaining elk within the security area by providing nearby forage as described in Alternative B.

Alternative D-R – Miller Creek Transmission Line Alternative

Alternative D-R would cross along the boundary of a block of security habitat between Miller and West Fisher creeks within the Silverfish PSU for a distance of 0.5 mile. New road construction would primarily be within the clearing area. Elk security in the Crazy and Silverfish PSUs would not change as a result of road use in this alternative. The effect of clearing would be the same as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Alternative E-R would not cross any blocks of elk security or require changes in motorized access that would impact elk security. This alternative would therefore not affect elk security.

Combined Mine-Transmission Line Alternatives

The combined alternatives would have the same effects of the separate mine and transmission line alternatives. Mapped elk security would increase in all combined alternatives because of access changes in the mine area. Year-round activity 24 hours per day between the plant and impoundment sites may displace elk from the lower Ramsey Creek and Poorman drainages and partially negate any beneficial effect on elk populations during the hunting season. Vegetation clearing may reduce the effectiveness of security habitat in all combined alternatives except 3E-R and 4E-R. Alternative 2B would require clearing in elk security in the Ramsey Creek and Miller Creek drainages, while Alternatives 3C-R and 4C-R would require clearing in elk security in the Miller Creek drainage. About 0.5 mile of clearing in the Miller Creek drainage would occur in Alternatives 3D-R and 4D-R. Forage would potentially be increased by the vegetation clearing and may aid in retaining elk within the security area by providing nearby forage.

3.25.3.1.5 Cumulative Effects

Past impacts to elk security are incorporated into the existing condition discussion as they determine the current location and amount of elk security habitat. Past road construction and road closures on National Forest System lands and other ownerships determined the amount of security habitat available currently. Past fire suppression has led to a reduction in openings and early seral stage stands on National Forest System lands and consequently reduced the amount of forage compared to what would have been present historically under natural disturbance processes. The amount of hiding cover may be artificially high as a consequence of fire suppression. Past vegetation management and fires contributed openings (forage) and reduced cover within these PSUs, but the amount of cover remains high. All mine alternatives would increase mapped elk security and contribute toward providing security in the Crazy PSU. The cumulative effect on mapped elk security would be beneficial.

3.25.3.1.6 Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. All mine and the agencies’ transmission line alternatives would comply with 36 CFR 228.8.

National Forest Management Act/2015 Kootenai Forest Plan

FW-GDL-WL-10: All mine alternatives would be designed in accordance with guideline FW-GDL-WL-10 and would increase security habitat within the Crazy PSU. Year-round activity 24 hours per day between the plant and impoundment sites may displace elk from the lower Ramsey Creek and Poorman drainages and partially negate any beneficial effect on elk populations during the hunting season. This increase would move the Crazy PSU closer to the 30 percent security threshold. The increase would cease at the end of operations.

Alternative E-R would be designed and implemented in accordance with guideline with FW-GDL-WL-10 because it would not impact elk security and therefore maintain the existing levels of elk security. Alternatives B, C-R and D-R would not change motorized access for the public during the general elk hunting season and would be designed and implemented in accordance with that component of FW-GDL-WL-10. The vegetation clearing in those alternatives may impact the effectiveness of elk security. In the case of Alternative D-R, the potentially overlap of vegetation clearing and security habitat would be small. Alternatives B and C-R would bisect a large block of security. The vegetation clearing would contribute needed forage habitat, but non-motorized access may impact the integrity of the security area along the transmission line.

3.25.3.2 Big Game (Elk/Deer) Habitat

3.25.3.2.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

As described in section 1.1.2.1.2 of the wildlife introduction, the vegetation management approach in the 2015 KFP is one that provides for ecosystem diversity by providing the ecological components, patterns, and processes at multiple scales on the landscape, and thereby provides the full spectrum of habitats and conditions needed for all of the biological organisms associated with the various ecosystems (USDA Forest Service 2013c). Cover/forage habitat for native ungulates, including deer and elk, is managed through the desired conditions for vegetation and fire in the 2015 KPF. Additional 2015 KFP direction considered in the analysis of big game habitat is:

> **FW-DC-WL-08.** Habitat for native ungulates is available and well-distributed across the landscape to provide prey for carnivores.
>
> **FW-DC-WL-16.** Habitat for native ungulates (elk, deer, moose, bighorn sheep, and mountain goat) is managed in coordination with state agencies. Cover and forage are managed according to FW-DC-VEG-01, FW-DC-VEG-02, FW-DC-VEG-04, FW-DC-VEG-05, and FW-DC-VEG-11.
>
> **FW-DC-WL-17.** Forest management contributes to wildlife movement within and between national forest parcels. Movement between those parcels separated by other ownerships is facilitated by management of the National Forest System portions of linkage areas identified through interagency coordination. Federal ownership is consolidated at these approach areas to highway and road crossings to facilitate wildlife movement.
>
> **FW-DC-WL-19.** By trending toward the desired conditions for vegetation, habitat is provided for native fauna adapted to open forests and early seral habitats, or whose life/natural history and ecology are partially provided by those habitats.
>
> **FW-GDL-WL-08**. Big Game. Management activities should avoid or minimize disturbance to native ungulates on winter range between December 1 and April 30, with exception of routes identified on MVUM as open to motor vehicle use. Management activities that occur on winter range during the winter period should concentrate activities to reduce impacts to native ungulates.
>
> **FW-GDL-WL-09**. Big Game. Management activities should be avoided on native ungulate winter range areas during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage.

> **FW-GDL-WL-11.** Big Game. Management activities should avoid or minimize disturbance to native ungulates during the birthing/parturition period.
>
> **FW-GDL-WL-12.** Connectivity. During construction or reconstruction of highways that cross national forest lands, or high use forest roads, wildlife crossing features should be included in the design where necessary to contribute to connectivity of wildlife populations.
>
> **FW-GDL-WL-13.** Connectivity. Management activities within one quarter mile of existing crossing features, and future crossing features developed through interagency coordination, should not prevent wildlife from using the crossing features. The vegetative and structural components of connectivity, including snags and downed wood, should be managed according to the desired conditions for vegetation.
>
> **FW-GDL-WL-14.** Connectivity. In wildlife linkage areas identified through interagency coordination, federal ownership should be maintained.
>
> **GA-DC-WL-FSH-01.** NFS lands, in particular those lands in the Miller Creek, Fritz Mountain, Calx Mountain, and Syrup Redemption areas, provide for wildlife movement between the larger blocks of forested lands in these areas and for movement between the Cabinet Yaak and Northern Continental Divide ecosystems. This includes movement for big game between the Cabinet Mountains and Fisher River. Wildlife also move between the Fisher River, Wolf Creek, and areas east of Koocanusa Reservoir, the Blue Mountain vicinity north of the Kootenai River, and north-south through the Cabinet Mountains.
>
> **GA-DC-WL-FSH-02.** Habitat conditions for elk and mule deer are retained or enhanced in areas of intermixed ownership.
>
> **GA-DC-WL-LIB-04.** Wildlife move between the Cabinet Mountains and the Fisher River, as well as north-south through the Cabinet Mountains.

The 2015 KFP contains direction for elk security habitat; that analysis is contained in a separate analysis (section 3.25.3.1, *Elk Security)*.

For the transmission line alternatives, the MFSA directs the DEQ to approve a transmission line if, in conjunction with other findings, the DEQ finds and determines that the facility would minimize adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives. An assessment of effects on big game species is part of the transmission line certification process. FWP is required to report DEQ information relating to the impact of the proposed site on FWP's area of expertise. The report may include opinions as to the advisability of granting, denying, or modifying the certificate.

3.25.3.2.2 Analysis Area and Methods

Federal Requirements

The analysis area for big game security on National Forest System lands was the seven PSUs potentially affected by proposed activities: the Crazy, McElk, McSwede, Riverview, Rock, Silverfish, and Treasure PSUs. The majority of the proposed and alternative mine facilities, as well as a portion of the proposed and alternative transmission line alignments would be within the Crazy PSU while most of the remaining segments of the transmission line alignments on National

Forest System lands would be within the Silverfish PSU. The Rock PSU was eliminated from further analysis as less than 1 acre of private land on steep, rocky ground would be affected by the Rock Lake Ventilation Adit. Table 198 describes the indicators and measures used in the big game habitat analysis.

Table 198. Resource Indicators and Measures for Assessing Effects on Big Game Habitat.

Resource Element	Resource Indicator	Measure	Source
Cover/forage	Indicator 1—Amount of cover relative to forage	Cover/forage percentages	FW-DC-WL-16 FW-DC-WL-19
Winter range	Indicator 2—Management activities on winter range that may impact big game	Overlap of activities and winter range	FW-GDL-WL-08 FW-GDL-WL-09
Special habitats	Indicator 3—Management activities in special habitats such as birth/parturition areas and wallows	Acres of activities in birthing/parturition areas and wallows	FW-GDL-WL-11
Connectivity	Indicator 4—Management activities in connectivity areas	Overlap of activities and connectivity areas	FW-DC-WL-17 FW-GDL-WL-12 FW-GDL-WL-13 FW-GDL-WL-14 GA-DC-WL-FSH-01 GA-DC-WL-LIB-04

State Requirements

To evaluate potential direct, indirect, and cumulative impacts of the transmission line, the analysis area includes all land within a corridor 1 mile on each side of the alternative transmission line alignments. The 1-mile buffer adjacent to the transmission line alignments was guided by Circular MFSA-2 (DEQ 2004). Circular MFSA-2 requires an assessment along the transmission line alternatives of the winter distribution of elk, deer, moose, pronghorn, mountain goat and bighorn sheep and areas where they concentrate during severe winters, as identified by the Montana FWP and the USDA Forest Service (DEQ 2004). Suitable habitat for pronghorn and bighorn sheep is not found in the analysis area. Effects on mountain goat winter range are discussed in section 3.25.3.3, *Mountain Goat;* effects on moose winter range are discussed in section 3.25.7.1, *Moose.*

The following methods were used to analyze effects.

- The effects to cover/forage were assessed based on the percentage of cover and forage as a result of project activities.
- The effects on winter range were assessed based on the overlap of project activities with winter range.
- The effects on special habitats were assessed based on the acres of project activities within special habitats.
- The effects on connectivity were assessed based on overlap of project activities with connectivity areas.

3.25.3.2.3 Baseline Data

Cover/forage information is based on vegetation GIS layers available from the KNF and the overlap with project activities that would reduce cover or increase forage. Winter range GIS layers used for the 2015 KFP analysis were used to determine overlap between winter range and project activities. The winter range layers are a compilation of winter range data available from the State and KNF information. The location of specials habitats (*e.g.*, calving areas, wallows) is based on KNF or State information. Connectivity habitat is based on KNF or State information and the overlap with project activities.

3.25.3.2.4 Affected Environment

Resource Indicator 1

The current amount of cover is generally high across the KNF, which is reflected in the desire to create more open stands and openings in FW-DC-VEG-04, FW-DC-VEG-05, and FW-DC-WL-19 in the 2015 KFP. Cover includes both thermal and hiding cover. Natural disturbance processes across the forest would have historically created and maintained openings (*i.e.*, forage). The FEIS for the 2015 KFP (USDA 2013c) described how the amount of cover is artificially high due to fire suppression and that the direction in the 2015 KFP (USDA 2015b) would increase the amount of forage and reduce cover to levels nearer to those found historically under natural disturbance processes (*i.e.*, conditions that native ungulates on the KNF would have evolved with). The FEIS for the 2015 KFP (USDA 2013c) also described how the amount of seedling/sapling size class (recent openings and therefore forage for big game) is expected to decrease over time due to the limited amount of active vegetation management and the few acres expected to burn on the Forest. This may eventually decrease the acreage in this seedling/sapling size class down to the lower edge of the historic range of variation, and potentially below that threshold. This illustrates the need to maintain and create as much forage (openings) as possible to keep the amount within or near what would have been expected under natural disturbance processes.

Within the Crazy PSU, cover is 82 to 96 percent and forage is 4 to 18 percent. Within the Silverfish PSU cover is 97 to 99 percent and forage 1 to 3 percent.

Resource Indicator 2

Winter range for elk, white-tailed deer, and mule deer is found within all the PSUs affected by the alternatives. Most of this habitat is at the lower elevations within the PSUs near US 2.

Resource Indicator 3

Wallows, found near springs and other wet areas, are important habitat features for elk. See the *Wetlands and Other Waters of the U.S.* section for more information regarding the extent of wetlands and effects of the alternatives. No known concentrated fawning/calving sites lie within the analysis area, although these activities likely occur.

Resource Indicator 4

Potential connectivity areas (movement areas) for big game were determined to be ridgetops (3rd order or larger drainages) or drainages. As discussed in the cover/forage portion of this analysis, the amount of cover is high compared to openings (forage) and therefore openings are not considered limiting for big game movement through these PSUs.

Elk and deer cross US 2 in the vicinity of Raven and Brulee creeks in the McElk PSU (moving between Barren/Teeters Peaks and Kenelty/Fritz Mountains) as they move between summer and winter ranges. This area is near the boundary of the McElk PSU and Silverfish PSUs, with a portion of the Riverside PSU as well. Much of the land near US 2 in this vicinity is either corporate or private ownership.

3.25.3.2.5 Environmental Consequences

Mine Alternatives

Alternative 1 – No Mine

Resource Indicator 1
There would be no changes to cover/forage under this alternative. Within the Crazy PSU, cover would remain at 82 to 96 percent and forage at 4 to 18 percent.

Resource Indicator 2
There would be no impacts to winter range under this alternative.

Resource Indicator 3
There would be no impacts to wallows or wetlands under this alternative, or to birthing/parturition areas.

Resource Indicator 4
There would be no impacts to connectivity (movement areas) under this alternative.

Alternative 2 – MMC's Proposed Mine

Resource Indicator 1
Mine facilities would reduce cover but would not necessarily contribute to forage until after mining operations and reclamation has occurred. Within the Crazy PSU, cover would change to 82 to 92 percent and forage to 8 to 18 percent.

Resource Indicator 2
Effects due to human disturbance during winter are not anticipated because none of the facilities for Alternative 2 would be in winter range for elk and deer. The Libby Creek Road, which is open to motorized use on the Motor Vehicle Use Map, passes through deer winter range and adjacent to elk winter range. Snowplowing and year-round road use would occur during the 2-year Evaluation Phase and the first year of Construction. Such activity would occur during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage. Increased road use may affect wintering elk and deer and cause them to decrease use near the road. After the Bear Creek Road was reconstructed in the Construction Phase, it would be used for access and effects on deer and elk winter range along the Libby Creek Road would cease. The Bear Creek Road does not pass through or adjacent to winter range for deer and elk and its use as the main access road would not affect wintering elk and deer.

Resource Indicator 3
In the Crazy PSU, 39 acres of wetlands (potential wallows) would be impacted, with an additional 3 acres or more potentially impacted by the pumpback well system. See the Wetlands and other Waters of the U.S. section for information regarding wetland impacts and mitigation.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative 2 may remove habitat that could be used for these activities. Human disturbance around the mine facilities may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4

Alternative 2 may impact potential big game connectivity in the Little Cherry, Poorman, and Ramsey creek drainages where the tailings impoundment, plant site, and LAD Areas would be constructed, and where other mine-related activities would occur. Facilities associated with Alternative 2 would not occur on ridgetops and would not likely directly interfere with big game connectivity in these areas. Individual animals may adjust their localized movement patterns, but no connectivity barriers would be created by Alternative 2. Increased traffic on the Libby Creek Road during the Evaluation Phase and first year of Construction and on the Bear Creek Road during the Construction, Operations, and Closure Phases is not expected to create a barrier to deer and elk movement.

Other Potential Effects

Widening, improvement, and yearlong access of the Bear Creek Road would lead to increased vehicle volumes and speed. Estimates of increased annual traffic volume range from 187 percent to 234 percent (Table 177 in section 3.21, *Transportation*). The increase in traffic in Alternative 2 would substantially increase the risk of increased deer mortality on the access road. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1630), which would minimize vehicular-big game collisions during the early morning, evening and night time-periods. MMC would provide transportation to employees using buses, vans, and pickup trucks thereby limiting the use of personal vehicles. MMC would report road-killed animals to the FWP as soon as road-killed animals were observed. The FWP would either remove road-killed animals or direct MMC how to dispose of them.

When the mill ceased operations in the Closure Phase, mine traffic volume would be substantially less than shown in Table 177 in section 3.21, *Transportation*. Future traffic volume when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and loss of the Little Cherry Loop Road beneath the impoundment. Mortality risk to big game would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (increased road width, improved sight distance, paving) and higher traffic speeds would result in a permanently higher big game mortality risk compared to pre-mine conditions. At mine closure, all new roads (except the Bear Creek access road) constructed for the project would be reclaimed, which would include grading to match the adjacent topography and obliterating the road prism. After reclamation success criteria are achieved, areas disturbed by road use would provide forage for big game. MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section). The Ramsey Plant Site would be fenced, restricting deer access.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Resource Indicator 1
Similar to Alternative 2, Alternative 3 mine facilities would reduce cover but would not necessarily contribute to forage until after mining operations and reclamation has occurred. Cover within the Crazy PSU would change to 82 to 93 percent and forage to 8 to 18 percent.

Resource Indicator 2
The effects on winter range would be the same as Alternative 2.

Resource Indicator 3
In the Crazy PSU, 13 acres of wetlands (potential wallows) would be impacted, with an additional 16 acres or more potentially impacted by the pumpback well system. See the Wetlands and other Waters of the U.S. section for information regarding wetland mitigation.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative 3 may remove habitat that could be used for these activities. Human disturbance around the mine facilities may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4
Alternative 3 may impact potential big game connectivity in the Poorman and Libby creek drainages where the tailings impoundment and plant site would be constructed, and where other mine-related activities would occur. Alternative 3 would impact fewer riparian corridors than Alternative 2 because disturbance from the plant and adits would be concentrated in the Libby Creek drainage. Also, the Alternative 3 impoundment would occupy less of the Little Cherry Creek riparian corridor than the Alternative 2 impoundment. Facilities associated with Alternative 3 would not occur on ridgetops and would not directly interfere with big game connectivity in these areas. Individual animals may adjust their localized movement patterns, but no connectivity barriers would be created by Alternative 3.

Other Potential Effects
The effect of increased traffic on the Libby Creek and Bear Creek roads would be the same as Alternative 2, except that in Alternatives 3 and 4, MMC would remove big game animals killed by any vehicles daily from road rights-of-way within the permit area and along roadways used for access or hauling ore for the life of the mine and monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. Highway safety signs such as “Caution – Truck Traffic” would help slow public traffic speeds in anticipation of meeting oncoming trucks. Staging shipments of supplies in a general location prior to delivery to the mine site would reduce traffic and deer mortality risk.

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to white-tailed deer. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Resource Indicator 1
Similar to other alternatives, Alternative 4 mine facilities would reduce cover but would not necessarily contribute to forage until after mining operations and reclamation has occurred. Within the Crazy PSU cover would change to 82 to 93 percent and forage to 7 to 18 percent.

Resource Indicator 2
The effects on winter range would be the same as Alternative 3.

Resource Indicator 3
In the Crazy PSU, 43 acres of wetlands (potential wallows) would be impacted. See the Wetlands and other Waters of the U.S. section for information regarding wetland mitigation.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative 4 may remove habitat that could be used for these activities. Human disturbance around the mine facilities may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4
Impacts to big game connectivity from Alternative 4 would be similar to Alternative 2.

Transmission Line Alternatives

Alternative A – No Transmission Line

Resource Indicator 1
This alternative would not change the amount of cover/forage within the PSUs. Within the Crazy PSU cover would remain at 82 to 96 percent and forage at 4 to 18 percent. Within the Silverfish PSU cover would remain at 97 to 99 percent and forage 1 to 3 percent.

Resource Indicator 2
There would be no impacts to winter range under this alternative.

Resource Indicator 3
There would be no impacts to wetlands and potential wallows under this alternative, or impacts to birthing/parturition areas.

Resource Indicator 4
There would be no impact to connectivity (movement areas) under this alternative.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Resource Indicator 1
Alternative B would remove vegetation along the transmission line corridor and consequently reduce cover and increase forage. Most of the change would occur within the Silverfish PSU. Within the Crazy PSU cover would remain at 82 to 96 percent and forage at 4 to 18 percent. Within the Silverfish PSU, cover would decrease to 96 to 99 percent and forage increase to 1 to 4 percent.

Resource Indicator 2

The eastern extent of the transmission line in Alternative B would overlap winter range (elk, white-tailed deer, and mule deer). Alternative B would affect 124 acres of elk winter range and 149 acres of deer winter range in the analysis area, primarily in the Miller Creek drainage and along the Fisher River valley (Table 199 and Figure 89). The effect would primarily be from clearing, with some minor habitat loss from road construction. Short-term disturbance impacts in winter range from transmission line construction would be minimized by restricting transmission line construction between December 1 and April 30. Private land at the Sedlak Park Substation and loop line currently have high road densities and overall elk and deer populations would not likely be affected. After construction, there would be relatively little project-related activity along the transmission line until decommissioning and therefore few effects would be anticipated to wintering big game. MMC did not propose to restrict decommissioning activities during the winter. Helicopter use and other activities could result in short-term disturbance of big game winter range during line and substation decommissioning.

Table 199. Impacts on Elk and Deer Winter Range by Transmission Line Alternative.

Species	[A] No Transmis-sion Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Elk (acres)					
National Forest System Lands	0	27	53	20	5
State and Private Lands	0	97	108	108	97
Total	0	124	161	128	103
Deer (acres)					
National Forest System Lands	0	16	48	30	37
State and Private Lands	0	133	114	114	151
Total	0	149	162	144	188

Source: GIS analysis by ERO Resources Corp. using KNF data and 2008 FWP mapping.

Resource Indicator 3

Four acres of wetlands (potential wallow site) would be within the clearing area of Alternative B. The wetlands would still remain, but the vegetation near the wetlands may be cleared for the transmission line and thereby change potential elk use of these sites.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative B may remove habitat that could be used for these activities. Human disturbance around the transmission line may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4

Potential big game connectivity in the Crazy PSU may be affected where the Alternative B transmission line would traverse or cross the Howard, Libby, and Ramsey creek drainages. Alternative B may also impact big game connectivity in the Crazy PSU where it followed the ridge between Midas Creek and Howard Creek. Big game may temporarily avoid using these areas during transmission line construction and decommissioning due to increased noise and the presence of humans and machinery, but these effects would be short-term, and would be minimized through timing restrictions. The width of clearing area would not likely be great enough to affect big game movement in this area after the Construction Phase because some cover would remain and the width of the clearing area would not be large. Individual animals may adjust their localized movement patterns in the short term, but no barriers to connectivity would likely be created by Alternative B.

Alternative B would potentially impact big game connectivity in the Silverfish PSU where it followed the ridges between Midas Creek and Howard Creek, and Midas Creek and the unnamed tributary to Miller Creek. Big game may potentially use these areas less compared to existing conditions during transmission line construction due to increased noise from helicopters and machinery and the presence of humans, but these effects would be short-term. The width of clearing area would not likely be great enough to effect big game movement in this area after the construction phase because cover would remain and the width of the clearing area is not large.

The eastern segment of the Alternative B transmission line alignment would be within the connectivity area of US 2 in the Fisher River valley described in the existing condition section. The proximity of this alignment to US 2 would result in a widening of disturbed area and could potentially impact big game movement by decreasing cover (primarily corporate/private lands in Silverfish, Riverview, and McElk PSUs). Transmission line construction activities may potentially cause big game to change their movement patterns within this area, but these effects would be short-term because human-caused disturbance directly related to the project would decrease when the transmission line construction were completed. Once revegetated, cleared areas could provide additional forage habitat. Some shrub and tree cover would be maintained in the transmission line clearing area because only the largest trees would be removed, and remaining vegetation would continue to provide cover. Given that most of the connectivity area potentially affected by Alternative B is generally heavily roaded and has been logged in the past 20 to 30 years (mainly corporate/private lands), and because of the short-term nature of human-caused disturbance, it is not likely that big game movement within the connectivity area would be greatly affected by Alternative B.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Resource Indicator 1
Alternative C-R would also remove vegetation along the transmission line corridor and consequently reduce cover and increase forage. Most of the change would occur within the Silverfish PSU. Within the Crazy PSU cover would remain at 82 to 96 percent and forage at 4 to 18 percent. Within the Silverfish PSU, cover would decrease to 96 to 99 percent and forage increase to 1 to 4 percent.

Resource Indicator 2
Similar to Alternative B, the eastern segments of Alternative C-R would overlap winter range (elk, white-tailed deer, and mule deer). Alternative C-R would affect 161 acres of elk winter range and 162 acres of deer winter range in the analysis area, primarily in the Miller Creek, West Fisher Creek, and Fisher River drainages (Table 199 and Figure 89). The effect would primarily be from clearing, with some habitat loss from road construction. Short-term disturbance impacts in winter range from transmission line construction would be minimized by restricting transmission line construction and decommissioning between December 1 and April 30. Exemptions to these timing restrictions may be granted by the agencies in writing if MMC could clearly demonstrate that no significant environmental impacts would occur as a result. No waiver of winter range timing restrictions would be approved on National Forest System or state trust lands where the grizzly bear mitigations would apply. Private land at the Sedlak Park Substation and loop line

currently have high road densities and overall elk and deer populations would not likely be affected. After construction, there would be relatively little project-related activity along the transmission line until decommissioning. Few effects would be anticipated to wintering big game during operations and timing restrictions would eliminate decommissioning activities during the winter.

Resource Indicator 3
Two acres of wetlands (potential wallow site) would be within the clearing area of Alternative C-R. The wetlands would still remain, but the vegetation near the wetlands may be cleared for the transmission line and thereby change potential elk use of these sites.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative C-R may remove habitat that could be used for these activities. Human disturbance around the transmission line may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4
In the Crazy PSU, impacts from Alternative C-R on connectivity would be similar to Alternative B.

Alternative C-R may impact big game connectivity in the Silverfish PSU where it would follow the ridges between Midas Creek and Howard Creek, Midas Creek and the unnamed tributary to Miller Creek, and Miller Creek and West Fisher Creek and the east-facing ridge north of the Sedlak Park Substation. Big game may potentially use these areas less during transmission line construction due to increased noise from helicopters and machinery and the presence of humans, but these effects would be short-term. The transmission line would not likely affect big game connectivity in this area after the construction phase because some cover would remain and the width of the clearing area would be narrow.

A relatively small segment of the Alternative C-R transmission line would cross the Fisher River valley in the wildlife connectivity area near US 2 (as described in the existing condition), potentially impacting big game movement in a localized area due to transmission line construction activities. These effects would be short-term because human-caused disturbance directly related to Alternative C-R would decrease when the transmission line construction was completed. Given that the area of the connectivity area potentially affected by Alternative C-R is generally heavily roaded and has been logged in the past 20 to 30 years (mainly corporate/private lands), and because of the short-term nature of human-caused disturbance, it is not likely that this alternative would greatly affect big game movement within the connectivity area

Alternative D-R – Miller Creek Transmission Line Alternative

Resource Indicator 1
Alternative D-R would also remove vegetation along the transmission line corridor and consequently reduce cover and increase forage. Most of the change would occur within the Silverfish PSU. Within the Crazy PSU cover would remain at 82 to 96 percent and forage at 4 to 18 percent. Within the Silverfish PSU, cover would decrease to 96 to 99 percent and forage increase to 1 to 4 percent.

Resource Indicator 2
Similar to other alternatives, the eastern segments of Alternative D-R would overlap winter range (elk, white-tailed deer, and mule deer). Alternative D-R would affect 128 acres of elk winter range and 144 acres of deer winter range in the analysis area, primarily in the Miller Creek, West Fisher Creek, and Fisher River drainages (Table 199 and Figure 89). The type and duration of direct impacts on winter range would be the same as Alternative C-R.

Resource Indicator 3
Approximately 2 acres of wetlands (potential wallow site) would be within the clearing area of Alternative D-R, the same as Alternative C-R. The wetlands would still remain, but the vegetation near the wetlands may be cleared for the transmission line and thereby change potential elk use of these sites.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative D-R may remove habitat that could be used for these activities. Human disturbance around the transmission line may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4
In the Crazy PSU, Alternative D-R impacts to connectivity would be similar to Alternatives B and C-R.

Like Alternative C-R, Alternative D-R may potentially impact big game connectivity in the Silverfish PSU where it followed the east-facing ridge north of the Sedlak Park Substation and crosses the ridges between Miller Creek and West Fisher Creek, and Miller Creek and Howard Creek. Big game connectivity may potentially be impacted in these areas during transmission line construction due to increased noise from helicopters and machinery and the presence of humans, but these effects would be short-term. The transmission line would not likely affect big game connectivity in this area after the construction phase because some cover would remain and the width of the clearing area would be narrow.

Potential effects of Alternative D-R on big game connectivity in the area around US 2 described earlier would be the same as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Resource Indicator 1
Alternative E-R would also remove vegetation along the transmission line corridor and consequently reduce cover and increase forage. Most of the change would occur within the Silverfish PSU. Within the Crazy PSU cover would remain at 82 to 96 percent and forage at 4 to 18 percent. Within the Silverfish PSU, cover would decrease to 95 to 99 percent and forage increase to 1 to 5 percent.

Resource Indicator 2
Similar to other alternatives, the eastern extent of Alternative E-R overlaps winter range (elk, white-tailed deer, and mule deer). Alternative E-R would affect 103 acres of elk winter range and 188 acres of deer winter range in the analysis area, primarily in the Miller Creek, West Fisher Creek, and Fisher River drainages (Table 199 and Figure 89). The type and duration of direct impacts on winter range would be the same as Alternative C-R.

Resource Indicator 3
Approximately 2 acres of wetlands (potential wallow site) would be within the clearing area of Alternative E-R, the same as Alternatives C-R and D-R. The wetlands would still remain, but the vegetation near the wetlands may be cleared for the transmission line and thereby change potential elk use of these sites.

No known concentrated fawning/calving sites occur within the analysis area, although project activities associated with Alternative E-R may remove habitat that could be used for these activities. Human disturbance around the transmission line may also reduce big game use in the immediate vicinity. Much of the PSUs in the analysis area would not be impacted by project activities and would remain available for fawning and calving.

Resource Indicator 4
In the Crazy PSU, Alternative E-R would potentially impact connectivity in the Howard and Libby Creek drainages but would otherwise be similar to the other transmission line alternatives.

Alternative E-R may potentially impact big game connectivity in the Silverfish PSU where it followed the east-facing ridge north of the Sedlak Park Substation and crossed the ridge between West Fisher and Howard creeks. Big game connectivity may be impacted in these areas during transmission line construction due to increased noise from helicopters and machinery and the presence of humans, but these effects would be short-term. The transmission line would not likely affect big game connectivity in this area after the construction phase because some cover would remain and the width of the clearing area would be narrow.

Potential effects of Alternative E-R on big game connectivity in the US 2 area described earlier would be the same as Alternatives C-R and D-R.

Combined Mine-Transmission Line Alternatives

Resource Indicator 1
The combined alternatives would only overlap in effects for cover/forage in the Crazy PSU. The combined result would still drop the upper end of the percentage range for cover slightly and raise the lower end of the range for forage slightly compared to individual alternatives. Overall, the result would still be abundant cover and limited forage within the Crazy and Silverfish PSUs.

Resource Indicator 2
Snowplowing and year-round use of the Libby Creek Road in all combined alternatives would occur during the 2-year Evaluation Phase and the first year of Construction. Such activity would occur during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage. Increased road use may affect wintering elk and deer and cause them to decrease use near the road. After the Bear Creek Road was reconstructed in the Construction Phase, it would be used for access and effects on deer and elk winter range along the Libby Creek Road would cease. Due to the timing restriction in the mine and transmission line alternatives during the winter for construction activities, displacement impacts on wintering big game during the transmission line construction phase would be avoided. Alternatives 3C-R and 4C-R would have the greatest amount of clearing in winter range, while Alternatives 3E-R and 4E-R would have the least amount.

Resource Indicator 3
The mine alternatives have a greater impact on wetlands (potential wallows) compared to the transmission line alternatives. There would not be much difference in effects among the transmission line alternatives. Alternatives 2 and 4 would have more impacts on wetlands than Alternative 3 and therefore any combination with those two alternatives and a transmission line alternative would have greater impacts compared to Alternative 3 combinations.

Resource Indicator 4
All of the mine and transmission line alternatives potentially impact big game connectivity at least temporarily during construction activities, although none of them were identified as creating a barrier to movement.

3.25.3.2.6 Cumulative Effects

Resource Indicator 1

Past impacts to cover and forage are incorporated into the existing condition discussion as they determine the current amount of cover and forage. Past fire suppression has had the largest impact on the amount of cover and forage. In many areas of the KNF the amount of cover is artificially high compared to what would have been present under natural disturbance processes. On other land ownerships, particularly corporate and private lands, the amount of forage may be greater than on National Forest System lands. It is expected that vegetation management on National Forest System lands that create more forage and move vegetative conditions nearer to the Desired Conditions in the 2015 KFP will provide the amounts of cover and forage and the pattern similar to what big game would have found on the KNF historically under natural disturbance processes. Although the Montanore Project is not a vegetation management project, it would contribute toward increasing forage, especially along the clearing for the transmission line. Mine facilities that were reclaimed and revegetated would eventually contribute forage as well.

Resource Indicator 2

Past impacts to winter range include the conversion of winter range to subdivisions and residences on private lands, as well as road construction on all land ownerships. Fire suppression and past vegetation management has also altered the amount of cover and forage available for wintering big game on all land ownerships. As discussed under Resource Indicator 1, National Forest System lands may be providing less forage than big game would have found historically under natural disturbance processes. Human presence on winter range on all land ownerships may contribute toward shifting big game use away from those areas immediately adjacent to the human disturbance, at least temporarily. The transmission line alternatives contain timing restrictions on construction and decommissioning during the winter that would minimize or avoid impacts to wintering big game.

Resource Indicator 3

Past activities on all land ownerships may have impacted special habitat features such as wallows and birthing/parturition areas. The amount of wetlands impacted by the Montanore alternatives is relatively small compared to the overall size of the PSUs in the analysis area. However, those acres impacted have the potential to provide wallows and would be lost or their use by big game potentially diminished under these alternatives. Wetland mitigation would potentially offset these losses. On other land ownerships, particularly private lands, big game use of potential wallows may have been impacted due to loss of wetlands or simply due to human presence that may discourage big game use.

No concentrated areas of birthing/parturition have been identified in these PSUs. However, these activities may occur throughout the PSUs and the mine/transmission line alternatives may impact some individuals and cause them to use other sites. Given the size of the PSUs and the availability of habitat elsewhere, the potential effect on birthing/parturition activities for big game is expected to be minimal. Development of private lands may have caused the loss of potential birthing/parturition sites for the similar reasons described above for impacts to wallows. Also, vegetation management and fire suppression may have altered habitat and changed the specific location of birthing/parturition within the PSUs over time.

Resource Indicator 4

Likely the biggest impact on connectivity for big game has occurred on private lands as those lands were subdivided and developed over time. This is particularly true near US 2 where the private land is concentrated and most of the development has occurred. Vegetation management on all land ownerships may have changed the pattern of cover/forage and therefore potentially impacted connectivity in some locations. Fire suppression, particularly on National Forest System lands, likely has increased the amount of cover compared to what would have been present under natural disturbance processes. Road construction on all land ownerships also may have impacted big game connectivity, particularly those roads that receive greater human use. The Montanore alternatives may have limited impacts on connectivity, but these are not anticipated to rise to the level of becoming a barrier to movement. The transmission line, for example, is not likely to have much human presence after construction was completed. The access roads for the mine would see an increase in traffic, but no locations along those roads is expected to become a barrier to movement for big game.

3.25.3.2.7 Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Mineral Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on winter range or all practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. The agencies' alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit winter range, such as timing restrictions during all project phases.

National Forest Management Act/2015 Kootenai Forest Plan

The National Forest Management Act directs the Forest Service to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." The direction in the 2015 KFP provides for the diversity of plants and animals across the KNF and was developed under the 1982 Planning Rule for the National Forest Management Act.

Consistency with 2015 KFP direction is described below.

FW-DC-WL-08: The Montanore Project is not managing vegetation for ungulate habitat. The alternatives would contribute in a minor way to progress toward this desired condition. The transmission line alternatives would contribute toward the creation of forage for big game. The mine alternatives would do so in a minor way as well, although it would not occur until after reclamation and revegetation occurred. Big game habitat would remain available and well-distributed across the landscape to provide prey for carnivores.

FW-DC-WL-16: The Montanore Project is not managing vegetation for ungulate habitat. Analysis of all mine and transmission line alternatives used information provided by the State (*e.g.*, winter range GIS layers). All alternatives would not affect overall forestwide trends toward achieving this desired condition.

FW-DC-WL-17: None of the mine and transmission line alternatives would create barriers to movement. All alternatives would be neutral with regard to progress toward achieving this desired condition.

FW-DC-WL-19: The mine alternatives would be neutral to this desired condition or would contribute to early seral habitats in the long-term after reclamation and revegetation was completed. The transmission line alternatives would create openings and early seral habitats, which would contribute to progress toward this desired condition.

FW-GDL-WL-08: All mine and transmission line alternatives would avoid or minimize disturbance to deer and elk on winter range between December 1 and April 30, with exception of routes identified as open to motor vehicle use. The Libby Creek Road, which is open to motor vehicle use, would be snowplowed and used during the winter during the Evaluation Phase and first year of Construction. Transmission line alternatives would limit construction during the winter on winter range, and during operation very little activity would occur and would be concentrated along the transmission line. All alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-09: None of the mine alternatives would be designed in accordance with this guideline. Snowplowing and year-round use of the Libby Creek Road would occur during the 2-year Evaluation Phase and the first year of Construction. Such activity would occur during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage. After the Bear Creek Road was reconstructed in the Construction Phase, it would be used for access and effects on deer and elk winter range along the Libby Creek Road would cease. Section 2.12, *Forest Plan Amendment* describes the project-specific amendment to the 2015 KFP that the KNF would adopt in all mine alternatives. The amendment would allow snowplowing and use of the Libby Creek Road in deer winter range during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage. The amendment for deer winter range would be needed for the project until the Bear Creek Road was reconstructed. Design features cannot be applied to the project to achieve compliance with the guideline. The amendment would apply to National Forest System lands affected by the Montanore Project facilities, and would not apply to State or private lands. A significance determination of the amendments will be in the ROD and is available in the project record.

FW-GDL-WL-11: No areas of concentrated use for deer and elk birthing or parturition are known within the analysis area. Therefore, all alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-12: There are no sites along routes used for these alternatives where project activities are expected to create a connectivity or movement barrier. No crossing features are warranted for inclusion in the project design. Therefore, all alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-13: There are no existing crossing features or any crossing features under development. Therefore, all alternatives would be designed in accordance with this guideline. The locations where the transmission lines would be nearest to US 2 are not National Forest System lands.

FW-GDL-WL-14: None of the alternatives would create barriers to connectivity for deer and elk. Mitigation lands that were purchased and transferred to the KNF for management (see grizzly bear analysis) may contribute toward National Forest System lands near US 2 and consequently contribute toward connectivity. Therefore, all alternatives would be designed and implemented in accordance with this guideline.

GA-DC-WL-FSH-01: None of the alternatives would create barriers to connectivity for deer and elk. Depending on the location of the grizzly bear mitigation lands purchased and transferred, those lands may contribute toward this desired condition.

GA-DC-WL-FSH-02: None of the alternatives would create barriers to connectivity for deer and elk. Depending on the location of the grizzly bear mitigation lands purchased and transferred, those lands may contribute toward this desired condition.

GA-DC-WL-LIB-04: None of the alternatives would create barriers to connectivity for deer and elk. Depending on the location of the grizzly bear mitigation lands purchased, those lands may contribute to progress toward this desired condition.

3.25.3.3 Mountain Goat

3.25.3.3.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

As described in section 1.1.2.1.2 of the wildlife introduction, the vegetation management approach in the 2015 KFP is one that provides for ecosystem diversity by providing the ecological components, patterns, and processes at multiple scales on the landscape, and thereby provides the full spectrum of habitats and conditions needed for all of the biological organisms associated with the various ecosystems (USDA Forest Service 2013c). Cover/forage habitat for mountain goat is managed through the desired conditions for vegetation and fire in the 2015 KPF. Additional wildlife-specific 2015 KFP direction considered in the analysis of big game habitat, including mountain goat, is described under section 3.25.3.2, *Big Game (Elk/Deer Habitat)*.

3.25.3.3.2 Analysis Area and Methods

Mountain goat ecology, biology, habitat use, status, and conservation are described and summarized in Joslin (1980) and Brandborg (1955). That information is incorporated by reference. Mountain goat occurrence data come from District wildlife observation records, Forest historical data (NRIS Wildlife) and other agencies (FWP).

Habitat mapping for mountain goat is derived from Joslin (1980), and is categorized according to seasonal use (winter and summer, range). Five habitat categories are defined in Joslin (1980) and mapped by Brown (2006). Because winter range is limited and critical for the annual overwinter survival and productivity of mountain goats, any impact on winter range, whether categorized as confirmed, likely, or possible winter range, was considered as an impact on winter range. Likewise, areas used by goats to transition between summer and winter range (transitional summer range) and areas regularly used by mountain goats during summer (summer range) were combined into a single summer range because mountain goats may be found in any of these areas during warm seasons.

Mountain goats have been shown to be sensitive to human disturbances such as helicopter use, blasting, and road building (Joslin 1980; Côte 1996; Côte *et al.* 2013, Goldstein *et al.* 2005, Wilson 2005). Increased disturbance may result in displacement from suitable habitat. Mountain goats may also remain in proximity of the disturbance, potentially suffering increased stress levels that could result in a decline in reproductive rates (Ibid.). Mountain goats have been found to be moderately to strongly disturbed by helicopter flights less than 500 meters horizontal distance (Côte *et al.* 2013) Disturbance responses decrease with horizontal distance up to 1,500 meters where goats have little to no response to helicopter flights (Ibid.). Côte *et al.* (2013) and Cadsand (2012) suggest a minimum separation distance of 1,500 meters between helicopter flights and goat range, thus, the influence zones (1 mile or about 1,600 meters) suggested for grizzly bear in the Cumulative Effects Model (USDA Forest Service *et al.* 1988; USDA Forest Service *et al.* 1990) were used to estimate the displacement effects of disturbances associated with mine and transmission line construction and operations on mountain goats. Disturbance effects were calculated by applying the following buffers: 0.25 mile on each side of open roads (including seasonally open roads that are open during bear year from April 1 to Nov. 30) and 1 mile on each side of helicopter construction disturbance. In all transmission line action alternatives, no transmission line construction would occur on National Forest System or State lands between December 1 and April 30.

Effects of the alternatives were evaluated based on impacts on mountain goat habitat. The analysis area for direct and indirect project impacts on individuals and their habitat includes all mountain goat habitat in the Crazy, and Silverfish PSUs, and a 0.25-mile buffer surrounding the Rock Lake Ventilation Adit in the Rock PSU (Figure 90). The boundaries for determination of population trend and contribution toward population viability are the FWP Mountain Goat HD 100 and the KNF, respectively. Mountain goat habitat does not occur on private land within the zone of influence of the proposed project.

The impacts analysis includes an evaluation of the potential benefits to mountain goats from mitigation measures proposed by MMC or the agencies. The agencies' mitigations include funding for monitoring of mountain goat responses to mine-related impacts, prohibiting blasting at adit portals during kidding (between May 15 and June 15), access changes, land acquisitions, and prohibiting employees from carrying firearms.

3.25.3.3.3 Affected Environment

Mountain goats are found primarily in alpine habitat and high elevation coniferous forest stands throughout the year. Goats annually use the same summer and winter ranges, travel corridors, kidding areas, and mineral licks, and rarely explore new territory, which make them vulnerable to human activities or habitat changes in their range. Habitat use information and traditional use patterns are learned behaviors passed down through generations. If traditional use patterns are altered and seasonal home range knowledge is not transferred to offspring, then suitable ranges may not be recolonized. Mountain goats use steep rock outcrops and escarpments for escape from predators and security during the kidding period, and feed on vegetation found in the rock crevices. They use coniferous timber as shelter from severe weather, particularly during winter. Mountain goats eat a wide variety of foods, but in the Cabinet Mountains, shrubs are the major component of their diet year-round. Grasses are also consumed when available. The analysis area contains about 43,470 acres of summer mountain goat habitat (Figure 90).

Mountain goat winter range is usually found in spruce-fir forests that are characterized by 80 percent slopes, average snow depths of less than 20 inches, or where the terrain extends to areas of lower elevation with an average snow depth less than 20 inches. During the winter, mountain goats usually forage on shrubs and trees. During mild winters, mountain goats have been known to travel between several winter areas. The analysis area contains about 5,863 acres of winter range (Figure 90).

During the 1988-1989 environmental studies, most goats in the area wintered in Rock Creek, but two were observed above Libby Creek and one above Ramsey Creek (Western Resource Development Corp. 1989f). FWP has identified the area above Rock Creek the south-facing slopes above upper West Fisher Creek; and south-facing slopes above Libby, Ramsey, and Poorman creeks as winter range (Brown 2006).

Historical population numbers were estimated to be 350 goats in the Cabinet Mountains in 1950, declining to between 95 and 160 in 1980 (Casebeer *et al.* 1950; Joslin 1980). Mountain goat counts have fluctuated widely during FWP standardized sampling surveys of HD 100 (Cabinet Mountains) since 2001. A low count of 53 total goats was counted in HD 100 in 2001 with a high count of 105 in 2003. The most recent count (2013) counted 54 total goats, but a high percentage of kids compared to adults (43 percent), indicating a high rate of reproduction (FWP 2013d). During surveys conducted in 1988 and 1989, 40 to 55 mountain goats were estimated to occupy rocky ridges in portions of the analysis area (Western Resource Development Corp. 1989f). During all seasons, most of the activity was in and near the headwalls of the Rock, Libby, and West Fisher creek drainages, but some solitary males were observed in the Ramsey and Poorman creek areas. The closest documented wintering area on the east side of the Cabinet Mountains was on the south-facing slope of Shaw Mountain in Libby Creek. Two goats were seen in this area in 1989 (Ibid.), which is about 0.5 mile north of the Libby Adit Site. More recent observations by FWP personnel indicate that Libby, Ramsey, West Fisher, Poorman, and Rock creeks represent a population epicenter for mountain goats in the southern Cabinet Mountains (Brown 2008a).

Mountain goat breeding occurs primarily in November (Joslin 1980). During the breeding season, mountain goats are primarily observed in the project vicinity in the Libby, Ramsey, and West Fisher creek drainages (Brown, pers. comm. 2007).

Summer transitional mountain goat habitat provides high-quality forage areas within high elevation coniferous forests and rock outcrops. Although winter range appears to be the limiting factor to goat densities in the Cabinet Mountains, quality summer range is also of paramount importance in providing highly nutritious forage, which fortifies the body for winter and sustains the population from year-to-year. Ridgelines are commonly used as travel corridors (Joslin 1980).

Mountain goats generally give birth to their kids in late May or early June on lower slopes at the mouth of drainages (Joslin 1980). The areas around Shaw Mountain and Leigh Lake appear to be important for mountain goat kidding (Brown 2008a).

3.25.3.3.4 Environmental Consequences

Mine Alternatives

Alternative 1 would have no direct impacts on mountain goats. Physical impacts on mountain goat habitat from the mine alternatives would be greatest for Alternative 2, which would affect 108 acres of summer range, primarily due to the Ramsey Plant Site and LAD Area 1. Alternative 2 would also directly affect 44 acres of winter range along Ramsey Creek. MMC would not restrict blasting at the entrances to adit portals during May 15 to June 15, potentially disturbing the potential goat kidding area on Shaw Mountain.

Alternatives 3 and 4 would directly impact 90 acres of summer mountain goat habitat along Libby Creek and at the Rock Lake Ventilation Adit. Alternatives 3 and 4 would not directly affect any winter mountain goat habitat. In Alternatives 3 and 4, results of mountain goat surveys funded by MMC would be analyzed by the KNF, in cooperation with the FWP, at the end of the construction period to determine the appropriate level and type of survey work needed during the Operations Phase. If the agencies determined that construction disturbance were significantly affecting goat populations, mitigation measures would be developed and implemented to reduce the impacts of mine disturbance. MMC would not conduct any blasting at the entrance to any adit portals during May 15 to June 15 to avoid disturbance to the potential goat kidding area on Shaw Mountain.

Alternative A – No Transmission Line

Alternative A would have no impacts on mountain goat habitat (Table 200).

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

The agencies' transmission line alternatives (C-R, D-R, and E-R) would not affect mountain goats. Construction of the Sedlak Park Substation and loop line would have no impacts to mountain goats with any alternative. Impacts on mountain goats from the Transmission Line Alternative B are shown in Table 200 and described in the following subsections. The analysis of the effects of human activity on goats is based on activity-specific buffers, and includes the effects of open roads. Road access changes associated with mitigation were determined for combined action alternatives. It is not possible to attribute these access changes to individual mine and transmission line alternatives independent of one another. Because the disturbance influence zone applied to new or opened roads associated with the transmission line is encompassed entirely by the buffer applied for helicopter disturbance, human disturbance effects for transmission line construction are calculated based on the area of overlap between the helicopter disturbance influence zone and mountain goat habitat. It is assumed that human activity would not affect mountain goats during transmission line operations. The evaluation of the effects of human activity on mountain goats from individual mine alternatives may be inferred from impact calculations for the combined mine-transmission line alternatives shown in Table 201.

Table 200. Mountain Goat Habitat Affected by North Miller Creek Transmission Line Alternative.

Habitat Component	[A] No Transmission Line (acres)	[B] North Miller Creek (acres)	
		Const[1]	Ops[2]
Summer Mountain Goat Habitat Available (acres)	43,407	43,407	43,407
Summer Mountain Goat Habitat Physically Removed (acres)	0	23	23
Winter Mountain Goat Habitat Available (acres)	5,863	5,863	5,863
Winter Mountain Goat Habitat Physically Removed (acres)	0	24	24
Total Mountain Goat Habitat Available (acres)	49,090	49,090	49,090
Total Mountain Goat Habitat Physically Removed (acres)	0	47	47

[1] Const = during transmission line construction.
[2] Ops = during transmission line operations
Source: GIS analysis by ERO Resources Corp. using KNF Cabinet Mountain goat habitat, 2006 developed by Jerry Brown, FWP, digitized by Barb Young.

Table 201. Summer Mountain Goat Habitat Affected by Combined Mine-Transmission Line Alternative.

Habitat Component	[1] No Mine/ Existing Conditions (acres)	[2] MMC's Proposed Mine (acres)		[3] Agency Mitigated Poorman Impoundment Alternative (acres)						[4] Agency Mitigated Little Cherry Creek Impoundment Alternative (acres)					
	TL-A	TL-B		TL-C-R		TL-D-R		TL-E-R		TL-C-R		TL-D-R		TL-E-R	
		Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]
Summer Mountain Goat Habitat Available (acres)	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407	43,407
Summer Mountain Goat Habitat Physically Removed (acres)[3]	0	125	125	90	90	90	90	90	90	90	90	90	90	90	90
Summer Habitat Displacement from Past Human Activity (acres % of available)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)	3,713 (9)
Summer Habitat Displacement from Alternative Activity[4,5] (acres % of available)	0 (0.0)	6,791 (16)	2,200 (5)	5,066 (12)	1,707 (4)	5,011 (12)	1,707 (4)	5,011 (12)	1,707 (4)	5,006 (12)	1,707 (4)	5,011 (12)	1,707 (4)	5,011 (12)	1,707 (4)

[1] Const = during project construction.
[2] Ops = during project operations.
[3] Due to overlap between mine and transmission line disturbance footprints, habitat physically removed due to mine alternatives in combination with transmission line alternatives are not additive.
[4] Acres of disturbance do not include areas of overlap from different sources of disturbance.
[5] For Alternative 2B, the use of helicopters during line construction would be at the discretion of MMC. The agencies assumed that helicopters would not be used during vegetation clearing or structure placement for Alternative 2B. Helicopter use was assumed for line stringing only.
Source: GIS analysis by ERO Resources Corp. using KNF Cabinet Mountain goat habitat, 2006, developed by Jerry Brown, Montana FWP, digitized by Barb Young.

Table 202. Winter Mountain Goat Habitat Affected by Combined Mine-Transmission Line Alternative.

Habitat Component	[1] No Mine/ Existing Conditions	[2] MMC's Proposed Mine		[3] Agency Mitigated Poorman Impoundment Alternative						[4] Agency Mitigated Little Cherry Creek Impoundment Alternative					
	TL-A	TL-B		TL-C-R		TL-D-R		TL-E-R		TL-C-R		TL-D-R		TL-E-R	
		Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]	Const[1]	Ops[2]
Winter Mountain Goat Habitat Available (acres)	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683
Winter Mountain Goat Habitat Physically Removed (acres)	0	56	56	0	0	0	0	0	0	0	0	0	0	0	0

[1] Const = during project construction.
[2] Ops = during project operations.
[3] Due to overlap between mine and transmission line disturbance footprints, habitat physically removed due to mine alternatives in combination with transmission line alternatives are not additive.
No transmission line construction would occur in any alternative between December 1 and April 30.
Source: GIS analysis by ERO Resources Corp. using KNF Cabinet Mountain goat habitat, 2006, developed by Jerry Brown, Montana FWP, digitized by Barb Young.

Alternative B would physically remove 23 acres of summer mountain goat habitat and 24 acres of winter mountain goat habitat, due to the transmission line clearing area in Ramsey Creek (Table 200). During the Construction Phase, Alternative B would result in additional short-term disturbance to goats, primarily due to displacement from roads and helicopter line stringing in the Ramsey Creek area, between May 1 and November 30. Transmission line construction would not occur between December 1 and April 30. Line stringing conducted by helicopter would likely approach within 500 meters (horizontal distance) of mountain goat groups. Mountain goats within 500 meters of helicopter line stringing would be moderately to strongly disturbed (Côte *et al.* 2013). Disturbance to mountain goats would diminish with distance to 1,500 meters horizontal distance where little to no disturbance would occur (Côte *et al.* 2013). Disturbance could displace goats from suitable habitat or reduce their ability to effectively use the available habitat in the short term. Individual goats or groups could suffer increased stress levels from disturbance during helicopter line stringing, but these impacts would last no more than 10 days and would not likely affect goat populations. Disturbance effects could also occur from other transmission line construction activities in areas where helicopters were not used. Except for annual inspection and infrequent maintenance operations, helicopter and other transmission line construction activities would cease after transmission line construction until decommissioning. Helicopter use and other activities could result in short-term disturbance of mountain goats during line decommissioning.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would not physically remove any mountain goat habitat. Helicopter construction of transmission structures would not occur in proximity to mountain goat habitat, and is not expected to affect mountain goats. Line stringing conducted by helicopter may displace goats temporarily from suitable habitat or reduce their ability to effectively use the available habitat. During the Construction Phase, Alternative C-R would result in increased short-term disturbance of goat habitat, primarily due to helicopter line stringing at the mouth of upper Libby Creek. Individual goats may suffer increased stress levels from disturbance during helicopter line stringing, but these impacts would last no more than 10 days and would not likely affect goat populations. In Alternative C-R, except for annual inspection and infrequent maintenance operations, helicopter use and other transmission line construction activities would cease after transmission line construction until decommissioning, similar to Alternative B.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts of Alternative D-R on mountain goats would be the same as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Impacts of Alternative E-R on mountain goats would be the same as Alternative C-R.

Combined Mine-Transmission Line Effects

Impacts of the combined mine-transmission line alternatives are shown in Table 201 and Table 202 and described below. Because some of the impact buffers for the mine alternatives and transmission line alternatives, acres of disturbance do not include areas of overlap from the different sources of disturbance. Construction of the Sedlak Park Substation and loop line would have no impacts to mountain goats with any alternative.

Alternative 2B would result in direct losses of about 125 acres of summer mountain goat habitat and 56 acres of winter mountain goat habitat, mostly due to disturbance from the Rock Lake Ventilation Adit and Ramsey Plant Site (Table 201). Slightly less goat habitat would be directly lost by the combined agencies' alternatives because the adits and plant site would be located in the same drainage (*i.e.*, Libby Creek). All combined agencies' alternatives would physically disturb about 90 acres of summer mountain goat habitat and no winter habitat. However, both Alternative 2B and the combined agencies' alternatives would directly impact one percent or less of the available summer and winter goat habitat.

Disturbance effects from human activity would have a much greater impact on the mountain goat than physical impacts on goat habitat, and would include disturbance from activities associated with blasting, construction of the plant and adit sites, road construction and use, plant and adit operations, and helicopter use that could displace goats from suitable habitat or reduce their ability to effectively use the available habitat. Disturbance from helicopter use and other transmission line construction activities are described above for the transmission line alternatives. Disturbance from blasting during mine construction could result in habitat displacement and increased stress levels for mountain goats, but would be short-term. Blasting would likely be mostly underground at the Libby Adit, where a maximum of two rounds of blasting would occur at the surface. The Ramsey Adits would probably require a maximum of two rounds of surface blasting per adit. The ventilation raise would be constructed from inside the mine and would not require any surface blasting, except for creation of the surface opening. Construction of the Ramsey Adits for Alternative 2B and the lower and upper Libby Adits for the combined agencies' alternatives is expected to take about 1 year. The Construction Phase in all combined action alternatives is expected to last 2 to 3 years. Noise and human activity associated with plant construction could also cause goats inhabiting surrounding areas to move to other portions of their home range for the duration of construction activities. Goats could suffer increased stress levels from disturbance during construction and operations that could result in a decline in reproductive rates (Joslin 1980).

During the Construction Phase, Alternative 2B would result in the most additional human disturbance to goat habitat, affecting about 6,791 acres of summer mountain goat range (16 percent of the habitat available). Human disturbance impacts from Alternative 2B would be greater than the combined agencies' alternatives due to helicopter line stringing, plant construction, and adit construction in Ramsey Creek. Less goat habitat would be disturbed by combined agencies' alternatives because the adits and plant site would be located in the same drainage (*i.e.*, Libby Creek), and because the transmission line would end at the mouth of Libby Creek. The agencies' alternatives would result in additional disturbance to between 5,006 acres and 5,066 acres or 12 percent of the summer mountain goat habitat available during project construction (Table 201). For the combined agencies' alternatives, no blasting would occur at the adits from May 15 to June 15, which would minimize disturbance to the potential goat kidding area on Shaw Mountain. The combined agencies' alternatives also would include funding for monitoring of mountain goat responses to mine-related impacts. In the agencies' mitigation (see section 2.5.7.4.5, *Indicator Species*), MMC would monitor goat populations, and the KNF, in consultation with the FWP, would assess effects. If mine disturbance were found to have a substantial impact on goat populations, MMC would develop, fund, and implement mitigation measures to reduce the impacts of mine disturbance.

During mine operations, additional disturbance to summer mountain goat habitat would range from 1,707 acres for the combined agencies' alternatives to 2,200 acres for Alternative 2B (4 and 5 percent of available summer habitat, respectively). Operations of Alternative 2B would affect slightly less winter goat habitat than the combined agencies' alternatives. During winter, mine operations would result in additional disturbance to winter mountain goat habitat ranging from

290 acres for Alternative 2B to 351 acres for the combined agencies' alternatives (5 and 6 percent of available winter habitat, respectively).Long-term disturbance to mountain goats during operations, such as noise and human activity, could cause goats to experience increased stress levels or to move from currently inhabited surrounding areas to other portions of their home range.

Most disturbances to goats would be short-term, and long-term disturbance (habitat removal) would increase on a relatively small proportion of goat habitat in the analysis area (Table 201). Alternative 2B would result in 0.3 percent of the summer mountain goat habitat and 1 percent of the winter mountain goat habitat available. The agencies' combined alternatives would result in less than 1 percent of the summer mountain goat habitat available and no loss of winter habitat. In all combined action alternatives, some disturbance effects would be offset by access changes (installation of gates or barriers and public access restrictions) and habitat acquisitions planned as mitigation for the impacts on grizzly bear and big game security. Acquired parcels would be managed for grizzly bear use in perpetuity, and could improve or contribute suitable mountain goat habitat if the acquired parcels were within goat habitat. The combined agencies' alternatives would include more road access changes and habitat acquisition, and would more effectively mitigate potential effects of disturbance to mountain goats. The combined mine-transmission line alternatives are not anticipated to result in the loss of goat herd occurrence or abundance in the southern Cabinet Mountains. In all combined action alternatives, the risk of mountain goat mortality would increase as a result of increased access to summer mountain goat habitat.

Cumulative Effects

Past actions are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E. Past actions, particularly timber harvest. Past actions (Appendix E) applicable to cumulative effects on mountain goats include mineral activities and road construction, maintenance and obliteration.

Neither Alternative 1 nor Alternative A would cumulatively impact mountain goats. Mineral exploration has occurred and would continue to occur throughout the Cabinet Mountains, cumulatively displacing goats from suitable habitat or reducing their ability to effectively use the available habitat. Disturbance impacts on mountain goats from the combined action alternatives would be compounded when impacts from other reasonably foreseeable actions are taken into account. Although unlikely to occur concurrently, the Wayup Mine/Fourth of July Road Access Project, the Rock Creek Project, and the Bear Lakes Access Project would collectively influence about 4,561 acres of MS-1 goat habitat (Bratkovich, pers. comm. 2008), potentially resulting in this habitat becoming less desirable or less effective for mountain goats.

Some of the disturbance associated with construction of the proposed project and other reasonably foreseeable actions, such as blasting and helicopter line stringing and construction, would be short-term. Noise generated by construction and blasting for the evaluation adits for the Rock Creek Project would occur sporadically for several weeks. Underground blasting would be considered after the adit reaches a depth of about 500 feet at the Rock Creek site to reduce the effects of blasting, based on experience at the Troy Mine adit. If surface blasting and other construction activities occurred concurrently for the Rock Creek and Montanore projects, cumulative noise disturbance could result in habitat displacement and increased stress levels for mountain goats.

While cumulative disturbance impacts on goats would be mostly short-term, disturbance during project operations, such as noise and human activity, would be long-term. Road access into critical goat habitat is the single biggest threat to goats in the Cabinet Mountains (Joslin 1980), and the Fourth of July proposal would construct a new road to the edge of the CMW and MS-1 habitat. Cumulative long-term disturbance to mountain goats could result in changes in seasonal habitat use, potentially causing goats to shift their use of both summer and winter habitat in Ramsey Creek (Alternative 2B only), and summer ranges in Libby Creek (all combined action alternatives), upper West Fisher Creek and Rock Creek basins. These potential changes in seasonal habitat use could increase the use of unaffected summer ranges creating potential conflicts with resident goats in the CMW. The cumulative disturbance effects of the mine alternatives and other reasonably foreseeable actions could result in reduced reproductive rates and a decrease in population of the Rock Creek herd. Some cumulative human-caused disturbance effects would be offset by road access changes (installation of barriers and gates and public access restrictions) and habitat acquisitions planned as mitigation for the Montanore, Rock Creek, and other projects.

No other past, current, or reasonably foreseeable actions are anticipated to contribute to cumulative impacts on mountain goats.

3.25.3.3.5 Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In these alternatives, MMC did not propose to implement feasible measures to minimize effects on the mountain goat or practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would incorporate feasible and practicable measures to minimize adverse environmental impacts on the mountain and wildlife habitat. These measures would include adding timing restrictions to blasting, and implementing monitoring and adaptive management during construction and operations. The agencies' land acquisition requirements in Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R would more likely provide mountain goat habitat than the land acquisition requirements of Mine Alternative 2 and Transmission Line Alternative B.

National Forest Management Act/Kootenai Forest Plan

Consistency with the 2015 KFP is described below.

FW-DC-WL-08: The Montanore Project is not managing vegetation for ungulate habitat. Alternatives 2, 3, 4, and B would remove mountain goat habitat (summer or winter habitat) through construction of mine or transmission line facilities. Additionally, construction and operation of these facilities would potentially disturb and displace mountain goats in the vicinity and cause them to underuse available habitat. The other transmission line alternatives may also displace mountain goats temporarily during the Construction Phase. Forestwide, adequate amounts of mountain goat habitat would remain available and well-distributed across the landscape to provide prey for carnivores. None of the alternatives would affect overall forestwide trends toward achieving this desired condition.

FW-DC-WL-16: The Montanore Project is not managing vegetation for ungulate habitat. Analysis of all mine and transmission line alternatives used information provided by the State (*e.g.,* winter range information). All alternatives would not affect overall forestwide trends toward achieving this desired condition.

FW-DC-WL-17: The mine and transmission line alternatives would not create barriers to movement. None of the alternatives would affect overall forestwide trends toward achieving this desired condition.

FW-GDL-WL-08 and FW-GDL-WL-09: MMC's proposed mine and transmission line alternatives would not comply with these guidelines for big game winter range. **The agencies' mine and transmission line** alternatives would avoid activities during the winter on mountain goat winter range. The impacts during the operation phase of the agencies' alternatives would be monitored. If mine disturbance were found to have a substantial impact on goat populations, MMC would develop, fund, and implement mitigation measures to reduce the impacts of mine disturbance. All agency alternatives would be designed and implemented to meet the intent of these guidelines.

FW-GDL-WL-11: MMC's proposed mine and transmission line alternatives would not comply with this guideline for mountain goat birthing/parturition period. In the agencies' alternatives, impacts to mountain goat birthing/parturition areas would be minimized through timing restrictions during the construction phase (blasting) when disturbance is most likely. The agencies' alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-12: There are no sites along routes used for these alternatives where project activities are expected to create a connectivity or movement barrier. No crossing features are warranted for inclusion in the project design. All alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-13: There are no existing crossing features or any crossing features under development. All alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-14: No wildlife linkage areas have been identified for mountain goats in the analysis area and connectivity would not be impacted. All alternatives would be designed and implemented in accordance with this guideline.

GA-DC-WL-LIB-04: The alternatives are not expected to impact mountain goat connectivity north-south through the Cabinet Mountains. Depending on the location of the grizzly bear mitigation lands purchased, those lands may contribute to progress toward this desired condition. All alternatives would be neutral to progress toward achieving this desired condition.

Mountain Goat Statement of Findings

All of the action alternatives would have a minor long-term effect on mountain goats. Less than 0.3 percent of the available summer habitat would be directly lost from the construction of any alternative. About 1.2 percent of the available winter habitat would be directly lost from the construction of Alternative 2B. Operational activities of the mine under Alterative 2B could displaces goats from 5.1 percent of the available summer and winter habitat, whereas, the agencies' modified alternative could displace goats from about 3.9 and 6.2 percent of available summer and winter habitat, respectively. Mosaics of habitat types, forage opportunities, and secure habitat away from open roads and mine facilities are available within alpine habitats in the analysis area. ***Therefore, sufficient quality and quantity of the diverse age classes of vegetation currently found within the analysis area to provide habitat for mountain goats in the Crazy and Silverfish PSUs, consistent with KFP direction for native ungulate habitat.***

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53. Hunting is managed by the FWP. The Proposed Action would not prevent the state from continuing to manage these species as harvestable populations.

3.25.3.4 Pileated Woodpecker

3.25.3.4.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

The 1987 KFP included pileated woodpecker as the management indicator species for old growth. However, the analysis for the 2015 KFP indicated that sufficient habitat for pileated woodpecker is available across the forest (Ecosystem Resource Group 2012). The coarse filter vegetation habitat management direction will continue to provide adequate habitat for the pileated woodpecker over the life of the plan.

In addition, FW-DC-WL-11, old growth, or other stands having many of the characteristics of old growth, exists for terrestrial species associated with these habitats; and FW-DC-WL-12, trees and snags greater than 20-inch DBH are available through the forest provide direction for habitat important for the pileated woodpecker. See sections 3.22.2, *Old Growth Ecosystems* and 3.25.2.2, *Snags and Woody Debris* for additional information related to these habitat characteristics and associated KFP compliance.

3.25.3.4.2 Analysis Area and Methods

Old growth provides both nesting habitat and year-round foraging habitat for pileated woodpecker (Thomas 1979); the pileated woodpecker, however, is not solely dependent on old growth for their habitat needs. Large-diameter snags characteristically found in old growth forests provide nesting habitat for this species (the largest woodpecker in the Rocky Mountains), while both the snags and coarse woody debris provide habitat for the woodpecker's primary prey species, the carpenter ant (Warren 1990).

Pileated woodpecker population ecology, biology, habitat description, and relationships in the northern Rocky Mountains are described in McClelland and McClelland (1999), McClelland (1979, 1977), McClelland *et al.* (1979), and Warren (1990). Research conducted in the Pacific and Inland Northwest is described in Bull and Jackson (1995), Bull and Holthausen (1993), Bull *et al.* (1992b), Bull (1987, 1980, 1975), Bull and Meslow (1977), Mellen *et al.* (1992), Mellen (1987), Thomas (1979), Mannan (1977), and Jackman (1974). This research provided guidance in evaluating potential habitat and effects to pileated woodpeckers and is incorporated by reference.

Pileated woodpecker occurrence data come from recent District wildlife observation records, the Region One Landbird Monitoring Program (Avian Science Center, University of Montana), and Forest historical data (NRIS Wildlife). Potential habitat for this species on National Forest System land was estimated using old growth and recruitment potential old growth that has been mapped for the KNF. General pileated woodpecker habitat was identified using KNF vegetation data. Often specific pileated woodpecker habitat information was not available for private or state-owned lands in the analysis area, much of which has been logged in the past 20 to 30 years.

The analysis area includes the PSUs impacted by proposed activities. While the bulk of activities occur within the Crazy and Silverfish PSUs, there are also project activities within McElk, Riverview, Treasure, and Rock PSUs. The analysis area boundary for direct effects is the proposed activity areas, as activities and alteration of the habitat would affect suitability for different species. The acres directly impacted by activities are put into the context of the PSU scale to provide a consistently sized analysis unit and better gauge the relative impacts of the activities. The boundaries for indirect and cumulative effects are the planning subunits that contain the analysis area as alteration of habitat could affect the availability and use of habitats. Analysis at the PSU scale allows the effects of the proposed activities to be put into context and their relative impacts gauged. The impacts to the Rock PSU are limited to a less than 1 acre of patch of steep, rocky ground, the impacts are nearly undetectable at the PSU scale, and therefore this PSU is not carried forward in detailed analysis.

Project impacts are evaluated based on impacts to important attributes of pileated woodpecker habitat, primarily impacts to old growth. Specific features of old growth stands evaluated for project impacts include preferred nest tree species, preferred nest tree size, down logs (both size and quantity), basal area, and canopy closure.

The overall assessment of habitat quality also accounts for potential adverse factors discussed in the old growth analysis that relate to size and connectivity, and include fragmentation, edge effect, and lack of interior habitat. Risk to firewood cutting is also evaluated. Other stands may have one or more important attributes of old growth forests, or perhaps provide for connectivity and interior habitat. These stands were also reviewed as part of this analysis. The impacts analysis includes an evaluation of the potential benefits to pileated woodpeckers from mitigation measures proposed by MMC or the agencies, such land acquisitions.

3.25.3.4.3 Affected Environment

No population estimate is available for pileated woodpeckers within the KNF. However, trend data for many species, including the pileated woodpecker are being gathered through the Northern Region Landbird Monitoring Program. The objective of this program is long-term population-trend monitoring on the National Forests in Region One. Seven surveys have been conducted over a 10-year period on the KNF (USDA Forest Service 2008d).

Within the Crazy and Silverfish PSU, no pileated woodpeckers were observed during breeding bird surveys conducted in 2005 at the Little Cherry Creek Tailings Impoundment Site, the Ramsey Plant Site, the LAD Areas, and MMC's proposed transmission line alignment (Westech

2005a). The pileated woodpecker has been documented in the Crazy and Silverfish PSUs during 1995, 1996, 2000, 2004, 2007, and 2012 during different bird surveys conducted by either the MNHP and FWP, the Avian Science Center as part of the Region 1 Landbird monitoring program, and most recently the Rocky Mountain Bird Observatory monitoring program which has replaced the previous Region 1 Landbird Monitoring program. Data gathered through the Regional bird monitoring programs, do not indicated any noticeable population change for the species on the KNF (USDA Forest Service 2008d).

The Crazy PSU contains 8,350 acres of effective old growth, and the Silverfish PSU contains 5,298 acres of effective old growth. The Crazy PSU contains 465 acres of recruitment potential old growth, and the Silverfish PSU contains 1,491 acres of recruitment potential old growth. Existing pileated woodpecker nesting territories likely encompass a large portion of this old growth. Snags and down wood provide food resources such as carpenter ants and their larvae, one of the primary prey items for pileated woodpeckers in the Northern Rockies (McClelland and McClelland 1999; McClelland 1977). Existing snag densities and amounts of down wood in the Crazy and Silverfish PSUs are consistent with KFP desired conditions. Existing PPL for snag habitat and are 73 percent in the Crazy PSU and 90 percent in the Silverfish PSU (see 3.25.2, *Key Habitats*).

3.25.3.4.4 Environmental Consequences

The following section discusses the direct and indirect, and cumulative effects on pileated woodpeckers for each of the mine alternatives, transmission line alternatives, and combined mine-transmission line alternatives, on federal and private land. Impacts on pileated woodpecker in the Crazy and Silverfish PSUs from the mine and transmission line alternatives are summarized in Table 203 and Table 204 and described below.

Alternative 1 – No Mine

In Alternative 1, natural successional processes would continue to occur throughout the forest and habitat would continue to be provided for pileated woodpecker nesting pairs where feeding and breeding conditions are suitable. There would be no direct impacts on pileated woodpecker from Alternative 1 (Table 203).

Table 203. Effects on Potential Pileated Woodpecker Habitat in Crazy PSU by Mine Alternative.

Analysis Area	[1] No Mine/ Existing Conditions	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative	[4] Agency Mitigated Little Cherry Creek Impoundment Alternative
Unmitigated Effects				
Effective OG (acres)	8,373	8,072 (301)	8,219 (154)	8,197 (176)
Recruitment OG (acres)	465	418 (47)	465 (0)	418 (47)
General pileated woodpecker habitat	8,788	8,584 (204)	8,720 (68)	8,649 (139)

OG = old growth.
Number in parentheses is the reduction in habitat acres due to the alternative compared to Alternative 1 No Mine/Existing Conditions.
Mine alternatives would not impact potential pileated woodpecker habitat (old growth) in the Silverfish PSU and are not shown.

Alternative 2 – MMC's Proposed Mine

As shown in Table 203, Alternative 2 would affect about 301 acres of effective old growth, 47 acres of recruitment old growth, and 204 acres of general habitat in the Crazy PSU, reducing nesting and foraging habitat for the pileated woodpecker. No old growth would be directly affected by Alternative 2 in the Silverfish PSU or on private or State land east of the Silverfish PSU. The majority of impacts on potential pileated woodpecker habitat would occur in Little Cherry Creek Impoundment and LAD Area 2 at the mouth of Ramsey and Poorman creeks, reducing habitat connectivity between these drainages. The Alternative 2 tailings impoundment would result in the loss of 158 acres of effective old growth, 47 acres of recruitment old growth, and 172 acres of general pileated woodpecker habitat in one localized area, which could displace one or more nesting pairs that may have traditionally used the area. Snag impacts associated with Alternative 2 could include the removal of a nest tree or night winter roost tree used by the pileated woodpecker. Impacts on old growth are described in section 3.22.2, *Old Growth Ecosystems*. Loss of old growth providing potential pileated woodpecker habitat may be offset by private land acquisition associated with grizzly bear habitat mitigation. As described in section 3.25.2.2, *Snags and Woody Debris,* Alternative 2 would result in the loss of snags greater than 20 inches diameter at breast height (dbh) and down logs greater than 10 inches dbh that provide potential nesting and foraging habitat for pileated woodpeckers. Snag densities and quantities of down wood would remain consistent with KFP desired conditions and would continue to provide adequate habitat for cavity-dependent species on the KNF. Snag losses would not likely increase due to roads constructed for Alternative 2 because these roads would be closed to the public.

Table 204. Effects on Potential Pileated Woodpecker Habitat by Transmission Line Alternative.

Analysis Area and Indicator	[A] No Transmission Line	[B] North Miller Creek	[CR] Modified North Miller Creek	[DR] Miller Creek	[ER] West Fisher Creek
			Crazy PSU		
Effective OG (acres)	8,373	8,361 (12)	8,373 (0)	8,371 (2)	8,371 (2)
recruitment OG (acres)	465	465 (0)	465 (0)	465 (0)	465 (0)
General Pileated Woodpecker Habitat (acres)	8,788	8,779 (9)	8,776 (12)	8,761 (27)	8,761 (27)
			Silverfish PSU		
Effective OG (acres)	5,887	5,887 (0)	5,887 (0)	5,883 (0)	5,887 (0)
recruitment OG (acres)	1,506	1,506 (0)	1,506 (0)	1,506 (0)	1,506 (0)
General Pileated Woodpecker Habitat (acres)	9,124	9,124 (0)	9,121 (3)	9,088 (36)	9,072 (52)
State Land (acres)	338	338 (0)	332 (6)	332 (6)	321 (17)
Plum Creek (acres)	499	499 (0)	499 (0)	499 (0)	496 (3)
		McElk PSU			
Plum Creek (acres)	2,292	2,286 (6)	2,282 (10)	2,282 (10)	2,282 (10)

OG = old growth.
Number in parentheses is the reduction in habitat acres due to the alternative compared to Alternative A, No Transmission Line.
Source: GIS analysis by KNF.

Noise and other human-caused disturbances, such as blasting, construction of the plant and adit sites, road construction and use, and plant and adit operations could cause pileated woodpeckers to avoid nearby habitat, at least temporarily. Disturbance impacts would likely be greatest during the Construction Phase, but could persist through mine operations.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Direct impacts of Alternative 3 on old growth potentially supporting pileated woodpeckers would be similar to Alternative 2, except that Alternative 3 would affect less old growth. About 154 acres of effective old growth and 68 acres of general pileated habitat in the Crazy PSU would be disturbed In Alternative 3 (Table 203). The majority of impacts on old growth would occur as a result of the Poorman Impoundment construction or in LAD Area 2 at the mouth of Ramsey and Poorman creeks, reducing habitat connectivity between these drainages. The Alternative 3 tailings impoundment would result in the loss of 117 acres of effective old growth and 60 acres of general pileated woodpecker habitat in one localized area, which could displace one or more nesting pairs that may have traditionally used the area. Snag impacts associated with Alternative 3 could include the removal of a nest tree or night winter roost tree used by the pileated woodpecker or some of the old growth-associated wildlife species it represents.

Loss of old growth providing potential pileated woodpecker habitat may be offset by private land acquisition associated with grizzly bear habitat mitigation.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts of Alternative 4 on old growth potentially supporting pileated woodpeckers would be similar to Alternative 2, except that Alternative 4 would affect less old growth. Alternative 4 would affect about 176 acres of effective habitat, 47 acres of recruitment habitat, and 139 acres of general pileated habitat in the Crazy PSU (Table 203).

Impacts from noise and human activities associated with Alternative 4 would be similar to Alternatives 2 and 3.

The Alternative 4 tailings impoundment would result in the loss of 135 acres of effective old growth, 47 acres of recruitment old growth, and 133 acres of general pileated woodpecker habitat in one localized area, which could displace one or more nesting pairs that may have traditionally used the area. Snag impacts associated with Alternative 4 could include the removal of a nest tree or night winter roost tree used by the pileated woodpecker or some of the old growth-associated wildlife species it represents.

Loss of old growth providing potential pileated woodpecker habitat may be offset by private land acquisition associated with grizzly bear habitat mitigation.

Alternative A – No Transmission Line

There would be no impacts on pileated woodpecker from Alternative A (No Transmission Line) (Table 204). There would be no impacts to the Riverview PSU from any of the transmission line alternatives. Based on the lack of old growth and pileated woodpecker sightings, construction of the Sedlak Park Substation and loop line would not affect pileated woodpeckers in any transmission line alternative.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would affect about 12 acres of effective old growth in the Crazy PSU and 9 acres of general pileated habitat (Table 204). No recruitment old growth would be impacted in the Crazy PSU and no effective or replacement old growth would be impacted in the Silverfish or

Riverview PSUs. Alternative B would impact about 6 acres of pileated habitat on Plum Creek land in the McElk PSU. The majority of impacts on old growth would occur in the Ramsey Creek corridor and at the confluence of Libby and Howard creeks, reducing habitat connectivity in these drainages. Loss of old growth providing potential pileated woodpecker habitat may be offset by private land acquisition associated with grizzly bear habitat mitigation.

As described in section 3.25.2.2, *Snags and Woody Debris*, Alternative B would result in the loss of snags greater than 20 inches dbh and down logs greater than 10 inches dbh that provide potential nesting and foraging habitat for pileated woodpeckers. Snag densities and quantities of down wood would remain consistent with KFP desired conditions and would continue to be provide adequate habitat for cavity-dependent species in the KNF. Snag losses would not likely increase due to roads constructed for Alternative B because these roads would be closed to the public.

Noise from helicopters during line stringing could cause pileated woodpeckers to avoid nearby habitat, at least temporarily. Similar effects could occur from other transmission line construction activities in areas where helicopters were not used, and would be more extensive for Alternative B than the agencies' alternatives. Disturbance impacts would be short-term and, with the exception of line maintenance activities, would cease after transmission line construction until decommissioning. Helicopter use and other activities would cause similar disturbances with similar durations during line decommissioning.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would have similar physical impacts on pileated woodpecker habitat as Alternative B, except that no effective or recruitment old growth would be disturbed in the Crazy or Silverfish PSUs. As shown in Table 204, Alternative C-R would affect 12 acres of general pileated habitat in the Crazy PSU and 3 acres of general habitat in the Silverfish PSU. Additionally, 6 acres of State land would be impacted in the Silverfish PSU and 10 acres of Plum Creek land in the McElk PSU would be impacted. Impacts on old growth on private and State lands would be minimized through implementation of the Environmental Specifications (Appendix D) and Vegetation Removal and Disposition Plan. Loss of old growth providing potential pileated woodpecker habitat may also be offset by private land acquisition associated with grizzly bear habitat mitigation.

Impacts on snag habitat from Alternative C-R would be similar to Alternative B, except that disturbance would be more extensive for Alternative C-R (see section 3.25.2.2, *Snags and Woody Debris*).

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts of Alternative D-R on old growth potentially supporting pileated woodpeckers would be similar to Alternative C-R. As shown in Table 204, Alternative D-R would directly affect 2 acres of effective old growth. There would be no impact on recruitment old growth in the Crazy PSU. General pileated habitat would be reduced by 27 acres in the Crazy PSU. Alternative D-R would have no effect on effective or recruitment old growth in the Silverfish PSU. Thirty-six acres of general pileated habitat would be impacted. Impacts on snag habitat from Alternative D-R would be similar to Alternatives B and C-R, except that disturbance would be more extensive for Alternative D-R (see section 3.25.2.2, *Snags and Woody Debris*).

Noise and other human-caused disturbance to pileated woodpeckers would be similar to Alternative C-R, except that disturbance would be more extensive for Alternative D-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Direct impacts on pileated woodpecker habitat from Alternative E-R would be similar to Alternative D-R, a 2 acre reduction in effective old growth and a 27 acre reduction in general pileated habitat in the Crazy PSU. There would be no impact on recruitment old growth in the Crazy PSU. In the Silverfish PSU, 52 acres of general pileated habitat, 17 acres of habitat on State of Montana land, and 3 acres of Plum Creek land would be impacted. In the McElk PSU 10 acres of Plum Creek land would be impacted. Noise and other human-caused disturbance to pileated woodpeckers on private and State land would be similar for Alternatives E-R and Alternatives C-R and D-R, except that the extent of the disturbance would be greater for the longer Alternative E-R.

Combined Mine-Transmission Line Effects

Impacts on pileated woodpecker in the Crazy, Silverfish, and McElk PSUs from the combined mine-transmission line alternatives are summarized in Table 205. There are no impacts to the Riverview PSU from any of the alternative combinations. Based on the lack of old growth and pileated woodpecker sightings, construction of the Sedlak Park Substation and loop line would not affect pileated woodpeckers in any transmission line alternative.

In the Crazy PSU, MMC's proposed alternative (2B) would impact 313 acres of effective old growth, 47 acres of recruitment old growth, and 213 acres of general pileated woodpecker habitat. The agencies' combined alternatives would impact between 154 and 156 acres of effective old growth, 0 acres of recruitment old growth, and 80 to 95 acres of general pileated habitat for the Poorman Impoundment Alternatives. Under the Little Cherry Creek Impoundment Alternatives, between 176 and 178 acres of effective old growth, 0 to 47 acres of recruitment old growth, and 151 to 166 acres of general pileated habitat would be impacted.

In the Silverfish PSU, none of the alternatives would impact effective or recruitment old growth. The alternatives that include the Poorman Impoundment would impact between 3 and 52 acres of general pileated habitat, 6 to 17 acres of state of Montana land, and 0 to 10 acres of Plum Creek land. Under the alternatives that include the Little Cherry Creek Impoundment no effective or recruitment old growth would be impacted, between 3 and 52 acres of general pileated habitat, 6 to 17 acres of State of Montana land, and 0 to 3 acres of Plum Creek land would be impacted.

In the McElk PSU each of the agency combined alternatives impacts 10 acres of Plum Creek land. The MMC alternative impacts 6 acres of Plum Creek land. There are no impacts to the Riverview PSU from any of the alternative combinations.

Table 205. Effects on Potential Pileated Woodpecker Habitat by Combined Mine-Transmission Line Alternative.

Measurement Criteria	[1] No Mine Existing Condition	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Crazy PSU								
Effective OG (acres)	8,373	8,060 (313)	8,219 (154)	8,217 (156)	8,217 (156)	8,197 (176)	8,195 (178)	8,195 (178)
Recruitment Potential OG (acres)	465	418 (47)	465 (0)	465 (0)	465 (0)	418 (47)	418 (47)	465 (0)
General Pileated Woodpecker Habitat (acres)	8,788	8,575 (213)	8,708 (80)	8,693 (95)	8,693 (95)	8,637 (151)	8,622 (166)	8,622 (166)
Silverfish PSU								
Effective OG (acres)	5,887	5,887 (0)	5,887 (0)	5,887 (0)	5,887 (0)	5,887 (0)	5,887 (0)	5,887 (0)
Recruitment Potential OG (acres)	1,506	1,506 (0)	1,506 (0)	1,506 (0)	1,506 (0)	1,506 (0)	1,506 (0)	1,506 (0)
General Pileated Woodpecker Habitat (acres)	9,124	9,124 (0)	9,121 (3)	9,088 (36)	9,072 (52)	9,121 (3)	9,088 (36)	9,072 (52)
State of Montana Land (acres)	338	338 (0)	332 (6)	332 (6)	321 (17)	332 (6)	332 (6)	321 (17)
Plum Creek (acres)	499	499 (0)	499 (0)	499 (0)	496 (3)	499 (0)	499 (0)	496 (3)
				McElk PSU				
Plum Creek (acres)	2,292	2,286 (6)	2,282 (10)	2,282 (10)	2,282 (10)	2,282 (10)	2,282 (10)	2,282 (10)

OG = old growth.
Number in parentheses is the reduction in habitat acres due to the alternative compared to Alternative 1, No Mine/Existing Condition.
Source: GIS analysis by KNF.

For all combined action alternatives, the tailings impoundment would result in the loss of 117 to 158 acres of effective old growth, 0 to 47 acres of recruitment potential old growth, and 60 to 172 acres of general pileated habitat in one localized area, which could displace one or more nesting pairs that may have traditionally used the area. Snag impacts associated with all combined action alternatives could include the removal of a nest tree or night winter roost tree used by the pileated woodpecker. Impacts on old growth from the combined mine-transmission line alternatives are described in section 3.22.2, *Old Growth Ecosystems*.

As described in section 3.25.2.2, *Snags and Woody Debris*, all combined action alternatives would result in the loss of snags greater than 20 inches dbh and down logs greater than 10 inches dbh that provide potential nesting and foraging habitat for pileated woodpeckers. In all combined mine-transmission line alternatives, snag densities and quantities of down wood would remain consistent with KFP desired conditions and would continue to be provide adequate habitat for cavity-dependent species in the KNF. Snag losses would not likely increase due to roads constructed for the combined action alternatives because these roads would be closed to the public.

In all combined action alternatives, noise from helicopters during line stringing and from other construction-related activities may cause pileated woodpeckers to avoid nearby habitat, at least temporarily. Disturbance impacts from blasting and helicopters would be short-term and, with the exception of line maintenance activities, would cease after transmission line construction until decommissioning. Disturbance from helicopter use and other transmission line construction activities are described for Alternatives B and C above. Disturbance impacts during mine operations would probably be lower in intensity, but would last through the life of the mine.

For all combined action alternatives, impacts on old growth on private land would be minimized through implementation of the Environmental Specifications (Appendix D) and Vegetation Removal and Disposition Plan described in section 2.5.2.6.2, *Vegetation Removal and Disposition Plan*. In all combined action alternatives, losses and degradation of providing potential pileated woodpecker habitat may be offset by private land acquisition associated with grizzly bear habitat mitigation.

Cumulative Effects

Summary of Existing Condition

Past actions, particularly timber harvest, road construction, and fire-suppression activities, have altered the old growth ecosystems in the analysis area. These changes have resulted in a reduction in late succession habitats; conditions favoring shade-tolerant, fire-intolerant species; loss of large snags and down wood; and increases in tree density and a shift to a largely mid-seral structural stage (USDA Forest Service 2003b).

Timber harvest has occurred in the analysis area since the 1950s. Prior to the 1990s, timber harvest often resulted in the loss of old growth, snags and down wood habitat. Road construction reduced the availability of snags and downed wood both directly and from firewood collection. Detailed description of previous vegetation and road management activities are found in Appendix E, of this document. In unharvested areas, natural disturbances such as wildfire would have resulted in the development of complex forest structure used by pileated woodpeckers. In contrast, fire suppression since the early 1900s has altered stand structure resulting in more homogenous stands with increased fuel loading in the understory and reduced development of large-diameter trees, snags, and down woody materials. Since the 1990s, application of KFP standards has resulted in the retention of snags and down woody materials as well as protection of old growth. Also, there has been more reliance on intermediate harvest that leaves more forest structure (including large old trees) and cover.

Effects of No Action Alternatives

The no action alternatives do not directly contribute any cumulative effects to pileated woodpeckers or their habitat.

Effects of Ongoing and Reasonably Foreseeable actions

Reasonably foreseeable actions include those federal, state, or private activities that are ongoing or scheduled to occur within the next five years, independent of this federal action. Appendix E identifies those current and foreseeable actions in the analysis area that were determined to be appropriate for inclusion in the analysis of environmental effects. As described above, loss of pileated habitat due to past actions has occurred within the analysis area. However, potential pileated habitat occurs throughout the analysis area due to the moist environment and associated forest cover types found here. Changes in harvest methods and protection of old growth areas in recent years has created/maintained higher quality habitat throughout the analysis area. Analysis for the 2015 KFP indicated that sufficient habitat for pileated woodpecker is available across the forest (Ecosystem Resource Group 2012).

Vegetation Management and Fuels Reduction Activities

Regeneration harvest included in the Miller-West Fisher Vegetation Management Project, the Coyote Improvement Vegetation Management Project, and the Silverbutte Bugs timber sale, which would occur in the Silverfish PSU, would not directly affect old growth providing potential pileated woodpecker habitat. Cumulatively, the proposed alternatives activities in old growth may reduce the amount and distribution of old growth, sufficient habitat for the pileated wood pecker would be available through the PSUs.

Public Use

Firewood gathering would continue to remove some snags from old growth along open road corridors and these acres were previously accounted for as part of the existing condition. Other forest uses such as mushroom and berry picking, camping, hunting, Christmas tree cutting, bough collection, etc. have little to no measurable impact on old growth and the pileated woodpecker because they are largely non-consumptive or rapidly re-established and would not contribute to the cumulative effect on snags and the old growth resource

While the combined action alternatives, in combination with other past, current, and reasonably foreseeable actions, would result in minimal losses and degradation of pileated woodpecker habitat.

Private Lands

Development of private lands, including timber harvest, home construction, and land clearing, are likely to continue within the Crazy and Silverfish PSUs. Therefore, on private and State lands there would likely be a decrease in at least general forest habitat. Impacts on pileated woodpecker on private, corporate timberlands and State lands would probably be minimal because it is likely that limited amounts of old growth occur on these lands, based on development and past and current harvest practices.

Cumulative noise and other human-caused disturbances could occur as a result of the combined action alternatives and other reasonably foreseeable actions. Cumulative disturbance effects could affect individual pileated woodpeckers, but would not likely affect pileated woodpecker populations in the KNF.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In these alternatives, MMC did not propose to implement feasible measures to minimize effects on the mountain goat or practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would incorporate feasible and practicable measures to minimize adverse environmental impacts on pileated woodpecker habitat. These measures would include adding timing restrictions to blasting, and implementing monitoring and adaptive management during construction and operations. The agencies' land acquisition requirements in Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R would more likely provide pileated woodpecker than the land acquisition requirements of Mine Alternative 2 and Transmission Line Alternative B.

National Forest Management Act/Kootenai Forest Plan

As described in section 3.25.2.2, Snags and Woody Debris, all action alternatives would be consistent with KFP desired conditions for snags and down wood. Although there would be site-specific reductions in old growth, Ecosystem Research Group reported the existing forestwide vegetation conditions and expected management under the 2015 KFP provide for pileated woodpecker habitat needs (Ecosystem Research Group 2012). In all combined mine-transmission line alternatives, a wide range of successional habitats, and associated amounts of down wood would be available.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

3.25.4 Forest Service Sensitive Species

Sensitive species are administratively designated by the Regional Forester (Forest Service Manual (FSM) 2670.5) and are those species for which population viability is a concern. Conservation Assessments have been completed for some sensitive species to assist land managers with planning efforts. The 2015 KPF includes direction for the protection, enhancement, and restoration of sensitive species and their habitats (Anderson 2014, Ecosystem Research Group 2012, Kootenai and Idaho Panhandle National Forests 2014).

3.25.4.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

The National Forest Management Act requires the Secretary of Agriculture to promulgate regulations specifying guidelines for land management plans that "provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives…" The "specific land area" (scale) for providing diversity is established in the framework as the area covered by the 2015 KFP, or the entire KNF.

As described in section 1.1.2.1.2 of the wildlife introduction, the vegetation management approach in the 2015 KFP is one that provides for ecosystem diversity by providing the ecological components, patterns, and processes at multiple scales on the landscape, and thereby provides the full spectrum of habitats and conditions needed for all of the biological organisms associated with the various ecosystems (USDA Forest Service 2013c). In addition to general habitat managed through the desired conditions for vegetation and fire in the 2015 KPF, the following 2015 KFP direction was considered in the analysis of all sensitive wildlife species discussed in this section. FW-GDL-WL-21 applies to those sensitive, threatened, or endangered species not covered under other forestwide guidelines. This direction is not repeated for each individual species.

> **GOAL-WL-01**: The KNF manages wildlife habitat through a variety of methods (*e.g.*, vegetation alteration, prescribed burning, invasive species treatments, etc.) to promote the diversity of species and communities and to contribute toward the recovery of threatened and endangered terrestrial wildlife species.
>
> **GOAL-WL-02**: The KNF manages and schedules activities to avoid or minimize disturbance to sensitive species and manages habitat to promote their perpetuation into the future.
>
> **FW-GDL-WL-21**: Management activities on NFS lands should avoid/minimize disturbance at known active nesting or denning sites for other sensitive, threatened, or endangered species not covered under other forestwide guidelines. Use the best available information to set a timeframe and a distance buffer around active nests or dens. Individual animals that establish nests and den sites near areas of pre-existing human use, inconsistent with the timeframes and distances in the other forestwide wildlife guidelines or in the best available information, are assumed to be accepting of that existing higher level of human use at the time the animals established occupancy. In those instances, as long as the individual animals continue to use the site, the higher intensity, duration, and extent of disturbance could continue but would not be increased beyond the level existing at the time the animals established occupancy."

Sensitive species are designated by the Regional Forester (FSM 2670.5). FSM 2672.42 directs the Forest Service to conduct a biological evaluation (BE) to analyze impacts on sensitive species. The sensitive species analysis in this document meets the requirements for a BE as outlined in FSM 2672.42. FSM 2670.22 requires that the Forest Service develop and implement management practices to ensure that sensitive species do not become threatened or endangered because of Forest Service actions and maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands. Any decision on the Montanore Project cannot result in loss of sensitive species viability or create significant trends toward federal listing (FSM 2670.32). Sensitive plant species identified within the analysis area are listed in Table 206. State wildlife Species of Concern are discussed in section 3.25.7, *Other Species of Interest*.

Table 206. Sensitive Wildlife Species on the KNF and Status within the Montanore Project Analysis Area.

Sensitive Species	Status[1]	Determination[2]	Comments
American Peregrine Falcon (*Falco peregrinus anatum*)	NS	No Impact	May occur in the analysis area, but no suitable habitat would be affected by project alternatives. Species dropped from further analysis.
Bald Eagle (*Haliaeetus leucocephalus*)	K	May Impact	Species and suitable habitat observed in analysis area
Bighorn Sheep (*Ovus canadensis*)	NS	No Impact	No suitable habitat available in analysis area
Black-backed Woodpecker (*Picoides arcticus*)	S	May Impact	Observed outside, but in vicinity of analysis area and suitable habitat available
Coeur d'Alene Salamander (*Plethodon vandykei idahoensis*)	S	May Impact	Adverse effect not likely because species not observed in analysis area since 1989 and habitat in analysis area degraded
Common Loon (*Gavia immer*)	NS	No Impact	No suitable habitat available in analysis area
Fisher (*Martes pinnanti*)	K	May Impact	Species and suitable habitat observed in analysis area
Flammulated Owl (*Otus flammeolus*)	K	May Impact	Species and suitable habitat observed in analysis area
Gray Wolf (*Canus lupus*)	K	May Impact	Species and suitable habitat observed in analysis area
Harlequin Duck (*Histrionicus histrionicus*)	K	May Impact	Species and suitable habitat observed in analysis area
North American Wolverine (*Gulo gulo*)	K	May Impact	Species and suitable habitat observed in analysis area
Northern Bog Lemming (*Synaptomys borealis*)	NS	No Impact	Analysis area not within species range
Northern Leopard Frog (*Rana pipiens*)	NS	No Impact	No suitable habitat available in analysis area
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	K	May Impact	Species and suitable habitat observed in analysis area
Western Toad (*Bufo boreas*)	K	May Impact	Species and suitable habitat observed in analysis area

[1] Status Key:
K = Species is known to occur within the analysis area.
S = Species is suspected to occur within analysis area.
NS = Species is not suspected to occur within the analysis area, and is dropped from further evaluation.
[2] Determination Key:
No Impact = Species is not suspected to occur within the analysis area.
May Impact = May impact individuals or their habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.
Source: USDA Forest Service 2011f; Westech 2005a; MNHP and FWP 2014; and KNF data for District observation and historical records (NRIS Wildlife).

3.25.4.2 Bald Eagle

3.25.4.2.1 Regulatory Framework

Federal Requirements

The bald eagle was removed from the federal threatened species list in 2007 (USFWS 2007b) and was subsequently added to the Forest Service sensitive species list. Bald eagles are also protected by two federal laws: the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The Eagle Act prohibits the “take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export, or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit.” “Take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” The term “disturb” is defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (50 CFR 22).

Regulations under the Eagle Act (50 CFR 22) allow for the limited take of bald eagles, or their nests, when the take is associated with otherwise lawful activities and the take would be compatible with the preservation of the bald eagle (74 Federal Register 46835). Compatible with the preservation of the bald eagle means the actions would have to be consistent with the goal of stable or increasing populations. Under these regulations, the USFWS may issue take permits, based on regional population thresholds, to allow take that results in mortality of eagles or an eagle nest under special circumstances. The permits authorize limited, non-purposeful take of bald eagles and golden eagles; authorizing individuals, companies, government agencies (including tribal governments), and other organizations to disturb or otherwise take eagles in the course of conducting lawful activities such as operating mines. Most permits issued under the regulations authorize disturbance. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is taken to avoid physical take. Removal of an eagle nest is allowed only where it is necessary to alleviate a safety hazard to people or eagles, necessary to protect human health or safety, the nest prevents the use of a human-engineered structure, or the activity, or mitigation for the activity, will provide a net benefit to eagles (50 CFR 22.27).

The MBTA specifically protects migratory bird nests from possession, sale, purchase, barter, transport, import, and export, and take. The other prohibitions of the MBTA, capture, pursue, hunt, and kill, are inapplicable to nests. The regulatory definition of take, as defined by 50 CFR 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt hunt, shoot, wound, kill, trap, capture, or collect. Executive Order 13186, Responsibilities of Federal agencies to Protect Migratory Birds, requires analysis of effects of federal actions on migratory birds as part of the environmental analysis process. In 2008, the USDA Forest Service and USFWS signed an MOU outlining the responsibilities of both parties in implementing the Executive Order. Under the MOU, the Forest Service will, during the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.

General 2015 KFP direction considered in the analysis of sensitive species is described in section 3.25.4.1, *Regulatory Framework,* p. 1133. In addition, the 2015 KFP direction considered in the analysis of the bald eagle is:

FW-DC-WL-06. Large-diameter trees are available within potential bald eagle nesting habitat adjacent to large lakes and major rivers. Forested stands are managed to promote large-diameter trees within eagle nesting territories, especially in the area between the nest site and the adjacent water body.

FW-GDL-WL-02. Bald Eagle. Management activities should avoid or minimize impacts to bald eagles on known occupied nest sites and roost sites, including known winter communal night roost areas, with timing and distance buffers based on the best available information.

FW-GDL-WL-03. Bald Eagle. Management activities should not result in the loss of existing nest trees or established roost sites.

FW-GDL-WL-04. Bald Eagle. Management activities should maintain or enhance nest site habitat suitability within existing nest territories (refer to FW-DC-VEG-03, FW-DC-VEG-07, FW-STD-VEG-01, FW-GDL-VEG-01, FW-GDL-VEG-02, FW-GDL-VEG-04, FW-GDL-VEG-05, and FW-DC-WL-13).

State Requirements

The State of Montana also has regulations in place to protect bald eagles. The intent of the Nongame and Endangered Species Act (87-5-103, MCA) is to "provide adequate remedies for the protection of the environmental life support system from degradation and provide adequate remedies to prevent unreasonable depletion and degradation of natural resources." This Act has similar language to the MBTA.

3.25.4.2.2 Analysis Area and Methods

Analysis Area

The analysis area for direct, indirect, and cumulative impacts to individuals and their habitat are all lands along US 2 from the Sedlak Park Substation to the Libby Loadout and within 1 mile of the transmission line alignment that are within the Bald Eagle Consultation Area (USFWS 2001). The 1-mile buffer adjacent to the transmission line alignments is based on the impact assessment requirements for linear features under MFSA (DEQ 2004). The analysis area occurs in the Crazy, Silverfish, McSwede, McElk, and Riverview PSUs. This area includes the Sedlak Park Substation and loop line. The analysis area for assessing trend toward federal listing and population viability is the KNF.

Methods

The National Bald Eagle Management Guidelines (NBEMG) (USFWS 2007c) provide recommendations for avoiding disturbance to bald eagles, and also encourage the continued development and use of state-specific management plans. The Montana Bald Eagle Management Plan (MBEMP) (Montana Bald Eagle Working Group 1994) and the 2010 addendum developed by the Montana Bald Eagle Working Group (Montana Bald Eagle Working Group 2010) stated that the Plan "will also serve as the conservation and management plan when bald eagles are delisted." The MBEMP and addendum provides guidance for bald eagle habitat management on the KNF. The effect of any proposed activity on potential eagle habitat (½ mile of major water source) and any known eagle nests within the bald eagle habitat will be discussed in relation to the 2010 Montana Bald Eagle Management Guidelines in lieu of the NBEMG. The NBEMG are more appropriate for states such as Florida, which have higher concentrations of bald eagles and have built nests near pre-existing human activity whereas Montana bald eagles are likely more accustomed to areas with less human activity and rural areas.

Eagle population ecology, biology, habitat description, and relationships identified by research are described in Montana Bald Eagle Working Group (MBEWG) (1991, 1994, 2010); USFWS (1995b, 1999); and USFWS (2007b). Eagle occurrence data come from recent District wildlife observation records, Forest historical data (NRIS Wildlife), and KNF monitoring data (USDA Forest Service 2008c). Nesting attempts on the KNF have increased significantly over the last two decades. Only one active nest was known to occur in 1978, whereas 35 active nests (15 on National Forest System lands and 20 on private land) were known and monitored in 2008. Nest success for active nests in 2008 was 41 fledglings. This is above the 20-year average of 24.5 fledges calculated for the last KNF monitoring reporting period (1988-2007, USDA Forest Service 2008c)

MBEMP guidelines identify four general areas of management concerns for bald eagles: nest sites, concentrated foraging areas winter communal roost sites, and mortality risks. In addition, the MBEMP describes seasonal restrictions and buffers around nests, foraging, and winter roost sites, based on activity type, to minimize disturbance to (MBEWG 2010). Buffers consist of visual buffers based on whether the human activity is visible from the nest, and distance buffers determined by the type of activity. MBEWG (2010) recommends seasonal restrictions from February 15 through August 15 for the following activities:

- Construction and maintenance including buildings roads, trails, or any other outside construction within direct line of sight of an active nest.
- Loud noises including fireworks, blasting, and operation of forest harvest machinery (skidders, trucks, chainsaws, etc.), jackhammers, construction equipment, etc.
- Forest management activities, thinning, and fuels reduction including all activities associated with the removal forest vegetation around occupied nests.
- Concentrated recreation including, but not limited to, hiking, bird-watching, fishing (on and offshore), hunting, boating, and use of personal watercraft.

Foraging areas, especially in the winter, often are found along highway and railroad corridors where animals killed by vehicles or trains occur. Winter habitat is generally dictated by the presence and abundance of food, open water, and secure night roost sites (MBEWG 1994). Effects indicators will be a quantitative (acres affected) or qualitative (potential to increase risk of mortality) effects analysis for the four habitat categories/management concerns. The impacts analysis includes an evaluation of the mitigation measures proposed by MMC or the agencies described in sections 2.4.6.3, *Grizzly Bear* and 2.9.6, *Wildlife Mitigation Measures*, recommendations outlined in Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012), and measures described in MMC's proposed Environmental Specifications (MMI 2005b) and the agencies' Environmental Specifications (Appendix D).

3.25.4.2.3 Affected Environment

Bald eagles occur as both seasonal migrants and year-round residents within the boundaries of the KNF. Based on the bald eagle habitat area boundaries agreed to by the USFWS (USFWS 2001), about 564,558 acres (242,965 acres National Forest System land, 275,470 acres private land, and 46,123 acres open water) of potential bald eagle habitat occurs in the KNF (USFWS 2001).

Nesting on the KNF has increased significantly over the last 2 decades. Only one active nest was known to occur in 1978, whereas 35 active nests (15 on National Forest System lands and 20 on private land) were known and monitored in 2008. Nest success for active nests in 2008 was 41 fledglings. This is above the 20 year average of 24.5 fledges calculated for the last KNF monitoring reporting period (1988-2007, USDA Forest Service 2008c).

Three known eagle nests are within the analysis area, all on private land (Figure 91). In 2006, a pair of bald eagles initiated nesting at a site, known as the Silverfish nest, located along the Fisher River just north of Silver Butte Road and just west of US 2 in the Silverfish PSU, about 600 feet west of MMC's proposed transmission line alignment Alternative B. Another active nest site is located along the Fisher River on private land about 1.4 miles north of the proposed transmission line. A third active nest is along Libby Creek about a mile south of the Libby Loadout and east of US 2. Bald eagles tend to use the same breeding area, and often the same nest, each year (MBEWG 1994) and these nests are likely to be active in the future.

Several bald eagle foraging, perching, and roosting areas are located along the Fisher River. Bald eagle foraging is occasionally observed along US 2 and in the major drainages in the Silverfish PSU (Bratkovich, pers. comm. 2006). In the fall, eagle use of Libby Creek is usually limited to about 8 miles upstream of its confluence with the Kootenai River.

Wintering bald eagle numbers have fluctuated over the years depending on food sources (fish from open waters and dead animals along roads and railroad tracks) and winter conditions (open versus frozen water for foraging habitat). Mid-winter bald eagle counts have averaged 88 bald eagles over the past 25 years (1989-2013, KNF bald eagle monitoring records). Winter use within the analysis area occurs along the US 2 corridor.

3.25.4.2.4 Environmental Consequences

Alternative 1 – No Mine

Alternative 1 would not directly or indirectly affect bald eagle nesting, foraging, communal roost, or other potential habitat. Without the proposed mine, traffic on US 2 from White Haven to Bear Creek Road would grow at an annual rate of 1.2 percent, increasing from a predicted 1,914 vehicles per day in 2010 to 2,401 vehicles in 2029. The traffic on Bear Creek Road averaged 16,338 vehicles per year between 1986 and 1991. Assuming traffic on the Bear Creek Road increased at the same rate as traffic on US 2, average traffic would be 20,493 vehicles per year in 2010. Without the proposed mine, traffic would grow at an annual rate of 1.2 percent increasing to 25,707 vehicles per year in 2029. No improvements would be completed to Bear Creek Road under this alternative. The increase in traffic in Alternative 1 would slightly increase the risk of increased eagle mortality on the Bear Creek Road and US 2 in the Bald Eagle Consultation Area.

Alternative 2 – MMC's Proposed Mine

The proposed mine would generate a negligible increase in traffic during the Evaluation Phase and the Construction Phase between Libby and the intersection with the Libby Creek Road. The increase would have a negligible effect on eagle mortality risk in the Bald Eagle Consultation Area. After the Bear Creek Road was reconstructed, traffic volume would increase, with an additional 132 vehicles per day on US 2, including 52 trucks and six buses. The increase in traffic would be 5 to 7 percent. Eagles are vulnerable to oncoming high-speed traffic, especially when gorged, ambient temperatures are well below freezing and wind is calm (MBEWG 1994). The increase in US 2 traffic in Alternative 2 during operations would slightly increase the risk of increased eagle mortality on US 2 in the Bald Eagle Consultation Area.

Traffic would increase substantially on the Bear Creek Road, a short (less than 1 mile) segment of which is in the Bald Eagle Consultation Area. Estimates of increased annual traffic volume range from 187 percent to 234 percent (Table 177 in the *Transportation* section). The increase in U.S. traffic in Alternative 2 would substantially increase the risk of increased eagle mortality on the short segment of the Bear Creek Road that is in the Bald Eagle Consultation Area. When the mill ceased operations in the Closure Phase, mine traffic volume would be substantially less than shown in Table 177. Future traffic volume when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and loss of the Little Cherry Loop Road beneath the impoundment. Mortality risk to the bald eagle would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (increased road width, improved sight distance, paving) and higher traffic speeds would result in a permanently higher bald eagle mortality risk the compared to pre-mine conditions.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative and Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Alternatives 3 and 4 would have similar effects on traffic volume on the Bear Creek Road and US 2 as Alternative 2. Creation of a supply staging area in Libby and consolidating shipments to the mine area would reduce traffic and associated eagle mortality risk from that estimated for Alternative 2.

Alternative A – No Transmission Line

Alternative A would not directly or indirectly impact bald eagle nesting, foraging, communal roost, or other potential habitat. The increase in traffic in Alternative A would slightly increase the risk of increased eagle mortality on US 2 in the Bald Eagle Consultation Area.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

About 0.5 mile of MMC's Proposed Transmission Line would have direct impacts on about 9 acres of bald eagle habitat in the nesting zone (Table 207). Alternative B would also temporarily disturb 33 acres of home range foraging area for nesting bald eagles, and 103 acres of other potential bald eagle habitat during transmission line construction. The clearing area for Alternative B would clear 4 acres of old growth on private land along the Fisher River and a short stretch of Miller Creek. Alternative B would likely result in the clearing of large spruce and cottonwood trees in these old growth areas that provide potential bald eagle nest sites. The clearing area associated with Alternative B would be within both the visual and distance buffers of an existing nest site. Bald eagles often avoid areas of high human use for nesting, foraging, perching, and roosting; they have shown a wide range of sensitivity to human disturbance (Stalmaster and Newman 1978; Knight and Knight 1984; Martell 1992; Beuhler *et al.* 1991; McCarigal *et al.* 1991). In addition to physical losses of habitat, impacts on bald eagles from Alternative B may include disturbance of breeding bald eagles and nest abandonment due to increased noise and the presence of humans and machinery and would likely require a federal take permit under the Eagle Act. Temporary disturbance impacts from Alternative B may also occur if increased noise and human presence associated with construction, including construction of the Sedlak Park Substation and loop line, caused eagles to avoid foraging in some areas.

Table 207. Transmission Line Impacts on Bald Eagle Nesting Habitat and Potential Bald Eagle Habitat by Transmission Line Alternative.

Transmission Line Alternative	Nearest Distance to Nest Site (miles)	Nest Site Area (Visual Buffer)[1] (acres)	Primary Use Area (Distance Buffer)[2] (acres)	Home Range Foraging Area[3] (acres)	Other Potential Bald Eagle Habitat[4] (acres)
B-North Miller Creek	0.07	9	10	33	103
C-Modified North Miller Creek	0.58	0	0	13	107
D-Miller Creek	0.58	0	0	13	107
E-West Fisher Creek	0.58	0	0	26	112

The transmission line disturbance area includes typical tree clearing width of 150 feet for Alternative B and 200 feet for Alternatives C-R, D-R, and E-R; and the disturbance area for the Sedlak Park Substation and access road. Areas of impact overlap between zones are not counted.
[1] Visual buffer = The initial buffer implemented based on whether the human activity is visible from within 0.25 mile radius of nest site.
[2] Distance Buffer = In the absence of adequate visual buffers, a distance buffer from 0.25 to 0.5 mile radius of nest site determined by the type of activity.
[3] Foraging Area (formally Zone 3) = suitable foraging habitat within 2.5 miles of nest site. Foraging habitat consists of rivers, streams, and wetland areas.
[4] Other potential bald eagle habitat = all lands within the analysis area.
Source: GIS analysis by ERO Resources Corp. using KNF data.

The likelihood of the 230-kV transmission line resulting in the electrocution of bald eagles or other raptors is extremely low; electrocution of raptors is primarily a problem associated with lower-voltage distribution lines (APLIC 2006). Also, electrocutions potentially caused by the transmission line would be minimized through implementation of recommendations outlined in APLIC (2006), which are based on a minimum spacing of 60 inches between phases or between phase and ground wires. The transmission line from BPA's loop line would not pose a risk of electrocution of raptors because phase spacing would be a minimum of 20 feet.

Although raptors are generally less vulnerable to collisions with power lines than other bird species (Olendorff and Lehman 1986), the proximity of the Alternative B transmission line, including BPA's Substation and loop line, to nesting bald eagles and their foraging habitat along the Fisher River would add to the risk of bald eagle collisions with the transmission line. Potential collisions of bald eagles with the transmission line would be reduced by constructing the transmission line according to recommendations outlined in APLIC (2012). Applicable recommendations outlined in APLIC include locating the transmission line away from streams and other potential flight corridors, placement of the lines below treeline or other topographical features, and installation of line-marking devices. MMC indicated no aviation flight paths were identified for the preferred corridor and no markers or other warning devices were planned (MMI 2005b).

MMC did not propose any timing restrictions for winter-time transmission line construction. Winter-time transmission line construction would slightly increase traffic on US 2 in the analysis area and would slightly increase eagle mortality risk.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would have no direct physical impacts on bald eagle habitat in the nesting zone. About 13 acres of bald eagle foraging habitat and 107 acres of other potential habitat would be temporarily disturbed during construction of Alternative C-R (Table 207). The clearing area for

Alternative C-R would not affect any old growth on private land along the Fisher River. Temporary disturbance impacts from Alternative C-R may also occur if increased noise and human presence associated with construction, including construction of the Sedlak Park Substation and loop line, caused eagles to avoid foraging in some areas. These impacts are likely to be minor, given the availability of foraging habitat in the surrounding area.

The location of the Alternative C-R transmission line alignment on an east-facing ridge immediately north of the Sedlak Park Substation would reduce the risks of bald eagle wire strikes and electrocutions relative to Alternative B. Similar to Alternative B, recommendations outlined in Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012) would be implemented.

Section 2.9.6.2.1, *Bald Eagle* describes the agencies' mitigation for the bald eagle. MMC would either: 1) not clear vegetation or conduct other construction activities during the breeding season (February 1 to August 15) in potential bald eagle nesting habitat or; 2) fund or conduct field and/or aerial reconnaissance surveys to locate any new bald eagle or osprey nests along specific segments of the transmission line corridor in Alternatives C-R, D-R, and E-R. Surveys would be conducted between March 15 and April 30, one nesting season immediately before transmission line construction. If an active nest were found, guidelines from the Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group 2010) would be followed to provide management guidance for the immediate nest site area (Zone 1), the primary use area (Zone 2), and the home range area (Zone 3) as long as they were in effect. This mitigation would minimize affecting a bald eagle nest.

The agencies' mitigation also includes other timing restrictions. All activities for both transmission line construction seasons and during decommissioning of the transmission line on National Forest System and State trust lands within the CYRZ and Cabinet Face BORZ would occur between June 16 and October 14. No transmission line construction in elk, white-tailed deer, or moose winter range between December 1 and April 30 unless approved by the agencies. The agencies' timing restrictions would minimize any increase in traffic on US 2 in the analysis area and increased eagle mortality risk.

The agencies' Environmental Specifications (Appendix D) include additional monitoring and mitigation not described in MMC's Environmental Specifications. As described in Appendix D, areas of high risk for bird collisions where line-marking devices may be needed, such as the Fisher River crossing, and recommendations for type of marking device would be identified through a study conducted by a qualified biologist and funded by MMC.

Alternative D-R – Miller Creek Transmission Line Alternative

The impacts on bald eagles from Alternative D-R would be the same as Alternative C-R. Modifications to the transmission line alignment and mitigation described in Alternative C-R would be implemented in Alternative D-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Alternative E-R would have no direct physical impacts on bald eagle habitat in the nesting zone. About 26 acres of bald eagle foraging habitat and 112 acres of other potential habitat would be temporarily disturbed during construction of Alternative E-R (Table 207). The clearing area for Alternative E-R would clear 7 acres of old growth on private and State land where the transmission line crossed the Fisher River and paralleled West Fisher Creek. Alternative E-R would likely result in the clearing of large spruce and cottonwood trees in these old growth areas that provide potential bald eagle nest sites. Temporary disturbance impacts from Alternative E-R may also occur if increased noise and human presence associated with construction, including construction of the Sedlak Park Substation and loop line, caused eagles to avoid foraging in some areas. These impacts are likely to be minor, given the availability of foraging habitat in the surrounding area. The risks of bald eagle wire strikes and electrocutions would be the same as Alternatives C-R and D-R. Modifications to the transmission line alignment and mitigation described in Alternative C-R would be implemented in Alternative E-R.

Cumulative Effects

Past actions (Appendix E) applicable to cumulative effects on bald eagle include existing road and associated traffic volume, primarily on US 2, and existing roads and human disturbance in the analysis area. Future actions that may increase traffic volume on US 2, and human disturbance in the analysis area include private land development, the Miller-West Fisher Vegetation Management Project, the Coyote Improvement Vegetation Management Project, the Silverbutte Bugs timber sale and the Flower Creek Vegetation Management Project. If timber harvest activities occurred concurrently with mine or transmission line construction and operations, higher traffic volume and associated increased eagle mortality risk along US 2 may occur. No other past, current, or reasonably foreseeable actions are anticipated to contribute to cumulative impacts on bald eagles.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In these alternatives, MMC did not propose to implement feasible measures to minimize effects on the bald eagle or practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would incorporate feasible and practicable measures to minimize adverse environmental impacts on the bald eagle and wildlife habitat. These measures would include realigning the transmission line away from an active eagle nest, limiting winter-time transmission line construction, either not clearing vegetation or conducting construction activities during breeding season in bald eagle habitat, or fund or conduct surveys to locate active nests in appropriate habitat, creating a supply staging area in Libby and consolidating shipments to the mine area to reduce traffic, and assessing areas of high risk for bird collisions where line-marking devices may be needed. Transmission Line Alternatives C-R and D-R would avoid old growth on private land along the Fisher River.

National Forest Management Act/Kootenai Forest Plan

All known bald eagle nest sites are on private land and 2015 KFP direction does not apply to activities on private land. All mine alternatives would be consistent with 2015 KFP sensitive species and bald eagle direction. MMC's transmission line alternative would not be designed in accordance with bald eagle guideline (FW-GDL-WL-02) to avoid or minimize impacts to bald eagles on known occupied nest sites and roost sites, including known winter communal night roost areas, with timing and distance buffers based on the best available information. In the agencies' transmission line alternatives, activity timing restrictions and snag retention described in section 3.25.2.2, Snags and Woody Debris would be consistent with 2015 KFP bald eagle direction.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual bald eagles or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All action alternatives may impact individual bald eagles and their habitat within the analysis area, but would not contribute to a trend toward federal listing or cause a loss of viability to the population or species.*** All action alternatives may affect the bald eagle and their habitat by increasing mortality risks in winter foraging area. All action transmission line alternatives would disturb home range foraging areas and may displace eagles from foraging areas during transmission line construction. The USFWS has removed the bald eagle from federal listing. Nesting on the KNF has increased significantly over the last 2 decades.

Bald and Golden Eagle Protection Act

Alternative B would not comply with the Eagle Act, as it would likely require obtaining a federal eagle take permit for which MMC has not applied. The agencies' transmission line alternatives would result in minimal impacts on individual bald eagles or eagle populations and habitat, and would comply with the Eagle Act.

Migratory Bird Treaty Act and Executive Order 13186

All action alternatives would comply with the MBTA, Executive Order 13186, and its associated MOU by evaluating the effects of federal actions on migratory birds as part of the NEPA process and promoting conservation of and minimizing adverse impacts on migratory birds.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53. All alternatives would comply with the Nongame and Endangered Species Act.

3.25.4.3 Black-backed Woodpecker

3.25.4.3.1 Regulatory Framework

General 2015 KFP direction considered in the analysis of sensitive species is described in section 3.25.4.1, *Regulatory Framework,* p. 1133. In addition, the 2015 KFP direction considered in the analysis of the black-backed woodpecker is:

> **FW-GDL-WL-05. Wildfire Areas.** Maintain unlogged conditions in some portions of areas burned by wildfires for 5 years post-fire. A well distributed diversity of patch sizes and burned conditions, based on fire characteristics and pre-fire forest conditions, should be left to provide habitat for species whose habitat requirements include recently burned forests (black-backed woodpecker, etc.).

3.25.4.3.2 Analysis Area and Methods

The analysis area for black-backed woodpeckers is described in section 3.25.1, *Introduction.* The analysis area for determination of population trend and contribution toward population viability is the KNF.

Black-backed woodpecker population ecology, biology, habitat description, and relationships identified by research are described in Samson (2006a, 2006b), O'Connor and Hillis (2001), Dixon and Saab (2000), Powell (2000), Cherry (1997) and Hutto (1995). These provided guidance in evaluating habitat and potential effects to black-backed woodpeckers, and are incorporated by reference. Black-backed woodpecker occurrence data come from recent District wildlife observation records and KNF historical data (NRIS Wildlife).

Bonn *et al*. (2007) provides some guidance for conducting project-level analysis to determine effects to black-backed woodpeckers. Black-backed woodpecker habitat was analyzed using GIS layers on fire and timber harvest history, stand type, and stand age/size. Additional sources used for analysis includes snag data, prescribed burn records for the analysis area, and Regional fire history summaries (Northern Rockies Coordination Center 2004-2011).

High quality habitat is defined as areas where recent (less than 8 years old) mixed-lethal or stand-replacement fires have occurred. Black-backed woodpeckers have been found to be almost entirely restricted to early post-fire forests (Hutto 1995). General forest (low quality) habitat consists of forested areas with patches of snags produced by insect and disease. Specific black-backed woodpecker habitat information was not available for private or state-owned lands in the analysis area, much of which has been logged in the past 20 to 30 years.

Indicators for comparing alternative effects on black-backed woodpecker are changes in high-quality and general forest habitat.

3.25.4.3.3 Affected Environment

Black-backed woodpeckers are associated with boreal and montane coniferous forests that have experienced recent burns. Black-backed woodpeckers are known to use three types of forested habitat: 1) post-fire areas that have burned within 1 to 6 years, 2) areas with extensive bark beetle outbreaks causing widespread tree mortality, and 3) areas of smaller disturbances scattered throughout the forest caused by wind throw, ice damage, or other occurrences that produce small patches of dead trees. These conditions all provide habitat for the black-backed woodpecker's primary food source, woodborer beetles, and larvae (Ecosystem Research Group 2012).

Research conducted in Montana (Hutto 1995; Caton 1996; Hitchcox 1996; Hejl and McFadzen 2000; Powell 2000) suggests black-backed woodpeckers require fire-killed trees for long-term survival. High quality black-backed woodpecker habitat is defined as recent (≤8 years old) mixed-lethal or stand-replacement fire areas where an abundance of snags are available. Fire-created black-backed woodpecker habitat provides the best conditions for 2 to 3 years following the fire then begins to decline as tree moisture content decreases and wood borer larvae decline (Bonn *et al*. 2007). Fire-killed trees generally do not provide insect food sources beyond 5 to 7 years (Caton 1996; Murphy and Lehnhausen 1998); secondary mortality from fire and insect attacks often extend the availability of quality habitat. Hoyt and Hannon (2002) documented black-backed woodpecker use of fire areas from up to 33 miles (50 kilometers) away up to 8 years after a fire occurred.

The analysis area has no high quality habitat because there have been no fires during the past 8 years. Low quality black-backed woodpecker habitat in the Crazy, Silverfish, McElk, and Riverview PSUs consists of general forest habitat that supports populations of resident black-backed woodpeckers. Based on potential habitat data, about 15,143 acres of general forest habitat is in the Crazy PSU, while 15,437 acres of general forest habitat is in the Silverfish PSU.

Black-backed woodpeckers nest in snags at high densities in burned areas from 1 to 6 years after fires (Caton 1996; Hitchcox 1996) and can colonize very small, isolated burns (Hitchcox 1996). As primary cavity-nesters, black-backed woodpeckers require dead or live trees with heartwood rot and show a preference for Douglas-fir, ponderosa pine, lodgepole pine, and western larch. According to Thomas (1979), a PPL of 40 percent or more should maintain viable populations of birds dependent on cavities for nest sites. The existing PPL for the Crazy and Silverfish PSUs is 73 and 90 percent, respectively. The availability of nest snags is non-limiting for black-backed woodpeckers (Ecosystem Research Group 2012).

On a forestwide level, habitat modeling estimated nearly 30,000 acres of black-backed woodpecker habitat (Ecosystem Research Group 2012). Potential black-backed woodpecker habitat is abundant, broadly distributed, and totals 1,317,790 acres of general forest habitat. Across the KNF, wildfires over the last 8 years ranged from 11 to 4,723 acres per year and created a total of about 9,390 acres of high quality habitat (Northern Rockies Coordination Center 2004-2011). Wildfire activity during the summer season of 2014 are estimated to have burned 32,000 acres.

The nearest recorded observation of a black-backed woodpecker to the analysis area occurred in 1995 in a burned area west of Rock Creek (MNHP and FWP 2014). No black-backed woodpeckers were observed during black-backed woodpecker surveys of more than 1 mile of the Libby Creek wildfire burn area in 2003 and 2004 (see Project record). No black-backed woodpeckers were observed during breeding bird monitoring and point count surveys of old growth stands in and adjacent to the proposed impoundment sites and Libby Plant Site conducted in 1992 (Mitchell and Bratkovich 1993), 2002, and 2004 (see Project record). Similarly, no black-backed woodpeckers have been observed during Region One (Forest Service) landbird monitoring surveys of transects established directly northwest of the proposed LAD Area 1 and in Miller Creek along NFS road #4724 in 1994, 1995, 1996, 1998, 2000, 2002, and 2004 (Ibid). The majority of the private and State lands in the analysis area has high road densities, allowing access for firewood collection, and has been logged in the past 20 to 30 years, and it is not likely that snags have been left standing. As a result, snag and down wood important to black-backed woodpeckers is likely to be less available on private and State lands.

Across the Forest Service Northern Region, the black-backed woodpecker is considered secure in terms of persistence (Samson 2006a, 2006b). The Northern Region Black-backed Woodpecker Overview (Bonn *et al*. 2007) shows region-wide populations are increasing. Habitat modeling for the 2015 KFP predicted the amount of habitat declines substantially in the first decade after 2015 implementation and then increases steadily to near current levels at decade five. The increasing trend matches predicted increases in burned acres through the five-decade period (Ecosystem Research Group 2012).

3.25.4.3.4 Environmental Consequences

Activities associated with mine and transmission line construction and operation have the potential to impact black-backed woodpecker habitat. Impacts from the mine (Table 208) and transmission line alternatives (Table 209) are described in the following subsections. None of the proposed alternatives for the mine or the transmission line would impact high-quality black-backed woodpecker habitat (recently burned forest).

Alternative 1 – No Mine

The No Mine Alternative would not have any direct, indirect, or cumulative impacts on black-backed woodpeckers or their habitat. Over time, with continued fire suppression and lack of active forest management, indirect effects of this alternative would include a continued trend toward later successional habitats.

Alternative 2 – MMC's Proposed Mine

Alternative 2 would have no effect on black-backed woodpecker habitat in the Silverfish PSU. In the Crazy PSU, 889 acres of general forest habitat would be impacted (Table 208). The Alternative 2 tailings impoundment would result in the loss of 715 acres of general forest habitat in one localized area, which could displace one or more nesting black-backed woodpecker pairs that may have traditionally used the area.

Table 208. Impacts on Black-backed Woodpecker Habitat in the Analysis Area by Mine Alternative.

Habitat Type	[1] No Mine/Existing Conditions	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment	[4] Agency Mitigated Little Cherry Creek Impoundment
General Forest Habitat (acres/%)	15,143	14,254 (889/6%)	14,425 (718/5%)	14,478 (665/4%)

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Source: GIS analysis by KNF using KNF data.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Direct and indirect impacts from Alternative 3 on black-backed woodpecker would be slightly less than Alternative 2. In the Crazy PSU, Alternative 3 would affect 718 acres of general forest foraging habitat (Table 208). The Alternative 3 tailings impoundment would result in the loss of 627 acres of habitat in one localized area, which could displace one or more nesting black-backed woodpecker pairs that may have traditionally used the area.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Direct and indirect impacts from Alternative 4 on black-backed woodpecker would be less than Alternative 2. In the Crazy PSU, Alternative 4 would affect 665 acres of general forest habitat (Table 208). The Alternative 4 tailings impoundment would result in the loss of 571 acres of mapped habitat in one localized area, which could displace one or more nesting black-backed woodpecker pairs that may have traditionally used the area.

Alternative A – No Transmission Line

The No Transmission Line Alternative would have no direct or indirect impacts on black-backed woodpecker habitat. The effects would be the same as Alternative 1.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would affect 35 acres of general forest habitat in the Crazy PSU, and 28 acres of general forest habitat in the Silverfish PSU (Table 209). The Alternative B clearing area would include 15 acres of potential black-backed woodpecker habitat on State and private land outside of the Crazy and Silverfish PSUs. The quality of the black-backed woodpecker habitat on private land is unknown. Based on the lack of suitable habitat and black-backed woodpecker sightings, construction of the Sedlak Park Substation and loop line would not affect black-backed woodpeckers in any transmission line alternative.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Impacts on black-backed woodpecker from Alternative C-R would be similar to Alternative B (Table 209), affecting 2 additional acres of general forest habitat in the Crazy PSU, 6 additional acres of general forest habitat in the Silverfish PSU, and 13 more acres of potential habitat on State and private land. The quality of the black-backed woodpecker habitat on private land is unknown. Impacts on general forest foraging habitat in the agencies' alternatives would be minimized through implementation of the agencies' Environmental Specifications (Appendix D) and a Vegetation Removal and Disposition Plan.

Alternative D-R – Miller Creek Transmission Line Alternative

Alternative D-R would affect 39 acres of general forest habitat in the Crazy PSU, and 82 acres of general forest habitat in the Silverfish PSU (Table 209). The Alternative D-R clearing area would include about 31 acres of coniferous forest providing potential black-backed woodpecker habitat on State and private land. The quality of the black-backed woodpecker habitat on private land is unknown.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Effects of Alternative E-R would be similar to Alternative D-R (Table 209).

Combined Mine-Transmission Line Effects

Combined mine-transmission line impacts on black-backed woodpecker habitat in the analysis

Table 209. Impacts on Black-backed Woodpecker Habitat in the Analysis Area by Transmission Line Alternative.

Habitat Type	[A] No Transmission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Crazy PSU					
General Forest Habitat (acres/%)	15,143	15,108 (35/<1%)	15,108 (35/<1%)	15,104 (39/<1%)	15,104 (39/<1%)
Silverfish PSU					
General Forest Habitat (acres/%)	15,437	15,409 (28/<1%)	15,388 (49/<1%)	15,353 (82/<1%)	15,358 (79/<1%)
State and Private Land					
General Forest Habitat (acres)	NA	15	28	28	31

NA = Not applicable.
Numbers in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Source: GIS analysis by KNF using KNF data.

area are shown in Table 210. Impacts on black-backed woodpecker in the Crazy PSU would range from 700 to 922 acres of general forest foraging habitat. For all combined action alternatives, impacts on black-backed woodpecker in the Silverfish PSU would be due entirely to the transmission line. Impacts in the Silverfish PSU would range from 28 to 82 acres of potential general forest foraging habitat. Impacts on potential black-backed woodpecker habitat on State and private lands would be 59 acres for Alternative B, 47 acres for Alternatives 3C-R and 3D-R, 50 acres for Alternative 3E-R, 72 acres for Alternatives 4C-R and 4D-R, and 75 acres for Alternative 4E-R. The quality of the black-backed woodpecker habitat on private land is unknown. Based on the lack of suitable habitat and black-backed woodpecker sightings, construction of the Sedlak Park Substation and loop line would not affect black-backed woodpeckers with any alternative.

The loss of potential habitat resulting from the combined action alternatives could reduce the quality of the habitat in these PSUs for nesting black-backed woodpeckers through increased habitat fragmentation, edge effects, and disturbance effects. For all alternatives, construction of the tailings impoundment would result in the loss of between 571 and 715 acres of potential habitat in one localized area, which could displace one or more nesting black-backed woodpecker pairs that may have traditionally used the area. None of the alternatives would affect burned forest habitat or areas of bark-beetle outbreak preferred by black-backed woodpeckers. Despite several surveys conducted in the Crazy and Silverfish PSUs, no black-backed woodpecker nests were identified in the analysis area.

Cumulative Effects

The Affected Environment/Existing Condition describes the existing suitable habitat within the analysis area, primarily general forest habitat as no wildfires have occurred within the analysis area in recent years (≤8 years). In addition, adjacent planning areas were evaluated for potential impacts to high-quality habitat related to areas of disturbance that occur across project boundaries. There are no apparent conditions within proximity of the analysis area that would contribute to effects to black-backed woodpeckers.

Past Actions

The primary measure of habitat suitability is changes to nesting and foraging habitat, primarily changes to high quality habitat that developed as a result of wildfire. Past actions, particularly timber harvest, road construction, fire suppression, and firewood gathering activities, have contributed to a reduction in potential black-backed woodpecker habitat (USDA Forest Service 2003b). Fire suppression since the early 1900s has resulted in fewer severe fires on the landscape and has affected the creation of high quality habitat for black-backed woodpeckers. Timber harvest has occurred in the analysis area since the 1950s. Harvests that targeted beetle infested stands and post-fire areas for salvage reduced natural disturbance areas targeted by the woodpecker. In addition, regeneration harvests would have had the most impact on general forest habitat. Detailed description of previous vegetation management activities are found in Appendix E. Since the 1990s, application of KFP direction has resulted in the retention of snags and protection of old growth and riparian habitats. Also, there has been more reliance on intermediate harvest that leaves more forest structure (including large old trees), snags, and downed wood. Current levels of black-backed woodpecker habitat are relatively high, the result of recent wildfires (Ecosystem Research Group 2012).

Table 210. Impacts on Black-backed Woodpecker Habitat in the Analysis Area by Combined Mine-Transmission Line Alternative.

Measurement Criteria	[1] Existing Condition	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
	TL-A	TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Crazy PSU								
General Forest Foraging Habitat (acres/%)	15,143	14,221 (922/6%)	14,391 (752/5%)	14,386 (757/5%)	14,386 (757/5%)	14,443 (700/5%)	14,439 (704/5%)	14,439 (704/5%)
Silverfish PSU								
General Forest Foraging Habitat (acres/%)	15,437	15,409 (28/<1%)	15,388 (49/<1%)	15,355 (82/<1%)	15,358 (79/<1%)	15,388 (49/<1%)	15,355 (82/<1%)	15358 (79/<1%)
State and Private Land								
Potential habitat affected (acres)	NA	59	47	47	50	72	72	75

Number in parentheses is the reduction in habitat acres compared to existing conditions.
Source: GIS analysis by KNF using KNF data.

No Action

The No Action alternatives (Alternative 1 and Alternative A) would not contribute to cumulative impacts on the black-backed woodpecker.

Action Alternatives

Ongoing and Reasonably Foreseeable Actions

Reasonably foreseeable actions include those federal, state, or private activities that are ongoing or scheduled to occur within the next five years, independent of this federal action. Appendix E, identifies those current and foreseeable actions in the analysis area that were determined to be appropriate for inclusion in the analysis of environmental effects.

Vegetation Management

The Miller-West Fisher Vegetation Management Project will include intermediate harvest of 1,206 acres, regeneration harvest of about 692 acres, precommercial thinning of 351 acres, and prescribed burning of 2,830 acres of National Forest System lands in the Silverfish PSU. The Coyote Improvement Vegetation Management Project is in the planning stages and will take place within the Crazy PSU. The project will harvest 240 acres to increase stand resiliency to mountain pine beetles. Silverbutte Bugs timber sale is in the Silverfish PSU and will be a small project like Coyote. Timber harvest and other clearing activities planned for the projects will contribute to cumulative losses of snags used by black-backed woodpecker for nesting. Activities associated with the projects are expected to retain sufficient suitable cavity habitat. Snags and down wood created in burned areas will provide both feeding and nesting habitat for the black-backed woodpecker.

Flower Creek timber sale is in the Treasure PSU and only has minimal overlap with the project with a small amount of the access road for Montanore within this PSU. Flower Creek timber sale, like the timber sales mentioned above, would contribute openings or open-canopied habitat as well. Approximately 900 acres are proposed for treatment. Due to the minimal overlap, cumulative effects would be minimal.

Normal road and trail maintenance activities have the potential to remove nesting and foraging trees if they are close to a trail or road and present a safety hazard. Similarly, firewood cutting would remove snags and would reduce nesting and foraging habitat availability along open roads. The decrease in habitat would be limited to areas within about 150 to 200 feet of open roads. This loss of snag habitat was accounted for in the analysis of available snag habitat.

Within the analysis area, continued development of private land is anticipated and, depending on the type of development, such as timber harvest, home construction or land clearing would reduce general forest habitat by varying levels. This loss of general forest habitat would have minimal effect on black-backed woodpecker populations. Proposed removal of vegetation associated with this project would result in a 6 percent reduction of general forest habitat and would not reduce areas of high quality habitat.

Similarly, other agency and public actions identified in Appendix E (description of ongoing and foreseeable actions) would have little or no effect on black-backed woodpeckers or their habitat as most activities would occur within general forest habitat.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on the black-backed woodpecker or all practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. The agencies' alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit black-backed woodpecker, including minimizing the disturbance area in the agencies' mine alternatives and implementing a Vegetation Removal and Disposition Plan and Environmental Specifications in the agencies' transmission line alternatives.

National Forest Management Act/Kootenai Forest Plan

As described in section 3.25.2.2, *Snags and Woody Debris*, all action alternatives would be consistent with desired conditions for snags and down wood. In all combined mine-transmission line alternatives, a wide range of successional habitats, and associated amounts of down wood would be available.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual black-backed woodpeckers or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All combined action alternatives may impact individual black-backed woodpeckers or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.*** This determination is based on: 1) no impact on high quality (post-fire) habitat would occur; 2) general forest habitat reduction would be 6 percent or less; 3) no black-backed woodpeckers have been observed in the Crazy or Silverfish PSU, despite several recent surveys; 4) individual nest trees or localized patches of insect infestation within the analysis area removed during project activities may disturb individuals or pairs.

3.25.4.4 Coeur D'Alene Salamander

3.25.4.4.1 Analysis Area and Methods

The analysis of potential impacts of the proposed project on individuals of the Coeur d'Alene salamander or their habitat is limited to where the Coeur d'Alene salamander could potentially occur, adjacent to Bear Creek Road (NFS road #278). Other areas of the analysis area do not provide suitable habitat for this species.

Coeur d'Alene salamander population ecology, biology, habitat description, and relationships identified by research are described in Cassirer *et al*. (1994), Maxell (2000), Maxell *et al*. (2003), and MNHP and FWP (2014), which are incorporated by reference. Coeur d'Alene salamander occurrence data come from recent District wildlife observation records and KNF historical data (NRIS Wildlife), MNHP, and other agencies, such as FWP. The impacts analysis includes an evaluation of the benefits to the Coeur d'Alene salamander from mitigation measures proposed by the agencies such as implementation of a final Road Management Plan and a Vegetation

Removal and Disposition Plan and adherence to INFS standards and guidelines and Montana water quality standards.

3.25.4.4.2 Affected Environment

The Coeur d'Alene salamander has been found below 5,000 feet in western Montana and is the only species of lungless salamander in the northern Rocky Mountain region (Cassirer *et al.* 1994). The salamander is associated with seepages, waterfalls, and small creeks near talus with fractured rock and with dense overstory canopies (Werner *et al.* 2004; MNHP and FWP 2014).

Johnson (1999) reports Coeur d'Alene salamander confirmed presence in four of the eight planning units on the KNF at 13 different sites. The salamander has been confirmed in two additional planning units since 1999 and the known sites total 36. The Coeur d'Alene salamander is lungless and respirates entirely through its skin. This necessitates moist conditions to prevent dessication and death. Known populations on the KNF are isolated by miles of dry, unsuitable habitat that cannot be crossed (Maxell 2000; Maxell *et al.* 2003).

Historical records show that Coeur d'Alene salamanders were observed prior to 1990 above and below the Bear Creek Road (NFS road #278) on the northwest side of Big Hoodoo Mountain. A single adult Coeur d'Alene salamander was recorded in 1989 adjacent to the Libby Creek Road (NFS road #231) about 1.5 miles northeast of MMC's proposed Little Cherry Creek Impoundment (Westech 2005a). No recent observations of the Coeur d'Alene salamander in the Crazy and Silverfish PSUs have been recorded (MNHP and FWP 2014). The site description for the Libby Creek record indicated it lacks the moist environment typical of Coeur d'Alene salamanders. The site could not be located during 2005 surveys (Westech 2005a). Where Coeur d'Alene salamanders were recorded adjacent the Bear Creek Road (NFS road #278), past timber harvest appears to have reduced canopy cover needed to ensure moist conditions (Westech 2005a).

3.25.4.4.3 Environmental Consequences

The transmission line alternatives, including construction of the Sedlak Park Substation and loop line, would not affect the Coeur d'Alene salamander due to the absence of nearby suitable habitat and are not included in the analysis.

Alternative 1 – No Mine

Alternative 1 would not disturb Coeur D'Alene salamanders or their habitat and would have no effect on this species.

Alternative 2 – MMC's Proposed Mine

According to Maxell (2000), the greatest threats to the Coeur d'Alene salamander are timber harvest, fire, road and trail development and maintenance, vehicle use on roads, and isolation of populations. About 10 miles of the Bear Creek Road (NFS road #278), from US 2 to the Bear Creek bridge, would be widened on its existing alignment and chip-sealed. The roadway width would be 20 to 29 feet wide and designed to handle speeds of 35 to 45 mph. The disturbed area, included ditches and cut-and-fill slopes, is expected to be up to 100 feet wide. Because the Bear Creek Road would be chip-sealed, use of mine or adit water or chemical stabilizers for dust suppression along the Bear Creek Road would be unlikely. Widening and improvement of the Bear Creek Road would affect 0.2 acres of wetlands along the road (see Table 187 in the *Wetlands and Other Waters of the U.S.* section) and may remove small areas of potential Coeur d'Alene salamander habitat. Some incidental mortality may occur due to forest clearing and increased traffic associated with Alternative 2. Although impacts on the Coeur d'Alene salamander are possible, they are not likely to occur because no Coeur d'Alene salamanders have been recently observed in the analysis area and because habitat in the analysis area does not appear to provide characteristics typically favored by this species, in particular adequate canopy cover to ensure moist conditions.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Impacts on the Coeur d'Alene salamander from Alternative 3 would be the same as Alternative 2, except that the likelihood of impacts would be less. The agencies' alternatives would include implementation of several measures that would further minimize adverse effects, if any, on the Coeur d'Alene salamander. MMC would implement a final Road Management Plan and a Vegetation Removal and Disposition Plan and comply with INFS standards and guidelines for any work in a RHCA along an access road.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts on the Coeur d'Alene salamander from Alternative 4 would be the same as Alternative 3.

Cumulative Effects

Timber harvest has occurred in the analysis area since the 1950s and, up until the early 1990s, harvest occurred within riparian habitats resulting in alterations and reduction of riparian habitat. High levels of road construction to facilitate harvest occurred through the 1980s and resulted in sedimentation into streams. Detailed descriptions of previous vegetation and road management activities are found at the beginning of Chapter 3 and Appendix E lists all past actions considered in the cumulative effects analysis. Since the adoption of the 1987 KFP and its revision in 2015, application of KFP direction has resulted in the protection of riparian habitats, less road construction and road closures, and BMP work on existing roads to reduce sedimentation.

Alternative 1 would not have cumulative impacts on the Coeur d'Alene salamander. The likelihood of mine alternatives directly or indirectly affecting the Coeur d'Alene salamander is low. No other reasonably foreseeable actions would affect any known locations of Coeur d'Alene salamander. All mine alternatives would have no cumulative impacts on this species.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. All Mine Alternatives and Transmission Line Alternatives would comply with 36 CFR 228.8 with regard to effects to the Coeur d'Alene salamander.

National Forest Management Act/Kootenai Forest Plan

Coeur d'Alene salamanders have not been documented in areas potentially affected by any of the mine or transmission line alternatives since 1990. The site above and below the Bear Creek Road (NFS road #278) where they were documented prior to 1990 does not appear to provide sufficient canopy cover or other conditions to ensure moist conditions required by Coeur d'Alene salamanders. The agencies' alternatives would include implementation of several measures that would further reduce any effects on the Coeur d'Alene salamander, specifically: 1) implementation of a final Road Management Plan and a Vegetation Removal and Disposition Plan; 2) the use of either a chemical stabilization or groundwater on mine access roads and other work areas; and 3) as described in section 3.23, Wetlands and Other Waters of the U.S., compliance with INFS standards and guidelines for any work in a RHCA along an access road. Compliance with INFS, including RHCA standards and guidelines are discussed in detail in section 3.6 Aquatic Life and Fisheries. All mine and transmission line alternatives would comply with 2015 KFP direction applicable to the Coeur d'Alene salamander.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual Coeur d'Alene salamanders or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***Although unlikely, Alternatives 2, 3, and 4 (action alternatives) may impact individual Coeur d'Alene salamanders or their habitat, and but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.*** This determination is based on: 1) Widening and improvement of the Bear Creek Road would affect 0.2 acres of wetlands along the road and may remove or degrade small areas of potential Coeur d'Alene salamander habitat, 2) Some incidental mortality could occur due to forest clearing and increased traffic associated with the mine alternatives, 3) No Coeur d'Alene salamanders have been observed in the analysis area since 1989, 4) Habitat in the analysis area does not appear to provide characteristics favored by this species, in particular moist conditions, and 5) the agencies' alternatives would include implementation of several measures that would further reduce the likelihood of any adverse effects on the Coeur d'Alene salamander, including implementation of a final Road Management Plan, a Vegetation Removal and Disposition Plan, and compliance with INFS standards and guidelines for any work in a RHCA along an access road.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

3.25.4.5 Fisher

3.25.4.5.1 Regulatory Framework

In 2011, the USFWS determined that listing the fisher as threatened or endangered was not warranted at the time (USFWS 2011a). This finding was in response to a petition to list a distinct population segment of the fisher in its U.S. Northern Rocky Mountain range, including portions of Montana, Idaho, and Wyoming. The USFWS determined that fishers in the Northern Rocky Mountains met the definition of a distinct population segment because they are geographically separated from other fisher populations, and because the loss of this population would result in a significant gap in the range of the species and the loss of a unique genetic identity found nowhere else within the range of the species. Based on the existence of fisher throughout much of its historical range in Montana and Idaho, including "an increase in number and distribution since their perceived extirpation in the 1920s," and no indications that other natural or anthropogenic factors are likely to significantly threaten the existence of this distinct population segment of fisher, the USFWS concluded that the distinct population segment "is not now, or in the foreseeable future, threatened by other natural or anthropogenic factors affecting its continued existence, or that these factors act cumulatively with other potential threats, to the extent that listing under the Act [ESA] as an endangered or threatened species is warranted at this time" (USFWS 2011a).

3.25.4.5.2 Analysis Area and Methods

Fisher population ecology, biology, habitat description and relationships are described in Jones (1991), Powell (1993), Vinkey (2003), Lofroth *et al*. (2010), USFWS (2011a), and Raley *et al*. (2012). These provided guidance in evaluating potential habitat and effects to fisher, and are incorporated by reference. That information is incorporated by reference. Fisher occurrence data come from recent District wildlife observation records and KNF historical data (NRIS Wildlife) and other agencies, such as the FWP. Potential fisher habitat was recently modeled for Region One (USDA Forest Service 2012d, Ecosystem Research Group 2012) and includes old growth forest, as well as a diversity of forest successional stages and plant communities that provide seasonal fisher habitat and riparian areas that are important for travel, resting and denning. The modeling includes both National Forest System and private and State lands. Specific fisher habitat information is not available for private or state-owned lands in the analysis area, much of which has been logged in the past 20 to 30 years. Fisher habitat on private land was included in the Region One modeling.

The analysis area for the fisher is described in section 3.25.1, *Introduction.* The analysis area for determination of population trend and contribution toward population viability is the KNF.

The impacts analysis includes an evaluation of the benefits to fisher from mitigation measures proposed by the agencies such as implementation of a final Road Management Plan, a Vegetation Removal and Disposition Plan, and adherence to INFS standards and guidelines and the agencies' Environmental Specifications (Appendix D) or MMC's Environmental Specifications (MMI 2005b).

3.25.4.5.3 Affected Environment

In the western United States, fishers prefer late-successional forests (mature or old growth forests), and low elevation, moist riparian corridors for resting, denning, and travel (Heinemeyer and Jones 1994). The fisher feeds on a variety of prey, from small to medium-sized mammals, birds, and carrion (Powell and Zelinski 1994). Fishers use an assortment of habitats for feeding, although they avoid non-forested areas (Jones and Garton 1994, and Roy 1991). Complex forest structure such as large snags, large down wood material, and high canopy cover are important components of fisher habitat.

In the western United States, fisher populations are limited to certain mountain ranges in the Pacific Northwest and Rocky Mountains. Fisher distribution in United States Northern Rocky Mountains is thought to be similar to the presumed historical range (USFWS 2011a). These isolated populations may be acutely susceptible to local extinction (Heinemeyer and Jones 1994). Fishers once occurred in the Cabinet Mountains, but were eliminated locally by overtrapping and habitat alteration (Ruggiero *et al.* 1994; Vinkey *et al.* 2006). Between 1989 and 1991, 110 fishers from the Midwest were released in the Cabinet Mountains as part of a state translocation program. Vinkey (2003) studied the distribution of fishers in the Cabinet Mountains using winter snow tracking, track plates, and live-trapping surveys conducted from 2001 to 2003. All verified records of fishers from this study were from the west Cabinet Mountains. Vinkey (2003) concluded that the introduction of fishers to the Cabinet Mountains has established a small population, but that the long-term viability of this population is uncertain. Similarly, surveys for fishers in the Northern Rockies since 2004 has only detected fishers at 222 out of 4,813 snares deployed in eight years (Schwartz *et al*. 2006, USDA Forest Service 2012d). The KNF provides suitable fisher habitat, but both current and historical information suggests that fisher have never been abundant in the Cabinet Mountains (Heinz 1996; Vinkey 2003). The current population of fishers in the Cabinet Mountains is unknown. Fishers are generally more common where human density is low and human disturbance is reduced (Ruggiero *et al.* 1994).

Johnson (1999) reported fisher presence was confirmed in five of the eight planning units on the KNF. Fisher observation and monitoring data indicates that suitable habitat is present within the analysis area, especially along forested streams. There have been no recent (since 2000) sightings of fishers within the analysis area, but historical observations have been recorded within the Crazy and Silverfish PSUs. A fisher den was found in 1989 near Horse Mountain (Roy 1991). Fishers are known to be present within the Libby Creek drainage, and are possibly present within the Poorman Creek, Ramsey Creek, and West Fisher Creek drainages (Westech 2005a).

Ruediger (1994) reported the KNF as a primary habitat area for fisher. More recently, fisher habitat was modeled for Region One and is found within the analysis area (USDA Forest Service 2012d). Forestwide, fisher habitat is abundant at 703,423 acres and exceeds the upper historic range of variation of 671,150 acres (Ecosystem Research Group 2012). Although fisher are found within landscapes that have high levels of contiguous cover and mid to late seral conditions, their home ranges include a diversity of forest successional stages and plant communities (Lofroth *et al*. 2010, Raley *et al*. 2012). Some studies have shown positive association with young successional stages such as pole-sapling and young forest (*e.g.*, Jones 1991), possibly because of prey resources associated with these environments. In particular, Jones (1991) observed fisher shifting their use of habitat seasonally, with mature and old-growth forests being used in the summer and young forest cover types used more in the winter. Riparian areas are important habitat for travel, resting, and denning. Based on habitat modeling, 19,178 acres of potential yearlong fisher habitat occur in the Crazy PSU and 13,262 acres in the Silverfish PSU, including state and private lands. The Crazy PSU is within the Kootenai planning unit, and the Silverfish PSU is within the Fisher planning unit. Following the identification process outlined in Ruediger (1994), these planning units are designated as secondary fisher conservation areas (Johnson 2004b). The Crazy and Silverfish PSUs are considered high-quality fisher habitat areas (Ibid.).

Old growth on private and State land in the analysis area consists mostly of cottonwood/ spruce riparian habitat. The majority of the private and State lands in the analysis area has high road densities and has been logged in the past 20 to 30 years (Figure 85), resulting in fragmented forest habitat. Based on recent modeling, potential fisher habitat on private and State lands is limited and of marginal quality (USDA Forest Service 2012d).

FWP currently manages the species as a furbearer with a limited harvest of 7 animals in 2014.

3.25.4.5.4 Environmental Consequences

Alternative 1 – No Mine

Alternative 1 would not disturb the fisher or its habitat and would have no effect on this species (Table 211). Over time, with continued fire suppression and lack of active forest management, indirect effects of this alternative would include a continued trend toward later successional habitats, which would favor fisher habitat. Large-scale fires could potentially occur in the analysis area. Over the next five decades, Ecosystem Research Group (2012) reported that the driving force behind habitat change on the KNF is due to natural disturbance processes, especially wildfire. Similarly, the USFWS 2011a listing decision notes that fisher populations have increased in numbers and distribution despite the effects of anthropogenic activities.

Alternative 2 – MMC's Proposed Mine

No impacts on fisher would occur as a result of Alternative 2 in the Silverfish PSU. Alternative 2 would reduce the amount of yearlong fisher habitat in the Crazy PSU by 746 acres, or 4 percent of the habitat available. Winter fisher habitat would be reduced by 1,798 acres or about 12 percent of the winter habitat available (Table 211). Most of the habitat impacts to both yearlong and winter habitat would be in the Little Cherry Creek Tailings Impoundment Site.

Table 211. Available Fisher Habitat and Potential Effects in the Analysis Area by Mine Alternative.

Measurement Criteria	[1] No Mine/Existing Conditions	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment	[4] Agency Mitigated Little Cherry Creek Impoundment
Crazy PSU				
Yearlong Habitat (acres)	19,178	18,432 (746/3.9)	18,690 (488/2.5)	18,644 (534/2.8)
Winter Habitat (acres)	14,722	12,924 (1,798/12.2)	13,686 (1,036/7.0)	13,369 (1,353/9.2)
Silverfish PSU				
Yearlong Habitat (acres)	13,262	13,262 (0/0)	13,262 (0/0)	13,262 (0/0)
Winter Habitat (acres)	12,964	12,964 (0/0)	12,964 (0/0)	12,964 (0/0)

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Source: GIS analysis by ERO Resources Corp. using KNF data.

The risk of fisher mortality would increase as a result of increased traffic and increased winter access to fisher habitat from Alternative 2. Alternative 2 would include snowplowing Bear Creek Road (NFS road #278) and Libby Creek Road (NFS road #231) during the evaluation program, and while the Bear Creek Road is reconstructed, allowing trappers easy winter access to old growth and riparian areas providing good fisher habitat. Trapping has a negligible impact on fisher populations in the KNF. The annual quota for fisher across FWP Region 1 is just two animals, mostly from the Flathead and Whitefish areas.

Annual traffic would be about three times existing levels throughout the life of the mine (Table 177). The increase in traffic in Alternative 2 would substantially increase the risk of increased fisher mortality. MMC would provide transportation to employees using buses, vans, and pickup trucks thereby limiting the use of personal vehicles. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1630), which would minimize vehicular-fisher collisions during the early morning, evening and night time-periods. MMC would report road-killed animals to the FWP as soon as road-killed animals were observed. The FWP would either remove road-killed animals or direct MMC how to dispose of them. Increased traffic noise may also displace fishers from suitable habitat. When the mill ceased operations in the Closure Phase, mine traffic volume would be substantially less than shown in Table 176. Future traffic volume when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and loss of the Little Cherry Loop

Road beneath the impoundment. Mortality risk to fisher would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (increased road width, improved sight distance, paving) and higher traffic speeds that would continue Post-Closure would result in a permanently higher fisher mortality risk compared to pre-mine conditions. All action alternatives would include snowplowing the Libby Creek Road (NFS road #231) during the Evaluation Phase and while the Bear Creek Road was reconstructed, providing trappers easier winter access to fisher habitat in old growth and riparian areas. A gate would limit motorized access to snowplowed areas.

While not highly sensitive to human activity, the fisher is a species that generally avoids humans (Powell 1993). Disturbance effects may occur due to the presence of people and machines during construction and operations, potentially displacing fishers from nearby suitable habitat. Displacement effects would probably be the greatest during the Construction Phase, but would continue at lower levels during operations. According to Heinemeyer and Jones (1994), the most sensitive time for fishers is the breeding, denning, and rearing period (February 15 to June 30).

Impacts within 200 meters of perennial streams are especially important to avoid (Ibid.). Impacts of Alternative 2 on riparian fisher habitat may be reduced through implementation of MMC's proposed Wetland Mitigation Plan. The feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC's plan is conceptual and would be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. Section 3.23, *Wetlands and Other Waters of the U.S.* discusses proposed wetland mitigation in more detail. MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section). The Ramsey Plant Site would be fenced, restricting deer access.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

The types of impacts on fisher from Alternative 3 would be the same as Alternative 2, except that less yearlong and winter fisher habitat would be affected (488 and 1,036 acres, respectively) (Table 211). Yearlong habitat would be reduced 2.5 percent and winter habitat reduced 7.0 percent from existing conditions. The agencies' mine alternatives would have fewer disturbances in RHCAs and other riparian areas, minimizing effect on the fisher. The effect of increased traffic on the Bear Creek Road would be the same as Alternative 2. MMC would remove big game animals killed by any vehicles daily from road rights-of-way within the permit area and along roadways used for access or hauling ore (NFS roads #231, #278, #4781, and #2316 and new roads built for the project) for life of mine. MMC also monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. These measures would minimize fisher mortality along the access road.

Impacts of Alternative 3 on riparian fisher habitat would be minimized through implementation of the agencies' proposed Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan. The agencies' alternatives would include implementation of several measures that would further minimize adverse effects, if any, on the fisher. MMC would implement a final Road Management Plan and a Vegetation Removal and Disposition Plan and comply with INFS standards and guidelines for any work in a RHCA along an access road. Habitat acquisitions and road closures associated with grizzly bear mitigation would also benefit fisher. Road closures would reduce trappers' winter access to fisher habitat in old growth and riparian areas.

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to the fisher. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in the *Water Quality* section, p.712.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts on fisher from Alternative 4 would be about the same as Alternative 3, except that slightly more yearlong and winter fisher habitat would be affected (534 and 1,353 acres, respectively) (Table 211). Yearlong habitat would be reduced 2.8 percent and winter habitat reduced 9.2 percent from existing conditions. The effect of mitigation on the fisher would be the same as Alternative 3.

Alternative A – No Transmission Line

Table 212 summarizes the changes in yearlong and winter habitat due to each alternative. Alternative A would not disturb the fisher or its habitat and would have no effect on this species.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would reduce the amount of yearlong and winter fisher habitat by less than 1 percent in both the Crazy PSU and Silverfish PSUs. Yearlong and winter fisher habitat would be reduced by 42 and 39 acres, respectively in the Crazy PSU; and 6 and 39 acres in the Silverfish PSU, respectively (Table 212). The risk of fisher mortality may increase as a result of increased construction traffic from any of the action alternatives, including Alternative B. Traffic increases are anticipated to be minimal during the 2-year transmission line construction and 1-year decommissioning periods. While not highly sensitive to human activity, the fisher is a species that generally avoids humans (Powell 1993). Disturbance effects could occur due to the presence of people and machines during transmission line construction, potentially displacing fishers from nearby suitable habitat. According to Heinemeyer and Jones (1994), the most sensitive time for fishers is the breeding, denning, and rearing period (February 15 to June 30). Displacement effects would be negligible during operations because activities would be limited to line maintenance. Alternative B would affect about 1 acre of coniferous forest and 4 acres of old growth providing fisher habitat on private land. Because fisher habitat on private land, including in the Sedlak Park Substation and loop line footprint, is of marginal quality, impacts on fisher would be minimal. MMC's Environmental Specifications (MMI 2005b) included limited measures that would protect riparian habitat.

Table 212. Available Fisher Habitat and Potential Effects in the Analysis Area by Transmission Line Alternative.

Measurement Criteria	[A] No Transmission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Crazy PSU					
Yearlong Habitat (acres)	19,178	19,136 (42/0.2)	19,149 (29/0.2)	19,142 (36/0.2)	19,142 (36/0.2)
Winter Habitat (acres)	14,722	14,682 (39/0.3)	14,706 (16/0.1)	14,699 (23/0.2)	14,699 (23/0.2)
Silverfish PSU					
Yearlong Habitat (acres)	13,262	13,256 (6/<0.1)	13,254 (8/<0.1)	13,220 (42/0.3)	13,200 (62/0.5)
Winter Habitat (acres)	12,964	12,925 (39/0.3)	12,929 (35/0.3)	12,904 (60/0.5)	12,922 (42/0.3)

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Source: GIS analysis by ERO Resources Corp. using KNF data.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Impacts on fisher from Alternative C-R on National Forest System land would be similar to Alternative B, except that slightly less yearlong and winter fisher habitat would be impacted. Yearlong and winter fisher habitat would be reduced by 29 and 16 acres, respectively in the Crazy PSU; and 8 and 35 acres in the Silverfish PSU, respectively (Table 212). Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect fishers.

Impacts of Alternative C-R on riparian fisher habitat would be minimized through implementation of the agencies' Vegetation Removal and Disposition Plan, and the agencies' Environmental Specifications (Appendix D). The agencies' Environmental Specifications describe mitigation activities that would benefit fisher, including locating structures outside of riparian forest, minimizing clearing of riparian forests and the use of heavy equipment in these areas, restoring degraded riparian habitats and improving passage for terrestrial wildlife along riparian corridors. One of the goals of the Vegetation Removal and Disposition Plan would be to minimize vegetation clearing. The plan would identify areas where clearing would be avoided, such as deep valleys with high line clearance, and measures that would be implemented to minimize clearing. It would evaluate the use of monopoles to reduce clearing in select areas, such as old growth. For example, the growth factor used to assess which trees would require clearing could be reduced in sensitive areas, such as RHCAs, from 15 years to 5 to 8 years. Reducing the growth factor could reduce clearing width, but increase maintenance costs. Heavy equipment use in RHCAs would be minimized. Shrubs in RHCAs and in the line of sight between the line and private land would be left in place unless they had to be removed for safety reasons.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts on fisher from Alternative D-R on National Forest System land would be similar to Alternative B. Alternative D-R would reduce the amount of yearlong and winter fisher habitat by less than 1 percent in both the Crazy PSU and Silverfish PSUs. Yearlong and winter fisher habitat would be reduced by 36 and 23 acres, respectively in the Crazy PSU; and 42 and 60 acres, respectively in the Silverfish PSU (Table 212). The acres impacted by Alternative D-R in the

Silverfish PSU would be slightly greater than Alternative B, but still less than 1 percent of the habitat available. Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect fishers. The mitigation measures described for Alternative C-R would be implemented in Alternative D-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Impacts on fisher from Alternative E-R on National Forest System land would be similar to Alternative D-R except that the relative effects to yearlong and winter fisher habitat vary slightly in the Silverfish PSU. Alternative E-R would reduce the amount of yearlong and winter fisher habitat by less than 1 percent in both the Crazy PSU and Silverfish PSUs. Yearlong and winter fisher habitat would be reduced by 36 and 23 acres, respectively in the Crazy PSU; and 60 and 42 acres, respectively in the Silverfish PSU (Table 212). Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect fishers. The mitigation measures described for Alternative C-R would be implemented in Alternative E-R.

Combined Mine-Transmission Line Effects

Alternative 2B would have the greatest impacts on fisher habitat in the Crazy PSU, impacting 783 acres (4.1 percent) of yearlong habitat and 1,826 acres (12.4 percent) of winter habitat. Alternatives 3C-R, 3D-R, and 3E-R would impact between 517 and 524 acres (2.7 percent of habitat available), and Alternatives 4C-R, 4D-R, and 4E-R would affect 563 and 571 acres (2.9 to 3.0 percent of habitat available) of yearlong fisher habitat in the Crazy PSU (Table 213). Impacts on both yearlong and winter fisher habitat in the Silverfish PSU for the other combined mine transmission line alternatives would all be less than 1 percent of the habitat available, range from 8 to 62 acres or yearlong habitat and 35 to 60 acres of winter habitat. Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect fishers. All combined action alternatives would fragment fisher habitat through the reduction of habitat and placement of human structure on the landscape. Although habitat fragmentation would increase, sufficient habitat would remain to provide connectivity to the species.

In all combined action alternatives, the risk of fisher mortality would increase as a result of increased traffic and increased access to fisher habitat. Annual traffic on the mine access road (Bear Creek Road) would be about three times existing levels throughout the life of the mine (Table 176 in the *Transportation* section), increasing the mortality risk. Increased traffic noise may also displace fishers from suitable habitat. All combined action alternatives would include snowplowing the Libby Creek Road (NFS road #231) during the Evaluation Phase and while the Bear Creek Road was reconstructed, providing trappers easier winter access to fisher habitat in old growth and riparian areas. Gates would limit motorized access. While research does not show fishers to be highly sensitive to human activity, disturbance effects could occur due to the presence of people and machines during transmission line construction, potentially displacing fishers from nearby suitable habitat. According to Heinemeyer and Jones (1994), the most sensitive time for fisher is the breeding, denning, and rearing period (February 15 to June 30). In Alternative 2B, impacts on riparian fisher habitat would be reduced through implementation of MMC's proposed wetland mitigation and Environmental Specifications (MMI 2005b). Impacts of the agencies' combined alternatives would be more effectively minimized through the agencies' Wetland Mitigation Plan and Vegetation Removal and Disposition Plan, and the Environmental Specifications (Appendix D), as described above. Impacts on fisher habitat would be somewhat reduced through MMC's and the agencies' proposed land acquisition associated with grizzly bear mitigation. Acquired parcels would be managed for grizzly bear use in perpetuity and may improve or contribute suitable fisher habitat if the acquired parcels provided appropriate habitat characteristics. Road closures would reduce trappers' winter access to fisher habitat in old growth and riparian areas.

Cumulative Effects

Past actions, including detailed descriptions of previous vegetation and road management activities, are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E. Past actions, such as timber harvest, road construction, and fire-suppression activities, have altered the old growth in the analysis area, resulting in a reduction in early and late succession habitats; conditions favoring shade-tolerant, fire-intolerant species; loss of large snags and down wood; increases in tree density, and a shift to a largely mid-seral structural stage (USDA Forest Service 2003b). Continuing development of private lands, including timber harvest, home construction, and land clearing would contribute to losses of fisher habitat in the analysis area. Impacts on fisher on private and State lands would probably be minimal because it is likely that fisher habitat in these areas is of marginal quality.

Future actions that may further reduce fisher habitat in the analysis area include the Miller-West Fisher Vegetation Management Project, the Coyote Improvement Vegetation Management Project, and the Silverbutte Bugs timber sale. Forest treatments proposed for these vegetation management projects, could contribute to cumulative losses and fragmentation of fisher habitat. The projects will not directly impact old growth that could provide potential fisher habitat. Surface impacts from other reasonably foreseeable actions in the analysis area would be minimal.

Other cumulative effects include existing road and associated traffic volume, primarily on US 2, and existing roads and human disturbance in the analysis area. If timber harvest activities occurred concurrently with mine or transmission line construction and operations, higher traffic volume and associated increased fisher mortality risk may occur. No other past, current, or reasonably foreseeable actions are anticipated to contribute to cumulative impacts on fishers.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on the fisher or all practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. These alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit fisher. These measures would include substantially reducing disturbance in yearlong and winter habitat in the mine area, reducing effects on old growth, locating structures outside of riparian forest, minimizing clearing of riparian forests and the use of heavy equipment in these areas, restoring degraded riparian habitats and improving passage for terrestrial wildlife along riparian corridors.

Table 213. Available Fisher Habitat and Potential Effects in the Analysis Area by Combined Mine-Transmission Line Alternative.

Measurement Criteria	[1] No Mine Existing Condition	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Crazy PSU								
Yearlong Habitat (acres)	19,178	18,395 (783/4.1)	18,661 (517/2.7)	18,654 (524/2.7)	18,654 (524/2.7)	18,615 (563/2.9)	18,607 (571/3.0)	18,607 (571/3.0)
Winter Habitat (acres)	14,722	12,896 (1,826/12.4)	13,674 (1,048/7.1)	13,666 (1,056/7.2)	13,666 (1,056/7.2)	13,357 (1,365/9.3)	13,350 (1,372/9.3)	13,350 (1,372/9.3)
Silverfish PSU								
Yearlong Habitat (acres)	13,262	13,256 (6/<0.1)	13,254 (8/0.1)	13,220 (42/0.3)	13,200 (62/0.5)	13,254 (8/0.1)	13,220 (42/0.3)	13,200 (62/0.5)
Winter habitat (acres)	12,964	12,925 (39/0.3)	12,929 (35/0.3)	12,904 (60/0.5)	12,922 (42/0.3)	12,929 (35/0.3)	12,904 (60/0.5)	12,922 (42/0.3)

Number in parentheses is the reduction in habitat acres/percentage compared to existing conditions.
Source: GIS analysis by ERO Resources Corp. using KNF data.

National Forest Management Act/Kootenai Forest Plan

Fisher habitat occurs within the analysis area. In Mine Alternative 2 and Transmission Line Alternative B, MMC did not propose to implement practicable measures to minimize effects on the fisher. The agencies' alternatives would include measures to minimize effect on the riparian and old growth forest that provide habitat for fisher. Section 3.22.2, *Old Growth Ecosystems* and section 3.6, *Aquatic Life and Fisheries* describe forest plan consistency with 2015 KFP direction regarding old growth and riparian habitat components, respectively, that benefit fisher.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual fisher or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All combined action alternatives may impact individual fishers or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.*** This determination is based on: 1) the mine alternatives would have no impact on fishers in the Silverfish PSU; 2) all combined action alternatives would result in the direct loss of fisher habitat, but these impacts represent less than 1 percent of potential fisher habitat; 3) all action alternatives could result in an increase in the risk of fisher mortality due to increased traffic and winter access to fisher habitat; and 4) all action alternatives would result in increased habitat fragmentation and disruption of movement in riparian corridors, and potential displacement from suitable habitat due to human disturbance. While some individuals could be affected, impacts would not be severe enough to limit fisher viability on the KNF. Given the availability of habitat, these impacts would not affect fisher populations in either the Crazy or Silverfish PSU.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53. Trapping is managed by FWP. Proposed actions would not prevent the state from continuing to manage this species as a harvestable population.

3.25.4.6 Flammulated Owl

3.25.4.6.1 Regulatory Framework

General 2015 KFP direction considered in the analysis of sensitive species is described in section 3.25.4.1, *Regulatory Framework,* p. 1133. In addition, the 2015 KFP direction considered in the analysis of the flammulated owl is:

> **FW-GDL-WL-16. Raptors.** Management activities on NFS lands should avoid/minimize disturbance at known active raptor nests, including owls. Timing restrictions and distance buffers should be based on the best available information, as well as site-specific factors (e.g., topography, available habitat, etc.). Birds that establish nests near pre-existing human activities are assumed to be tolerant of that level of activity.

3.25.4.6.2 Analysis Area and Methods

Flammulated owl occurrence data come from recent District wildlife observation records and KNF historical data (NRIS Wildlife). Potential flammulated owl habitat was mapped using

TSMRS/FACTS vegetation data and photo-interpreted timber strata on private lands. Dry habitat types containing mature stands of ponderosa pine and/or Douglas-fir with relatively open canopies were identified.

The amount of habitat available in PSUs where activities are proposed was mapped and evaluated for potential effects to habitat due to facility siting, clearing associated with transmission line siting and installation and activities associated with road construction and widening. Effects of the alternatives were evaluated based on changes in habitat and potential disturbance during the breeding season.

The analysis area for project impacts and cumulative effects to individuals and their habitat consists of the Crazy, Silverfish, McElk, and Riverview PSUs. The analysis area includes private and State lands crossed by the various transmission line alternatives. The analysis area includes the PSUs impacted by proposed activities. While the bulk of activities occur within the Crazy and Silverfish PSUs, there are also project activities within McElk, Riverview, Treasure, and Rock PSUs. The analysis area boundary for direct effects is the proposed activity areas, as activities and alteration of the habitat would affect suitability for different species. The acres directly impacted by activities are put into the context of the PSU scale to provide a consistently sized analysis unit and better gauge the relative impacts of the activities. The boundaries for indirect and cumulative effects are the planning subunits that contain the analysis area as alteration of habitat could affect the availability and use of habitats. Analysis at the PSU scale allows the effects of the proposed activities to be put into context and their relative impacts gauged. The impacts to the Rock PSU are limited to a less than 1 acre of patch of steep, rocky ground, the impacts are nearly undetectable at the PSU scale, and therefore this PSU is not carried forward in detailed analysis.

3.25.4.6.3 Affected Environment

Flammulated owls are cavity-dependent owls that inhabit mostly mature to old ponderosa pine and ponderosa pine/Douglas-fir stands with low to medium stem densities. They are migratory and are found on the KNF from May to mid-October. These small owls are strongly dependent on large-diameter trees (generally 18 inches DBH or more), especially for nesting habitat, and prefer open stands with understory grass species for hunting moths and other insects. Pockets of dense understory conifer thickets are important for roosting, thermal and escape cover. Detailed flammulated owl population ecology, biology, habitat description, and relationships identified by research are summarized in Hayward and Verner (1994). More recent research on nesting, food habits, home range and territories, and habitat quality conducted in Colorado, Idaho, and Montana is discussed in Linkhart (2001), Linkhart and Reynolds (1997), Linkhart *et al.* (1998), Groves *et al.* (1997), Powers *et al.* (1996), Wright (1996) and Wright *et al.* (1997). These provided guidance in evaluating potential habitat and potential effects to flammulated owls, and are incorporated by reference. In general, flammulated owls typically favor dry, relatively open forest at low to moderate elevation, generally dominated by ponderosa pine and Douglas-fir. They are obligate cavity nesters, generally using holes excavated by pileated woodpeckers or common flickers. Territory size during the nesting season averages about 40 acres (Hayward and Verner 1994). They feed primarily on moths and, in some areas, grasshoppers and cricket). They are neotropical migrants, breeding in North America as far north as southern British Columbia, Canada and at least as far south as Mexico and winter as far south as Guatemala (Hayward and Verner 1994).

The KNF provides about 40,000 acres of potential flammulated owl habitat (Ecosystem Research Group 2012) and potential flammulated owl habitat occurs across all eight planning units (Johnson 1999). Field surveys have confirmed flammulated owl presence in five of eight planning units (Johnson 1999). The owl population size on the KNF is unknown (Ibid.). Flammulated owl surveys using taped owl calls to draw a response from nesting birds have been conducted intermittently within the Crazy and Silverfish PSUs over the last decade. The probability of detecting a male Flammulated Owl varies considerably depending on the nesting phase: from 100 percent detection probability during pair bonding and incubation, to 80 – 35 percent detection probability during brooding, to less than 15 percent detection probability during the post-fledgling period (Barnes and Belthoff 2008). Weather may also influence the timing of the breeding season (Fylling *et al.* According to District flammulated owl observation and monitoring data, the species has been observed on numerous occasions in the past 13 years in the North Fork Miller Creek and the Miller Creek drainages. No observations of flammulated owls have been recorded within the Crazy PSU. No flammulated owls were found during surveys conducted in 2005 (Westech 2005a) in the Crazy and Silverfish PSUs. As part of the Northern Region Landbird Monitoring program, forestwide flammulated owl surveys were conducted in 2005 (Cilimburg 2006) and 2007 (Smucker and Cilimburg 2008) on the KNF. These surveys included the Teeters Peak area (NFS road #231) and Miller Creek (NFS roads #4725 and #4724,) with the species being detected along the North and South Fork Miller Creek roads (#4725 and #4724).

Mapped habitat from the KNF TSMRS/FACTS and timber strata/habitat type data indicate about 265 acres of potential flammulated owl habitat occur in the Crazy PSU, 581 acres in the Silverfish PSU, 2,490 acres in the Riverview PSU, 70 acres in the Treasure PSU and 3,368 acres in the McElk PSU. Of the 6,774 acres in the affected PSUs, 2,478 acres of potential habitat occur on National Forest System lands. Recent habitat analysis of forestwide habitat (Ecosystem Research Group 2012) predicts an increase in actual and potential flammulated owl habitat over the next 5 decades.

The majority of the private lands in the analysis area has high road densities and the lands have been logged in the past 20 to 30 years, resulting in loss of snags and fragmented forest habitat. Coniferous forest on private lands is primarily dominated by dry ponderosa pine/Douglas-fir communities.

3.25.4.6.4 Environmental Consequences

Impacts on flammulated owls from mine and transmission line alternatives are shown in Table 214, and are described in the following subsections. Impacts from the mine alternatives would not affect flammulated owl habitat in any of the potentially affected PSUs.

Alternative 1 – No Mine

Impacts on potential flammulated owl habitat caused by the mine alternatives would not directly affect flammulated owl habitat. Alternative 1 would not impact flammulated owls or their habitat.

Alternative 2 – MMC's Proposed Mine

There is no identified flammulated owl habitat associated with any facilities (adit, tailings impoundment, or associated roads) proposed in Alternative 2. Alternative 2 would not directly affect flammulated owl habitat.

Alternative 2 would include tree clearing within disturbance boundaries. There is no identified potential flammulated owl habitat within the footprint of facilities including the adit or tailings impoundments. There would be no direct effects to the species due to clearing at these sites. Noise and other human-caused disturbances, such as blasting, construction of the plant and adit sites, road construction and use, and plant and adit operations could result in disturbance to nearby habitat, at least temporarily. Ambient illumination may disrupt orientation in nocturnal animals and competitive and predator-prey interactions (Longcore and Rich 2004). Lighting from permanent facilities could disrupt normal nocturnal activities of any nearby flammulated owls. One block of potential habitat is 0.25 mile north of the Little Cherry Creek Tailings Impoundment Site. Flammulated owls appear to be relatively tolerant of disturbance during the nesting season (Linkhart *et al.* 1998), and it is likely that low intensity activities of tailings-related operations would not unduly affect suitability of that habitat block. Disturbance impacts would likely be greatest during the Construction Phase, but could persist at lower intensities through mine operations.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Alternative 3 would not directly affect any flammulated owl habitat and is identical to Alternatives 2 and 4 in this regard. The tailings impoundment would be located 1 mile from the nearest potential habitat and would be unlikely to have any direct effects on that habitat. Disturbance impacts on flammulated owls would be the same for Alternative 3 as Alternative 2, except that MMC would use fixture baffles and directional light sources to minimize ambient light emanating from the mine facilities during operations. Some ambient light would remain, however, and behavior of any nearby flammulated owls could be disrupted. One block of potential habitat is located 1 mile north of Little Cherry Creek. Based on the distance to identified potential habitat and the owl's apparent ability to tolerate moderate levels of disturbance during the nesting season (Linkhart *et al.* 1998), this alternative would have only minor impacts to flammulated owls.

Table 214. Effects on Flammulated Owl Habitat in the Analysis Area by Transmission Line Alternative.

Measurement Criteria	[A] No Transmission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Crazy PSU					
Flammulated Owl Habitat (acres/%)	265	265	265	265	265
McElk PSU					
Flammulated Owl Habitat (acres/%)	3,368	3,360 (8/<1%)	3,360 (8/<1%)	3,360 (8/<1%)	3,360 (8/<1%)
Riverview PSU					
Flammulated Owl Habitat (acres/%)	2,490	2,485 (5/<1%)	2,490 (0/0%)	2,490 (0/0%)	2,490 (0/0%)
Silverfish PSU					
Flammulated Owl Habitat (acres/%)	581	580 (1/<1%)	581 (0/0%)	581 (0/0%)	579 (2/<1%)
All Affected PSUs					
Flammulated Owl Habitat (acres/%)	6,704	6,690 (14/<1%)	6,696 (8/<1%)	6,696 (8/<1%)	6,694 (10/<1%)

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Source: GIS analysis by KNF using KNF data.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

There would be no direct effects to flammulated owl habitat due to implementation of Alternative 4, as there is no identified habitat within established limits of the adit, tailings impoundment, or road clearing widths associated with this alternative. Potential effects would be similar to those discussed for Alternative 2, with the addition of fixture baffles and directional light sources to minimize ambient light emanating from the mine facilities during operations and have, at most, minimal effects to flammulated owls in terms of potential disturbance.

Alternative A – No Transmission Line

Impacts on potential flammulated owl habitat caused by the transmission line alternatives are shown in Table 214. Alternative A would not impact flammulated owl habitat.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would reduce the amount of flammulated owl habitat in the McElk, Riverview, and Silverfish PSUs by 14 acres of. These impacts would represent less than 1 percent of the flammulated owl habitat in each PSU (Table 214).

Alternative B would include tree clearing within disturbance boundaries. Removal of large ponderosa pine or Douglas-fir trees and snags that provide potential nesting, feeding, singing, or roost sites could impact flammulated owls (Wright 1996). Given the existing snag levels (see section 3.25.2.2, *Snags and Woody Debris*), the loss of snags providing potential flammulated owl nesting habitat would have minor impacts on this owl. The reduction by 14 acres of potential flammulated owl habitat would be a negligible decrease, with 6,690 acres of habitat remaining in the affected PSUs (Table 214). Once reclaimed and once successional processes were allowed to take place, areas of disturbed flammulated owl habitat could potentially be restored to suitable habitat for this species in the long term.

Alternative B would affect about 8 acres of coniferous forest providing potential flammulated owl habitat on State or private land. The area potentially impacted by alignment of the transmission line would affect portions of two blocks, 325 acres and 91 acres in size. The majority of this area has been previously harvested but would still provide suitable owl habitat with an additional linear opening within its perimeter. Due to the relatively large amount of contiguous habitat still available and the already open nature of these blocks, impacts of Alternative B would be minimal. Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect flammulated owls.

Noise from helicopters during line stringing and from other construction-related activities could disturb nearby habitat temporarily. Owls are more active at night when helicopters would not be operating, and it is doubtful that short-term operations would cause territory abandonment. Disturbance impacts would be short-term and, with the exception of line maintenance activities, would cease after transmission line construction until decommissioning.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would reduce the amount of flammulated owl habitat in the McElk PSU by 8 acres. These impacts would represent less than 1 percent of the flammulated owl habitat in the PSU. The clearing associated with transmission line installation is almost identical to that described for all action alternatives, and effects would be similar (Table 214). The effect on State and private land would be the same in all alternatives. Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect flammulated owls.

Alternative D-R – Miller Creek Transmission Line Alternative

Alternative D-R would have the same effects as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Alternative E-R impacts on flammulated owl would be the same as Alternatives C-R and D-R in the McElk PSU. There would be an additional 2 acres impacted in the Silverfish PSU. The habitat block affected in the Silverfish PSU is 39 acres. A small sliver of the block (one acre) would be isolated from the larger block, reducing the effective size of the block to 36 acres, roughly the average breeding home range of flammulated owls. This may slightly reduce the suitability of this habitat block, though a range of home range sizes has been observed (Linkhart *et al.* 1998). Due to lack of suitable habitat, construction of the Sedlak Park Substation and loop line would not affect flammulated owls.

Combined Mine-Transmission Line Effects

The effects of the combined mine-transmission line alternatives would be the same as the transmission line alternatives because the mine alternatives would have no effect on flammulated owl habitat.

Cumulative Effects

The Affected Environment section describes the suitable habitat within the analysis area, specifically the warm/dry ponderosa pine and Douglas-fir habitat types within the analysis area. This cumulative effects section summarizes the past actions as well as further describes ongoing and other reasonably foreseeable contributions potentially impacting flammulated owl habitat. As described under the section “Analysis Area and Methods”, the analysis area for cumulative effects to individuals and their habitat consists of the Crazy, Silverfish, McElk, and Riverview PSUs and includes private and State lands crossed by the various transmission line alternatives.

Past Actions

Past actions, including detailed descriptions of previous vegetation and road management activities, are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E.

The measure of habitat suitability is alterations to the mapped suitable habitat described in the Affected Environment section of this analysis. Past actions, particularly timber harvest, road construction, and fire-suppression activities, have altered the old growth ecosystems in the analysis area, resulting in a reduction in early and late succession habitats; conditions favoring shade-tolerant, fire-intolerant species; loss of large snags and down wood; increases in tree density; and a shift to a largely mid-seral structural stage (USDA Forest Service 2003b). Timber harvest has occurred in the analysis area since the 1950s and, up until the early 1990s, included regeneration harvest, high grading of large old trees, and loss of snags that resulted in alterations and reduction of flammulated owl habitat. Fire suppression since the early 1900s has generally resulted in stand conversion from open ponderosa pine/Douglas-fir to more shade intolerant species, smaller tree growth and higher stem density, higher canopy cover, and a reduction in productive understory.

Firewood cutting would continue to occur where open roads provide access to old growth, contributing to the removal of snags important to flammulated owls. Continuing development of private lands, including timber harvest, home construction, and land clearing would contribute to losses of flammulated owl habitat in the analysis area. Impacts on flammulated owl on private and State lands would probably be minimal because it is highly fragmented due to high road densities and past timber harvest activities.

No Action Alternative

Alternative 1A would not contribute to cumulative losses of snags and would not contribute to cumulative effects on flammulated owl

Action Alternatives

Ongoing federal actions have been considered and included when formulating the existing condition of this analysis area. Ongoing public firewood gathering has the potential to remove individual snags and other potential nest trees but is not likely to substantively change the character of suitable habitat. Other ongoing activities such as weed spraying, road maintenance, general recreation, and most small mining activities would have negligible impacts to flammulated owl habitat.

The Miller-West Fisher Vegetation Management Project would include intermediate harvest of 1,206 acres, regeneration harvest of about 692 acres, precommercial thinning of 351 acres, and prescribed burning of 2,830 acres of National Forest System lands in the Silverfish PSU. The Coyote Improvement Vegetation Management Project is in the planning stages and would take place within the Crazy PSU. The project would harvest 240 acres to increase stand resiliency to mountain pine beetles. Silverbutte Bugs timber sale is in the Silverfish PSU and would be a small project like Coyote. Timber harvest and other clearing activities planned for the projects will contribute to cumulative losses of snags important to flammulated owls. Activities associated with the projects are expected to retain cavity habitat within KFP desired conditions for the Silverfish and Crazy PSUs. Also, while treatments associated with the projects will consume some snags and down wood, they also will create snags and down wood by killing live trees. Snags and down wood created in burned areas would provide both feeding and nesting habitat for the flammulated owl.

While the combined action alternatives, in combination with other past, current, and reasonably foreseeable actions, would result in some losses and degradation of flammulated owl habitat in the analysis area, cumulative impacts on overall areas of flammulated owl habitat would likely be minimal and would not likely affect populations in the analysis area. Sufficient habitat would remain within the affected PSUs to support existing populations, and habitat would continue to increase as the recent habitat analysis of forestwide habitat (Ecosystem Research Group 2012), shows an increase in actual and potential flammulated owl habitat over the next 5 decades.

Cumulative noise and other human-caused disturbances could occur as a result of the combined action alternatives and other reasonably foreseeable actions. Cumulative disturbance effects could affect individual flammulated owls, but would not likely affect flammulated owl populations in the KNF.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. All mine alternatives

would comply with 36 CFR 228.8. Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on the flammulated owl or all practicable measures to maintain and protect wildlife habitat. The agencies' transmission line alternatives would comply with 36 CFR 228.8. The agencies' alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit the flammulated owl, including minimizing clearing in flammulated habitat and implementing a Vegetation Removal and Disposition Plan and Environmental Specifications in the agencies' transmission line alternatives.

National Forest Management Act/Kootenai Forest Plan

As described in section 3.25.2.2, *Snags and Woody Debris*, all action alternatives would be consistent with KFP desired conditions for snags and down wood. In all combined mine-transmission line alternatives, a wide range of successional habitats, and associated amounts of down wood would be available. All alternatives would be designed in accordance with guideline FW-GDL-WL-16 to avoid/minimize disturbance at known active raptor nests, including owls.

Forest Service Management Sensitive Species Statement of Findings

The no action alternatives would not impact individual flammulated owls or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All combined action alternatives may impact individual flammulated owls or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for flammulated owls.*** This determination is based on: 1) the mine alternatives would have no impact on flammulated owls in the Crazy, McElk, Riverview, or Silverfish PSUs; 2) all transmission line would result in the direct loss of small areas of flammulated owl habitat (8 to 14 acres), but sufficient habitat would remain in the analysis area (6,700 acres) to support a large number of nesting pairs; 3) no active flammulated owl nests were identified in the analysis area during surveys conducted in 2005 (Westech 2005b) implementation of timing restrictions included in the agencies' combined action alternatives would minimize potential impacts on nesting flammulated owls; 6) mitigation measures for the action alternatives and other actions, such as habitat acquisitions and road access changes, could offset some of the impacts on flammulated owl habitat; and 7) sufficient habitat within affected PSUs and across the KNF would remain to support existing populations, and habitat would continue to increase as the recent habitat analysis of forestwide habitat (Ecosystem Research Group 2012), shows an increase in actual and potential flammulated owl habitat over the next 5 decades.

3.25.4.7 Gray Wolf

3.25.4.7.1 Regulatory Framework

In 2011, the USFWS reissued the wolf delisting rule first published in 2009 that delisted biologically recovered gray wolf populations in the Northern Rocky Mountains, including all wolves in Montana (USFWS 2011b). The final rule authorized the State of Montana (FWP) to manage wolves under the state's approved Gray Wolf Conservation and Management Plan. Following delisting, the gray wolf was subsequently added to the Forest Service sensitive species list for a period of 5 years, after which a status review will be made to determine the need to remain on or be removed from that list. The FWP currently manages active harvest of wolves in northwest Montana including within the analysis area.

General 2015 KFP direction considered in the analysis of sensitive species is described in section 3.25.4.1, *Regulatory Framework*, p. 1133. In addition, the 2015 KFP direction considered in the analysis of the gray wolf is:

> **FW-DC-WL-08**. Habitat for native ungulates is available and well-distributed across the landscape to provide prey for carnivores.
>
> **FW-DC-WL-18.** Secure denning and rendezvous sites are available for wolf packs and avoided by management activities during critical biological periods (e.g., whelping, rearing).
>
> **FW-GDL-WL-18. Wolf.** Management activities would avoid or minimize disturbance to wolves near den and rendezvous sites during the times those sites are in use based on the best available information.

3.25.4.7.2 Analysis Area and Methods

The Northern Rocky Mountain Wolf Recovery Plan and the Montana Gray Wolf Conservation and Management Plan provide descriptions of wolf ecology, biology, and habitat (USFWS 1987; FWP 2002). The KNF is within the Northwest Montana Recovery Area, one of three wolf recovery areas identified for the Northern Rocky Mountain wolf population (USFWS *et al*. 2004). Information for this recovery area is provided in Bradley *et al*. (2013) and is incorporated herein by reference. The Montana Gray Wolf Conservation and Management Plan identifies the Northwest Montana Recovery Area as Wolf Management Unit 1 (WMU 1). Wolf occurrence data come from recent District wildlife observation records, forest historical data (NRIS Wildlife), other agencies (USFWS, FWP), and Wolf and Wildlife Studies, a private organization.

The analysis area for the gray wolf is described in section 3.25.1, *Introduction.* The analysis area for determination of population trend and contribution toward population viability is the KNF.

The Montana Gray Wolf Conservation and Management Plan Final EIS (FWP 2003) specifies strategies to protect and manage wolf populations in Montana and is based on an adaptive management strategy with more management flexibility granted as the number of breeding pairs in Montana increases above the 15 pair benchmark. Potential management activities cover a range of concerns that include maintaining viable populations of wolves and their prey, resolving wolf-livestock conflicts, and assuring human safety.

Measurement indicators for evaluating effects of the alternatives on the gray wolf are based on the following key habitat components described in the Wolf Recovery Plan (USFWS 1987): year-round prey base, suitable denning and rendezvous sites, and sufficient space with minimal exposure to humans. The rationale for basing the impacts evaluation on these components and the indicators of effects are described in the following paragraphs.

Sufficient Year-Round Prey Base

The condition of the prey base for the gray wolf is evaluated based on KFP direction for big game (see deer/elk, mountain goat, and moose analyses). Because the mine alternatives would not affect big game habitat in the Silverfish PSU, the effects of the mine alternatives on prey were evaluated for the Crazy PSU only.

Suitable Denning and Rendezvous Sites

Gray wolf den sites are generally greater than 1 mile from open roads and 1 to 2 miles from campsites (USFWS 1987). These sites are normally on southerly aspects, on moderate slopes, within 400 yards of surface water, and at an elevation overlooking surrounding low-lying areas. Sensitivity to disturbance at den sites and subsequent abandonment varies greatly among individual wolves (Thiel *et al.* 1998; Claar *et al.* 1999). Rendezvous sites (resting and gathering areas) are usually complexes of meadows and adjacent timber, with surface water nearby (USFWS 1987). They tend to be situated away from human activity and on drier sites that are slightly elevated above riparian areas (Ibid.). FWP encourages land management agencies to consider the locations of wolf den and rendezvous sites in their planning activities to maintain the habitat integrity of these sites (FWP 2002). Den and rendezvous sites can also be protected by enacting timing restrictions on proposed activities within the den/rendezvous site areas. These restrictions would limit operating periods to the fall or winter seasons when these sites are unoccupied.

Sufficient Space with Minimal Exposure to Humans

Providing sufficient space with minimal exposure to humans can reduce the risk of human-caused mortality to wolves. Human disturbance and accessibility of wolf habitats (*i.e.*, road densities) are the principal factors limiting wolf recovery in most areas (Leirfallom 1970; USFWS 1978, 1987 all in Frederick 1991; Thiel 1978). These components can be generally measured by assessing effects on elk security habitat and core grizzly bear habitat.

Because the mine alternatives would not affect big game habitat in the Silverfish PSU, the effects of the mine alternatives on space with minimal exposure to humans were evaluated for the Crazy PSU only.

Alternative Mitigation Measures

MMC’s proposed Alternatives 2 and B include an access change in NFS road #4724 from April 1 to June 30 and a yearlong access change in a segment of NFS road #4784 to mitigate for impacts on grizzly bears. NFS road #4784 is proposed for an access change by the Rock Creek Project. The access change on NFS road #4784 would be implemented for all action alternatives only if it was not already implemented as part of the Rock Creek Project mitigation. The agencies’ alternatives would include additional yearlong access changes through the installation of barriers or gates in several roads (see Table 28 and Table 29 in Chapter 2 and Figure 35). Additional road access changes may also occur on land acquired as part of the grizzly bear mitigation proposed by MMC or the agencies (see mitigation plan descriptions in sections 2.4, *Alternative 2—MMC’s Proposed Mine*, and section 2.5, *Alternative 3—Agency Mitigated Poorman Impoundment Alternative*). These road access changes would reduce potential exposure of wolves to humans.

Other mitigation measures incorporated into MMC’s or the agencies’ alternatives that could benefit the gray wolf include prohibiting employees from carrying firearms, busing employees to the work site, removing road-killed big game animals, and monitoring road-killed animals along mine access roads to determine if improved access resulted in increased wildlife mortality. The agencies’ alternatives including funding of FWP personnel to implement adverse conditioning techniques before wolves concentrate their activity around any den sites or rendezvous sites located in or near the project facilities.

3.25.4.7.3 Affected Environment

Distribution

The Montana wolf population decreased about 4 percent from 2011 to 2012. At the end of 2012, there were at least 147 wolf packs in Montana, with at least 37 meeting breeding pair criteria. These packs contained a minimum estimate of 625 wolves. At least 400 wolves, consisting of 100 packs and 25 breeding pairs, inhabited the Montana portion of the NWMT Recovery area, which includes the KNF (Bradley *et al.* 2013).

Following the delisting of wolves in Montana in 2011, the FWP partitioned the state into 14 individual wolf management units. In 2012, 175 wolves were harvested across Montana, including 26 from resident packs within the KNF. FWP continued a statewide general hunting season in 2014. A majority of the packs in NWMT have little to no livestock present within home ranges. Depredation of livestock was documented for two KNF area packs and 10 wolves were lethally removed (Bradley *et al.* 2013).

The KNF is home to 26 resident packs (6 with breeding pairs) with the home ranges of several packs located along the border between the United States and Canada, the state line between Montana and Idaho, and adjacent National Forest System lands in Montana. These packs had a minimum total of 83 wolves at the end of 2012 (Bradley *et al*. 2013). An estimate of 89 wolves was recorded in 2011 (Hanauska-Brown *et al*. 2012). Considering pack movement, unknown pack numbers, and increased human related mortality (1 dispersed, 5 human-caused, 26 harvested by hunters, and 11 management removal) the numbers between years are similar and appear to have increased slightly (Bradley *et al*. 2013).

Two known breeding wolf packs (Cabinet and Satire packs) have been identified within the Crazy PSU and could potentially be affected by the Montanore Project (USFWS *et al.* 2013). Tracks and other signs of Cabinet pack wolves have been consistently observed in the Libby, Midas, Poorman, Ramsey, Bear, and Big Cherry creek drainages since 2004 (Laudon, pers. comm. 2010, 2014). Wolf sign has also been observed in the West Fisher Creek, Miller Creek, and Swamp Creek drainages, west of Howard Lake, and north of Horse Mountain. In 2012, the Satire pack was estimated to consist of a minimum of 2 individuals each. In 2012, 5 wolves were harvested from the Satire pack (Bradley *et al*. 2013). In 2013, the Cabinet Pack was estimated to consist of 5 adults and 5 pups; nine of these wolves were likely harvested in 2013. At least one adult, and likely several others, continue to use the Cabinet Pack territory, but it is unknown how many are Cabinet Pack members or their relatives. Sustained wolf mortality since the beginning of sport hunting in Montana in 2012 has changed wolf behavior and population dynamics, making it difficult to determine the status, composition, and habitat use of previously identified wolf packs (Laudon, pers. comm. 2014).

The Cabinet pack’s territory includes areas proposed for mine facility construction and operations. The Satire pack’s territory includes the eastern portion of the transmission line alternatives. Other than the Cabinet and Satire packs, active wolf packs closest to the analysis area include the McGinnis pack to the southeast, the McKay pack to the southwest, and the Lost Girl pack to the west (USFWS *et al.* 2013).

Prey Base

The Crazy and Silverfish PSUs support year-round habitat for most big game species, including elk, moose, and white-tailed deer that provide a prey base for wolves. The Crazy and Silverfish

PSUs are currently outside the desired conditions for big game species with high cover and limited forage availability. Fire suppression and past timber management have resulted in limited foraging habitat for big game in the two PSUs. Most forage habitat occurs in lower elevations of drainages, or in isolated patches of past disturbance. Although forest composition, structure, and pattern are outside the range of historic range of variability (USDA Forest Service 2013c), elk and deer populations on the KNF are increasing, probably because of increased road restrictions and decommissioning which improved elk security on the KNF (USDA Forest Service 2008c).

Den and Rendezvous Sites

Wolf den and rendezvous sites are monitored annually. Based on wolf activity documented during summer 2010, a possible pup rearing/rendezvous site was identified in the area between Little Cherry Creek and Poorman Creek. One probable rendezvous site was also identified in the same general area and others are likely to occur in the vicinity of the Montanore Project. No activity has been documented at these two rendezvous sites since 2011. Several other rendezvous sites potentially occur in the Crazy and Silverfish PSUs, but the status of these sites is unknown (Laudon, pers. comm. 2014).

No other known established den sites or rendezvous sites are within either the Silverfish or Crazy PSU. At least one known den site and three documented rendezvous sites are located near McGinnis Meadows, about 6 miles south of US 2 as it turns eastward toward Kalispell.

Sufficient Space with Minimal Exposure to Humans

Areas that experience little to no human use reduce the potential risk for disturbance and mortality often associated with roads that facilitate human access into wolf habitat. Elk security and grizzly bear core habitat, which are areas of reduced human use, provide secure areas for wolves. Elk security and grizzly bear core habitat are found between drainages throughout the Crazy and Silverfish PSUs (Figure 89 for elk security and Figure 92 for core habitat).

In addition, the western half of the Crazy and Silverfish PSUs is dominated by the CMW and Inventoried Roadless Area (IRAs), which provide habitat for wolves and their prey base where exposure to humans is minimal. Based on observations of wolves or their sign, adequate space for wolves is provided in the Crazy PSU, where the Cabinet pack has been observed along drainages where roads are more concentrated than in the upper elevations. Areas to the west and south of the analysis area with lower overall road densities and exposure to humans are known to be currently occupied by wolf packs.

Private and State Land

Private and State land in the analysis area provides habitat for wolf prey species such as elk, moose, and deer, but this land has more roads that could provide human access to potential wolf habitat than National Forest System lands. Most private lands in the analysis area occur east of US 2 and are not frequently used by the Cabinet pack. Private and State land in the eastern segments of the alternative transmission line alignments would occur within the Satire pack's home range (USFWS *et al.* 2013).

3.25.4.7.4 Environmental Consequences

Alternative 1 – No Mine

Alternative 1 would not affect the gray wolf and would not change existing conditions for prey base, denning and rendezvous sites, or space with minimal exposure to humans.

Alternative 2 – MMC's Proposed Mine

Prey Base

In Alternative 2, current populations of white-tailed deer, elk, and moose, would likely be maintained and continue to provide a good year-round prey base for wolves. Overall, road densities would likely improve through MMC's proposed land acquisition for grizzly bear mitigation. Acquired parcels would be managed for grizzly bear use in perpetuity, and could decrease road densities where roads could be gated or barriered, thereby benefitting big game. Alternative 2 effects on habitat conditions for big game species are described in section 3.25.3, *Elk Security, Big Game Winter Range (Elk and Deer), Mountain Goat, and Pileated Woodpecker* and section 3.25.7, *Other Species of Interest*.

Den and Rendezvous Sites

It is unknown if the pup rearing/rendezvous sites documented during the summer of 2010 are still active (Laudon, pers. comm. 2014). If any den was within the impoundment disturbance footprint, and if construction began after the den was being used, the den could be destroyed. Alternative 2 would likely deter wolves from denning or congregating nearby. Based on general habitat availability; location of roads, campsites, private residences, and other areas of human activity (Figure 87 and Figure 79); and the presence of features typical of den or rendezvous sites, such as streams and other areas of open water (Figure 52) it appears that other potentially suitable, secluded denning or rendezvous sites are available in the analysis area.

Sufficient Space with Minimal Exposure to Humans

As described in section 3.25.3, *Elk Security, Big Game Winter Range (Elk and Deer), Mountain Goat, and Pileated Woodpecker*, Alternative 2 would increase elk security and decrease core grizzly bear habitat. Acquired parcels would be managed for grizzly bear use in perpetuity, and could decrease road densities where roads could be gated or barriered, thereby benefitting big game and wolves. Where parcels acquired for grizzly bear mitigation occurred in Cabinet or Satire pack territories, any road access changes would directly benefit wolves in those packs.

Widening, improvement, and yearlong use of the Bear Creek Road would lead to increased vehicle volumes and speed. Estimates of increased annual traffic volume range from 187 percent to 234 percent (Table 177 in section 3.21, *Transportation*). The increase in traffic in Alternative 2 would substantially increase the risk of increased wolf, as well as big game, mortality on the access road. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1630), which would minimize vehicle-wildlife collisions during the early morning, evening and night time-periods. MMC would provide transportation to employees using buses, vans, and pickup trucks, thereby limiting the use of personal vehicles. MMC would report road-killed animals to the FWP as soon as road-killed animals were observed. The FWP would either remove road-killed animals that could attract wolves to the road or direct MMC how to dispose of them. When the mill ceased operations in the Closure Phase, mine volumes levels would be substantially less than shown in Table 177 in section 3.21, *Transportation*. Future traffic volume when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and loss of the Little Cherry Loop Road beneath the impoundment. Mortality risk to the wolf would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (increased road width, improved sight distance, paving) and higher traffic speeds would result in a permanently higher wolf mortality risk compared to pre-mine conditions.

MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section). The Ramsey Plant Site would be fenced, restricting wolf access.

The Cabinet pack may occupy this general area and could be affected by Alternative 2. Increased human access and disturbance from mine activities could displace prey species but adequate prey availability is expected to remain in surrounding less-disturbed areas to support any resident or transient wolves. Disturbance created by the project, starting with the Construction Phase and continuing through the Closure Phase, is expected to deter any establishment of new pack territories in or near the analysis area due to the constant and long-term nature of the disturbance.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Prey Base

The potential impacts of Alternative 3 on current populations of white-tailed deer and other big game would be the same as Alternative 2.

Den and Rendezvous Sites

The potential impacts of Alternative 3 on wolf den or rendezvous sites would be similar to Alternative 2, except that in Alternative 3, MMC would fund FWP to implement adverse conditioning techniques to deter wolves from denning in or near the mine facilities, if appropriate. If FWP determined that den or rendezvous site destruction or disturbance was likely, adverse conditioning to discourage use of the den would be used prior to the Construction Phase in early to mid-March before wolves concentrate their activity around the den site. Implementation of adverse conditioning techniques to deter wolves from denning in or near the analysis area would give wolves time to excavate an alternate den site at a safer, more secluded location. Construction prior to den use would likely deter wolves from denning nearby and from using the existing rendezvous site. Based on general habitat availability; location of roads, campsites, private residences, and other areas of human activity (Figure 87 and Figure 79); and the presence of features typical of den or rendezvous sites, such as streams and other areas of open water (Figure 52) it appears that other potentially suitable, secluded denning or rendezvous sites are available in the analysis area.

Sufficient Space with Minimal Exposure to Humans

As described in section 3.25.3, *Elk Security* and section 3.25.7, *Other Species of Interest*, Alternative 3 would Alternative 3 would include snowplowing Libby Creek Road (NFS road #231) and the Upper Libby Creek Road (NFS road #2316) during the evaluation program and while the Bear Creek Road was reconstructed, allowing poachers, legal hunters, and trappers easy winter access to potential wolf habitat.

The effect of increased traffic on the Bear Creek Road would be the same as Alternative 2, except that in Alternative 3, MMC would remove big game animals killed by any vehicles that could attract wolves to the road daily from road rights-of-way within the permit area and along roadways used for access or hauling ore for the life of the mine and monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. Highway safety signs such as “Caution – Truck Traffic” would help slow public traffic speeds in anticipation of meeting oncoming trucks. Staging shipments of supplies in a general location prior to delivery to the mine site would reduce traffic and wolf mortality risk.

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to wolves. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

Impacts on wolf habitat would be reduced through the agencies’ land acquisition requirement, and would likely be more effective than MMC’s proposed land acquisition because more land would be protected. Road densities would likely improve through the agencies’ proposed land acquisition for grizzly bear mitigation. Acquired parcels would be managed for grizzly bear use in perpetuity, and could decrease road densities where roads could be gated or barriered, thereby benefitting big game and wolves. Where parcels acquired for grizzly bear mitigation occurred in Cabinet or Satire pack territories, any road access changes would directly benefit wolves in those packs.

Impacts to the Cabinet and Satire packs from human disturbance associated with Alternative 3 would be similar to Alternative 2.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts of Alternative 4 on the wolf would be the same as Alternative 3.

Alternative A – No Transmission Line

Alternative A would not affect the gray wolf and would not change existing conditions for prey base, denning and rendezvous sites, or space with minimal exposure to humans.

Alternative B – MMC’s Proposed Transmission Line (North Miller Creek Alternative)

Construction of the Sedlak Park Substation and loop line would not affect gray wolves in any transmission line alternative because they would be close to US 2 and are not in proximity to any identified territories, dens, or rendezvous sites.

Prey Base

In Alternative B, current populations of white-tailed deer, elk, and moose, would likely be maintained, and would continue to provide a good year-round prey base for wolves. Cover would decrease relative to forage, which may improve prey populations. During transmission line construction some restricted, impassable/barriered, and temporary roads would be opened and some new access roads would be needed, but roads would not be open to the public during the hunting season, maintaining elk security. Alternative B effects on habitat conditions for these species are described in section 3.25.3, *Elk Security, Big Game Winter Range (Elk and Deer), Mountain Goat, and Pileated Woodpecker* and section 3.25.7, *Other Species of Interest*.

Den and Rendezvous Sites

No known gray wolf den or rendezvous sites would be affected by Alternative B.

Sufficient Space with Minimal Exposure to Humans

During transmission line construction, elk security would be maintained Alternative B as no there would be no additional public access during the hunting season.

Although new roads on National Forest System land would be revegetated after transmission line construction, the roads would allow increased pedestrian access to potential wolf habitat, resulting in increased potential for human disturbance and an increased risk of human-caused wolf mortality from poaching, legal hunting, and trapping. Alternative B could result in an increased risk of human-caused mortality during transmission line construction due to increased traffic, although traffic increases are anticipated to be minimal and short-term. In Alternative B, helicopter line stringing, which would last about 10 days, could temporarily displace wolves from the transmission line corridor and surrounding habitat. Similar effects could occur from other transmission line construction activities associated in areas where helicopters were not used, and would be more extensive for Alternative B than the agencies' alternatives. Alternative B construction activities could result in the short-term, temporary avoidance by transient, Cabinet or Satire pack wolves of the transmission line corridor and adjacent habitat. Effects on Cabinet pack wolves would be greatest where their activities have been documented in the Libby Creek and Ramsey Creek drainages. Except for annual inspection and infrequent maintenance operations, helicopter use and other transmission line construction activities would cease after transmission line construction until decommissioning. Helicopter use and other activities could cause similar displacement during line decommissioning.

Road densities would likely improve through MMC's proposed land acquisition for grizzly bear mitigation. Acquired parcels would be managed for grizzly bear use in perpetuity, and could decrease road densities where roads could be gated or barriered, thereby benefitting big game and wolves. Where parcels acquired for grizzly bear mitigation occurred in Cabinet or Satire pack territories, any road access changes would directly benefit wolves in those packs. Overall, Alternative B would have a minimal effect on the gray wolf.

Impacts on Private and State Land

Where big game winter range occurs (Figure 89 and Figure 96), short-term disturbance of wolves would be minimized by restricting construction during winter. While Alternative B would increase road densities on state and private lands, the increase would not affect elk security or wolf prey base. Roads opened or constructed for transmission line access on private land would be gated after transmission line construction, and would be gated during the hunting season would not affect elk security habitat.

In Alternative B, helicopter line stringing, which would last about 10 days, could temporarily displace wolves from the transmission line corridor and surrounding habitat. Similar effects could occur from other transmission line construction activities in areas where helicopters were not used, and would be more extensive for Alternative B than the agencies' alternatives. Alternative B construction activities could result in the short-term, temporary avoidance by transient, Cabinet or Satire pack wolves of the transmission line corridor and adjacent habitat. Except for annual inspection and infrequent maintenance operations, helicopter use and other transmission line construction activities would cease after transmission line construction until decommissioning.

Helicopter use and other activities could cause similar displacement during line decommissioning. Because State and private lands generally have high road densities and have been logged in the past 20 to 30 years, and because of the short-term nature of human-caused disturbance, overall, wolf populations on private and State land would not likely be affected by Alternative B.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Prey Base

The effects of Alternative C-R on current populations of elk and white-tailed deer would be the same as Alternative B. Alternative C-R may have minor effect on elk security habitat on State and private land (23 acres) if construction access displaced elk from security habitat. The reduced elk security would not affect the wolf's prey base.

Den and Rendezvous Sites

No known den or rendezvous sites would be affected by Alternative C-R.

Sufficient Space with Minimal Exposure to Humans

Alternative C-R effects on elk security habitat would be similar to Alternative B.

Effects of Alternative C-R on pedestrian access and traffic would be the same as Alternative B. In Alternative C-R, helicopters would be used for stringing the entire transmission line and in some segments for vegetation clearing and structure placement, extending the duration of disturbance by about 2 months. Vegetation clearing and structure placement where helicopters were not used could contribute to short-term displacement of wolves. Like Alternative B, Alternative C-R construction activities could result in the short-term, temporary avoidance of the transmission line corridor and adjacent habitat by transient, Cabinet pack, or Satire pack wolves. Alternative C-R would affect less of the Cabinet pack's known area of activity than Alternative B. In Alternative C-R, the Cabinet pack could be affected by temporary disturbance, especially where their activities have been documented in the Libby Creek drainage. In Alternative C-R, except for annual inspection and infrequent maintenance operations, helicopter and other transmission line construction activities would cease after transmission line construction until decommissioning, similar to Alternative B. Helicopter use and other activities could cause similar displacement during line decommissioning.

As described for Alternative B, big game populations would likely improve through the agencies' land acquisition requirement for grizzly bear mitigation, which would likely be more effective than MMC's proposed land acquisition because more land would be protected. Where parcels acquired for grizzly bear mitigation occurred in Cabinet or Satire pack territories, any road access changes would directly benefit wolves in those packs. Overall, Alternative C-R would have a minimal effect on the gray wolf.

Impacts on Private and State Land

Impacts to wolves on private land would be the same as Alternative B, except that short-term impacts on private land from road and helicopter use would be less extensive for Alternative C-R than for Alternative B. Within the Silverfish PSU, short-term impacts on State trust lands from road and helicopter use would be similar to impacts on National Forest System lands. Mitigations applied to State trust land would be the same as mitigations applied to affected National Forest System lands.

Alternative D-R – Miller Creek Transmission Line Alternative

The impacts of Alternative D-R on gray wolves would be the same as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

The impacts of Alternative E-R on gray wolves would be the same as Alternative D-R.

Combined Mine-Transmission Line Effects

None of the activities associated with the mine alternatives would occur in the Silverfish PSU; all impacts on wolves in the Silverfish PSU would be due to the transmission line.

Prey Base

In all combined mine-transmission line alternatives, current populations of white-tailed deer and elk, and moose would likely be maintained, and would continue to provide a good year-round prey base for wolves. While cover would decrease relative to forage, an abundance of cover is available in the analysis area. In all combined mine-transmission line alternatives, elk security habitat in the Silverfish PSU would be maintained during transmission line construction as no new road access will be available during the hunting season. Combined mine-transmission line alternative effects on habitat conditions for big game species are described in section 3.25.3, *Elk Security, Big Game Winter Range (Elk and Deer), Mountain Goat, and Pileated Woodpecker* and section 3.25.7, *Other Species of Interest*.

Den and Rendezvous Sites

It is unknown if the pup rearing/rendezvous sites documented during the summer of 2010 are still active (Laudon, pers. comm. 2014). If any den or site was within the Alternative 2B impoundment disturbance footprint, and if construction began after the den was being used, the den site could be destroyed. In the agencies' alternatives, MMC would fund FWP to implement adverse conditioning techniques to deter wolves from denning in or near the mine facilities, if appropriate. If FWP determined that den or rendezvous site destruction or disturbance was likely, adverse conditioning to discourage use of the den would be used prior to the Construction Phase in early to mid-March before wolves concentrate their activity around the den site. Implementation of adverse conditioning techniques to deter wolves from denning in or near the analysis area would give wolves time to excavate an alternate den site at a safer, more secluded location. For any action alternatives, construction of the impoundment prior to den use would likely deter wolves from denning or congregating nearby. Based on general habitat availability; location of roads, campsites, private residences, and other areas of human activity (Figure 87 and Figure 79); and the presence of features typical of den or rendezvous sites, such as streams and other areas of open water (Figure 52) it appears that other potentially suitable, secluded denning or rendezvous sites are available in the analysis area.

Sufficient Space with Minimal Exposure to Humans

The effect of snowplowing Libby Creek Road (NFS road #231) and the Upper Libby Creek Road (NFS road #2316) during the evaluation program and while the Bear Creek Road was reconstructed, increased vehicle volumes and speed, helicopter use and other transmission line construction activities, storage of mine, adit, or tailings water, and MMC's and the agencies' proposed mitigation would be as described in the mine and transmission line alternatives.

Impacts on Private and State Land

Where big game winter range occurs (Figure 89 and Figure 964), short-term disturbance of wolves, in particular those from the Satire pack, would be minimized by restricting construction during winter. Alternative B would result in increases in road densities on state and private lands. Roads opened or constructed for transmission line access on private land would be gated during hunting season to maintain elk security habitat.

In all combined mine-transmission line alternatives, helicopter line stringing, which would last about 10 days, could temporarily displace wolves from the transmission line corridor and surrounding habitat. Similar effects could occur from other transmission line construction activities in areas where helicopters were not used, and would be more extensive for Alternative 2B than the agencies' alternatives. Construction activities associated with all combined mine-transmission line alternatives could result in the short-term, temporary avoidance by transient or Satire pack wolves of the transmission line corridor and adjacent habitat. Except for annual inspection and infrequent maintenance operations, helicopter use and other transmission line construction activities would cease after transmission line construction until decommissioning. Helicopter use and other activities could cause similar displacement during line decommissioning. Because State and private lands generally have high road densities and have been logged in the past 20 to 30 years, and because of the short-term nature of human-caused disturbance, overall, wolf populations on private and State land would not likely be affected by the combined mine-transmission line alternatives.

Cumulative Effects

Past Actions and the Existing Condition

Past actions are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E. Section 3.25.4.6.3, *Affected Environment* above summarizes the existing condition, which reflects the prey base, den and rendezvous sites, and sufficient space with minimal exposure to humans within the analysis area.

Harvest has occurred in the analysis area since the 1950s, resulting in a diversity of age classes and successional stages and providing forage and cover for big game. Historically, natural disturbances such as wildfire resulted in a mosaic of habitats and forage conditions. Fire suppression since the early 1900s has altered stand structure resulting in more homogenous stands with greater canopy closure in some areas, which has in turn reduced forage production for prey species on some sites. Roads constructed in association with timber harvest, mining, and other development have cumulatively improved human access and decreased wolf security in the analysis area. Activities affecting wolf habitat have changed in recent years, with a trend toward reduced motorized access as a result of decisions intended to facilitate grizzly bear recovery. Reduced motorized access has resulted in increased wolf security in the analysis area. Since the mid-1990s, there has also been a greater use of intermediate harvest methods, which results in both big game hiding cover and foraging opportunities occurring in close proximity. Prescribed burning has worked successfully to cycle forest cover through the many periods of succession. Protection of water bodies and associated habitats as a result of compliance with 2015 KFP direction for fisheries and the Clean Water Act maintain characteristics often used for denning and rendezvous sites.

Development of private lands within the analysis area, including commercial timber harvest, land clearing, home construction, and road construction has contributed to increased disturbance of wolves and their prey and is expected to continue. Areas previously impacted by special use permits such as mineral material sites (pits quarries, borrow, roadsides), water developments, utility corridors, private land access routes, and outfitter/guide trails/camps, would continue to be present and used. Other public uses such as wildlife viewing, berry picking, firewood gathering, camping, snowmobiling, etc. have negligible impacts on wolves given their limited scope (time and space). Infra-structure, such as roads and campgrounds, that facilitate these activities have already been accounted for in the description of the affected environment.

Effects of Current and Reasonably Foreseeable Actions

Reasonably foreseeable actions are described in section 3.3, *Reasonably Foreseeable Future Action*. Current actions are described in section 3.2, *Past and Current Actions* and shown on Figure 50.

The Miller-West Fisher Vegetation Management Project will occur entirely in the Silverfish PSU and will include intermediate harvest of 1,206 acres, regeneration harvest of about 692 acres, precommercial thinning of 351 acres, and prescribed burning of 2,830 acres of National Forest System lands in the Silverfish PSU. Surface impacts from other reasonably foreseeable actions would be minimal, and would not result in any measurable changes in habitat for wolves or their prey.

New roads and roads closed for mitigation associated with reasonably foreseeable actions such as the Wayup Mine/Fourth of July Road Access Project, Plum Creek activities, and the Miller-West Fisher Vegetation Management Project, would contribute to cumulative effects on elk security habitat.

Road management actions such as road maintenance and administrative use associated with permit administration, data collection and monitoring of National Forest System lands are not likely to affect big game habitat because they generally do not result in vegetation removal. Wolves and their prey will typically avoid the disturbance area until human activities terminate, which usually last a few hours. These activities include work on existing roads for the Miller-West Fisher Project. This action would not result in a loss of cover because the roads already exist. Although water restoration projects may temporarily displace wolves or big game from a localized area, they typically benefit wildlife in the long-term by increasing security, providing pulses of foraging when seeded, or by stabilizing soils where certain habitat components can remain available.

With population growth and development, it is reasonable to assume that some corresponding increase in human use of National Forest System lands is likely to occur. Recreational activities such as sightseeing, hiking, cross-country skiing, camping, snowmobiling, fishing, and firewood cutting are ongoing and expected to increase over the next 10 years. This increase is likely to be gradual and incremental and tend to be focused on areas along or near roads open to motorized traffic. Wolves may, over time, experience more frequent disruption of their daily activities if they are in proximity to roads.

Activities on private land in the analysis area, such as timber harvest, land clearing, home construction, and road construction are likely to continue on private lands and would likely slightly impact big game cover and security. Potential effects depend on the magnitude, type, and location of developments and include the loss of secure habitat and localized disturbance of wolves and big game. Private lands occupy 10 percent of the Crazy PSU and 12 percent of the

Silverfish PSU and are intermixed with public and corporate/State land. Most recommended guidelines (with the exception of FW-GDL-WL-09) are met on National Forest System lands within the Silverfish PSU (see section 3.25.3.2.7), and development of private lands is expected to have minor cumulative impacts on big game species in the analysis area over the next 10 years.

No Action Alternative

The Montanore Project No Action alternatives (Alternative 1 and Alternative A) would not contribute to cumulative impacts on wolves.

Combined Mine-Transmission Line Action Alternatives

Cumulative effects of the combined mine-transmission line alternatives, in combination with past, present, and reasonably foreseeable actions on big game are described in section 3.25.3, *Elk Security, Big Game Winter Range (Elk and Deer), Mountain Goat, and Pileated Woodpecker* and section 3.25.7, *Other Species of Interest*. In summary, with the exception of Alternative 2B, for all combined mine-transmission line alternatives would maintain prey populations and increase areas with minimal exposure to humans by increasing elk security and grizzly bear core habitat. Alternative 2B would reduce areas with minimal exposure to humans by decreasing elk security and grizzly bear core habitat.

The combined mine-transmission line alternatives in combination with other reasonably foreseeable actions could deter wolves from denning or using rendezvous sites in the analysis area. Based on general habitat availability; location of roads, campsites, private residences, and other areas of human activity (Figure 87 and Figure 79); and the presence of features typical of den or rendezvous sites, such as streams and other areas of open water (Figure 52) it appears that other potentially suitable, secluded denning or rendezvous sites are available in the analysis area.

Helicopter use and other construction activities associated with the combined action alternatives could also contribute to cumulative impacts on wolves, although their effects would be temporary. All combined mine-transmission line alternatives would include the funding of one law enforcement position and one grizzly bear specialist. The agencies' combined mine-transmission line alternatives would include funding of a habitat conservation biologist. Although the objective of these positions would be focused on reducing mortality risk for grizzly bears, they would likely indirectly benefit wolves by increasing public awareness of issues related to threatened and endangered species and sensitive species in general, and improving enforcement of road access changes.

Cumulative effects of the combined mine-transmission line alternatives in combination with other reasonably foreseeable actions are not likely to change big game populations that provide prey for wolves. While cumulative losses of habitat would occur, areas disturbed as a result of the combined action alternatives and other reasonably foreseeable actions could provide additional forage habitat after reclamation, thereby improving habitat conditions for big game. Impacts on wolves would be somewhat reduced through road access changes and land acquisition requirement associated with grizzly bear. Acquired parcels would be managed for grizzly bear use in perpetuity, and could contribute additional wolf habitat where roads could be closed. Acquired parcels would be managed for grizzly bear use in perpetuity, and could decrease road densities where roads could be gated or barriered. Road access changes would create security habitat for prey species and reduce motorized access of wolf habitat. Where parcels acquired for grizzly bear mitigation occurred in Cabinet or Satire pack territories, any road access changes would directly benefit wolves in those packs. Current populations of white-tailed deer and elk, would likely be maintained and would continue to provide a good year-round prey base for wolves.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Mineral Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on the wolf or all practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. These alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit the gray wolf. These measures would include requiring MMC to fund FWP implementation of adverse conditioning techniques to deter wolves from denning in or near the mine facilities, if appropriate, minimizing disturbance in big game winter range, increasing areas **wi**th minimal exposure to humans through yearlong access changes, and increasing land acquisition requirements that would likely provide protection of big game habitat.

National Forest Management Act/Kootenai Forest Plan

The agencies' alternatives would include measures to minimize effects on wolves and big game prey species per FW-GDL-WL-21, FW-GDL-WL-08, 09, 10, and 11. All alternatives may affect individual wolves and their habitat within the analysis area, but would not contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual gray wolves or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All combined mine-transmission line action alternatives may impact individual wolves or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for gray wolves.*** This determination is based on: 1) the mine alternatives would have no impact on wolves or their prey in the Silverfish PSU; 2) all action alternatives would minimize or avoid disturbance in big game winter range, 3) Two potential rendezvous sites may be affected by the combined mine-transmission line alternatives. For the agencies' alternatives, if a wolf den or rendezvous site was located in or near the analysis area by FWP wolf monitoring personnel, MMC would provide funding for FWP personnel to implement adverse conditioning techniques to deter wolves from denning in or near the analysis area to give wolves time to excavate an alternate den site at a safer, more secluded location; 4) Sufficient populations of elk, deer, and other prey species would continue to be maintained, and would continue to provide a good year-round prey base for wolves. For the agencies' alternatives, access changes associated with grizzly bear mitigation would create security habitat for prey species; 6) In Alternative 2B, combined agencies' alternatives would result in short-term increases in disturbance from helicopter use and other activities in the analysis area during transmission line construction; 7) Impacts on the wolf would be reduced through MMC's and the agencies' land acquisition requirement. Acquired parcels would be managed for grizzly bear use in perpetuity, and could improve big game habitat and wolf security where roads could be gated or barriered. Where parcels acquired for grizzly bear mitigation occurred in Cabinet or Satire pack territories, any road access changes would directly benefit wolves in those packs; 8) Other measures included in all action alternatives to reduce mortality risks include prohibiting employees from carrying firearms; removing road-killed big game animals; and funding of grizzly bear specialists and one law enforcement position, which could indirectly benefit wolves through improved enforcement of access changes and by increasing public awareness of issues related to threatened and endangered species as well as other species. The agencies' alternatives also include implementation of a transportation plan and a requirement that MMC stage shipments of supplies in a general location prior to delivery to the mine site to reduce mine traffic and mortality risk. While some individual wolves could be affected, impacts would not be severe enough to affect wolf viability on the KNF.

Montana Gray Wolf Conservation and Management Plan

All alternatives would comply with direction in the State Management Plan.

3.25.4.8 Harlequin Duck

3.25.4.8.1 Regulatory Framework

General 2015 KFP direction considered in the analysis of sensitive species is described in section 3.25.4.1, *Regulatory Framework,* p. 1133. The additional 2015 KFP direction considered in the analysis of the harlequin duck is:

> **FW-GDL-WL-19. Harlequin Duck.** Management activities should avoid or minimize disturbance near known active nesting and rearing areas based on the best available information.

3.25.4.8.2 Analysis Area and Methods

Population ecology, biology, habitat description and relationships identified by research are described in Cassirer and Groves (1991), Reichel and Genter (1995), Cassirer *et al*. (1996), Hendricks (2000), and Carlson (2004). These provided guidance in evaluating potential habitat and potential effects to harlequin ducks, and are incorporated by reference.

Cassirer *et al*. (1996) completed a Conservation Assessment and Strategy for the U.S. Rocky Mountains that provides some management recommendations for harlequin ducks. The overall strategy is to maintain riparian and instream habitat. Potential threats to harlequin ducks include activities that affect riparian habitats, water yield and water quality, and activities that increase disturbance during the breeding season.

Harlequin duck occurrence data comes from MNHP surveys conducted on the Forest, District wildlife observation records, Forest historical data (NRIS Wildlife) and other agencies (FWP). The KNF Conservation Plan (Johnson 2004a) identified streams that provide actual or suspected harlequin duck habitat on the KNF.

The analysis area includes areas where aquatic resources may be affected either by mine construction, operations, and closure or by construction, maintenance, and decommissioning of the transmission line. Mine alternatives may affect the named and unnamed streams in the East Fork Bull River, Rock Creek, Ramsey Creek, Poorman Creek, Little Cherry Creek, Bear Creek, Cable Creek, Big Cherry Creek, and Libby Creek watersheds and any other areas where roads would be closed. The transmission line alternatives would have no effect on the harlequin duck and are not discussed further.

The Conservation Assessment (Cassirer *et al*. 1996) identified activities within two improved sight distances (an improved sight distance is the distance at which the riparian area is obscured from view prior to leaf out) of active sites as a disturbance factor to harlequin ducks. A qualitative discussion of the potential changes in water yield and water quality will also be used to compare the effects of alternatives.

3.25.4.8.3 Affected Environment

The harlequin duck is small sea duck that travels inland to breed in fast mountain streams on the KNF. Breeding habitat consists of second order or larger streams with high water quality and reaches with two to seven percent gradients. Habitat characteristics include riffle habitat, gravel to boulder-sized substrate, forested or shrubby banks with overhanging bank vegetation, logs, rocks, islands and gravel bars. Harlequin ducks are very sensitive to human presence and disturbance, especially during the nesting season. Harlequin ducks show a high degree of fidelity to their breeding grounds.

In the analysis area, Rock Creek and East Fork Rock Creek are occupied harlequin duck habitat, and possess necessary habitat parameters to support the duck. Similar to other high quality streams in Western Montana, Rock Creek and East Fork Rock Creek support a diversity of invertebrates with relative low total. Large woody debris, gravel bars, and boulders in and adjacent to Rock Creek and East Fork Rock Creek provide loafing areas and cover. Riparian deciduous tree and shrub communities and cedar-hemlock forested stands, of various successional stages, border the majority of both streams. These riparian and streamside communities provide cover and possible nesting areas.

Harlequin ducks breeding in Montana arrive primarily from late April to early May (MNHP and FWP 2014). Males depart in June while females and young depart from late July to early September (MNHP and FWP 2014). In Montana, breeding birds are found on 25 to 30 streams, referred to as “breeding streams.” These streams are clumped in four general areas: some tributaries of the lower Clark Fork River; some tributaries of the North, Middle, and South forks of the Flathead River; selected streams on Rocky Mountain Front; and on the Boulder River. Groups of breeding streams could be considered to sustain a subpopulation of harlequins because the ducks are geographically fragmented from other breeding birds and little interaction between these breeding communities occurs. One of these subpopulations is found in the Lower Clark Fork drainage in the Noxon/Trout Creek area. Breeding occurs on four streams: Rock Creek, Marten Creek, Swamp Creek, and the Vermillion River. Monitoring and inventory of the lower Clark Fork subpopulation shows a small but stable breeding group with a maximum of 15 breeding pairs. In 1995, three breeding pairs were found on Rock Creek (Fairman *et al.* 1995). One female and three young were documented on Rock Creek about 1 mile upstream of the Clark Fork River in late July 2010 (KNF 2010). Of the four breeding streams in the Lower Clark Fork subpopulation, Marten Creek produces the most broods, followed by Rock Creek (Fairman *et al.* 1995).

Johnson (2004a) reported harlequin duck breeding confirmed on 10 streams in six of the eight PSUs on the KNF. These streams provide about 71 miles of suitable habitat.

3.25.4.8.4 Environmental Consequences

None of the transmission line alternatives, including the Sedlak Park Substation and loop line, would affect the harlequin duck due to the absence of nearby suitable habitat and are not included in the analysis.

Alternative 1 – No Mine

Alternative 1 would not disturb the harlequin duck or their habitat and would have no effect on this species.

Alternative 2 – MMC's Proposed Mine

The total disturbance area within the Rock Creek drainage (for the ventilation adit) would be small (less than 1 acre). The potential for any increase in sediment delivery to the Rock Creek drainage from these activities is minimal. The ventilation adit would be on a steep slope above Rock Lake and noise generated during adit construction would be short-term and limited East Fork Rock Creek above Rock Lake. Construction noise would have no effect on the harlequin duck or their habitat.

In Rock Creek, without MMC's modeled mitigation, streamflow is predicted to decrease by 0.65 cfs at the mouth of Rock Creek (RC-2000) (Table 113). Flows of 100 cfs or greater in Rock Creek at RC-2000, located about 100 feet upstream of MT 200 occurred in 2011 during most days between mid-May and to the first week of July. 2012 and 2013 were wetter years, with flows of 100 cfs or greater starting at the end of March/beginning of April and occurring during most days through early to mid-July (see section 3.11.3.2.1, *Surface Water Hydrology*). According to Grant *et al.* (2008), changes in peak flow that fall in a range of ±10 percent are within the error of peak flow measurement and natural variability and cannot be ascribed as an effect.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative and Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

The effect of construction noise above Rock Lake would be the same as Alternative 2. In Alternatives 3 and 4, streamflow in Rock Creek, with MMC's modeled mitigation, is predicted to decrease by 0.15 cfs at the mouth of Rock Creek (RC-2000) (Table 113). According to Grant *et al*. (2008), changes in peak flow that fall in a range of ±10 percent are within the error of peak flow measurement and natural variability and cannot be ascribed as an effect. In Alternatives 3 and 4, sediment delivery to East Fork Rock Creek from NFS road #150A would decrease by almost 87 percent with the project and BMPs. No sediment decreases to East Fork Rock Creek were predicted under Alternative 2.

Cumulative Effects

Past actions are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E. Section 3.25.4.6.3, *Affected Environment* above summarizes the existing condition, which reflects the streamflow and habitat conditions found in Rock Creek and East Fork Rock Creek. Timber harvest has occurred in the analysis area since the 1950s and, up until the early 1990s, harvest occurred within riparian habitats resulting in alterations and reduction of riparian habitat. High levels of road construction to facilitate harvest occurred through the 1980s and resulted in sedimentation into streams. Since the adoption of the 1987 KFP and including the 2015 revision, application of KFP management direction has resulted in the protection of riparian habitats, less road construction and road closures, and BMP work on existing roads to reduce sedimentation.

With MMC's modeled mitigation, streamflow in Rock Creek is predicted to decrease by 0.19 cfs at the mouth of Rock Creek (RC-2000) (Table 118), assuming the Rock Creek Project and the Montanore Project operated and closed simultaneously. According to Grant *et al*. (2008), changes in peak flow that fall in a range of ±10 percent are within the error of peak flow measurement and natural variability and cannot be ascribed as an effect. The cumulative effect on the harlequin duck and its habitat from changes in streamflow during the breeding season would be negligible. Other activities associated with the Rock Creek Project may impact individual harlequin ducks or their habitat, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. All alternatives would comply with 36 CFR 228.8.

National Forest Management Act/Kootenai Forest Plan

All action alternatives would have minor effect on streamflow in Rock Creek and East Fork Rock Creek during breeding season. All action alternatives would have no effect on vegetation in Rock Creek and East Fork Rock Creek during breeding season. Therefore, project activities meet the intent of FW-GDL-WL-19 where it directs "management activities should avoid or minimize disturbance near known active nesting and rearing areas based on the best available information" for the harlequin duck.

Forest Service Sensitive Species Statement of Findings

The no action alternative would not impact individual harlequin duck or its habitat, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All combined action alternatives may impact individuals or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for harlequin ducks.*** This determination is based on the minor effect on streamflow in Rock Creek and East Fork Rock Creek during the breeding season.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

3.25.4.9 North American Wolverine

3.25.4.9.1 Regulatory Framework

On February 4, 2013, the USFWS proposed listing the wolverine as threatened and published a proposed 4(d) rule that listed several activities that are not considered significant threats to the species (USFWS 2013c). On August 13, 2014, the USFWS withdrew its proposal to list wolverine under the Endangered Species Act (USFWS 2014d), and as a result of this action the wolverine returned to the R1 Sensitive Species list.

In the proposed ruling, the USFWS thought that global climate change is the primary threat to the species and that legal and incidental trapping of wolverines were substantial threats in concert with climate change. Although the goods and services provided by National Forest System programs and activities have been, and will undoubtedly continue to be, affected by climate change (USDA Forest Service 2010a), the activities described in the project alternatives are not the cause of climate change. In their withdrawal of the proposed listing, USFWS found that none of the factors, including climate change, posed a threat to the species and it was not warranted to list wolverine under the ESA (USFWS 2014d). The USFWS found that there are no Forest Service land management activities or public use activities on National Forest System lands that threaten wolverines (direct effects) or high-elevation habitats (indirect effects) due to the nature and scale of such human activities. These activities include: 1) dispersed recreation such as snowmobiling, skiing, backpacking, and hunting for other species; 2) land management activities such as timber harvest, wildland firefighting, prescribed fire, and silviculture; and 3) mining (USFWS 2013c). These activities are not likely to disturb wolverines or habitat to an extent that threatens the viability of the population or species (USFWS 2013c). Wolverines occur naturally in low densities, and current population levels and trends are not definitively known (USFWS 2013c). However, there is evidence that their population is increasing (USFWS 2014d) and that wolverines are expanding both within areas currently occupied as well as suitable habitat not currently occupied (USFWS 2014d).

3.25.4.9.2 Analysis Area and Methods

The analysis area for direct, indirect, and cumulative effects to individuals and their habitat is primarily the contiguous area of persistent spring snow near the proposed and alternative mine and transmission line facilities, although movement/dispersal through areas outside of persistent spring snow was also considered.

Recent research provides guidance in identifying potential denning habitat within proposed analysis areas. In North America, 69 percent of den sites were located in areas where snow cover persists until mid-May for an average of 6 to 7 years (*i.e.*, "persistent snow") while 98 percent of all den sites were located in areas of at least 1 year of snow cover (Copeland *et al*. 2010). Based on this, wolverine denning habitat was mapped using Region 1 persistent snow layer, which is the same as Copeland *et al.*'s 2010 map. The presence of a persistent snow layer is an indicator of climatic conditions in the analysis area and whether the area could support wolverines. Proposed activities will be assessed in relation to their impacts to the persistent snow conditions.

The persistent snow layer from Copeland *et al*. (2010), which is also the R1 persistent snow layer, was the primary map used during this project analysis. The persistent snow layer was the primary layer used due to USFWS (2013c) focusing on persistent spring snow as one of two main factors potentially impacting wolverines. The agencies also considered four habitat maps developed by Inman *et al*. (2013). The four habitats were primary wolverine habitat, female maternal habitat, and male and female dispersal habitat. Maps of both were overlayed with maps of the alternatives. As Inman *et al.* (2013) reported, their map of primary wolverine habitat matches well with Copeland *et al*.'s persistent snow map, and this holds true for the analysis area as well. Inman *et al*. 2013 map of female maternal habitat covers a smaller area and has less overlap with the analysis area than Copeland *et al*.'s persistent snow map. The male and female dispersal habitat maps from Inman *et al*. have more overlap with the analysis area than Copeland *et al*.'s persistent snow map because wolverines wander over a wider area during dispersal. Inman *et al*.'s dispersal maps were based on habitats used briefly by their study animals while moving between primary habitat patches (Inman *et al*. 2013). The contiguous block of female dispersal habitat overlapping the project consists of the entire Cabinet Mountains and some adjacent areas. The male dispersal contiguous block that overlaps the project is much larger and covers most of western Montana and northern Idaho. This section summarizes a specialist's report on the wolverine available in the Project record.

The regulation of trapping activities is FWP's responsibility and is beyond the authority of the Forest Service to control. Currently, the state does not have a trapping season for wolverines in or near the analysis area. At the time of the 2013 listing proposal, Montana was the only state in the Forest Service Region 1 still maintaining an open wolverine trapping season, using seasonal quotas to monitor and regulate harvest levels. This season was administratively closed in 2012, and as of the 2014-2015 trapping period, it remains closed. There are currently no open trapping seasons for wolverine in Forest Service Region 1. None of the alternatives would increase trapping; trapping is not discussed further.

Wolverine occurrence data come from recent District wildlife observation records, NRIS wildlife database, research studies, or other agencies (FWP, MNHP).

3.25.4.9.3 *Affected Environment*

Due to their large home range size and habitat needs, the North American wolverine is rare and uncommon and most likely always has been. Wolverines use higher elevation, steep, remote habitat. Wilderness and roadless lands account for much of the areas wolverines are known to use, although it is unknown if this is due to avoidance of people or that wolverine tend to choose areas that are not conducive to human development (Copeland *et al*. 2007). Wolverines appear capable of adjusting to human disturbance (USFWS 2013c and USFWS 2014d). Wolverines travel long distances throughout large home ranges that average between 186 to 310 square miles (USFWS 2013c) but can range from 28 to over 360 square miles (Banci 1994). Wolverines are considered to be a generalist species (*i.e.*, not dependent on one vegetation type or prey species), one that is able to thrive in different habitat types and makes use of a variety of different resources within their home range. Wolverines are generally scavengers of carrion, but do prey on small mammals and birds and will eat berries, fruits, and insects (Hornocker and Hash 1981). Dens are dug into the snow to ground level and are generally located on north-facing slopes under rocks, boulders, tree roots, or avalanche debris (Magoun and Copeland 1998). Females enter dens in mid-February, giving birth to a litter of young, and then use a series of dens or rendezvous sites until mid-May when her offspring are mobile enough to travel (Copeland and Yates 2008, Magoun and Copeland 1998).

Wolverines are not thought to be dependent on vegetation or habitat features that may be manipulated by land management activities. They have been documented using both recently logged areas and burned areas (USFWS 2013c). It is unlikely that wolverine avoid the type of low-use roads that generally occur in wolverine habitat (USFWS 2013c). The best scientific information available does not substantiate dispersed recreational activities (even at high levels) as a threat to the wolverine population (USFWS 2014d). Additionally, the scale at which most land management decisions (including Forest Service vegetative management activities) occur is relatively small compared to the average size of a wolverine home range and although impacts to individual animals may occur, they do not rise to the level to be a threat to the population (USFWS 2014d). While there are no definitive effects currently known at the population level, there are ongoing scientific investigations to better understand potential recreational impacts to wolverine.

Deep, persistent, and reliable spring snow cover (April 15 to May 14) is the best overall predictor of wolverine occurrence in the contiguous United States. Wolverine year-round habitat use takes place almost entirely within the area defined by deep, persistent spring snow (USFWS 2013c). This is likely related to the wolverine's need for deep snow during the denning period (USFWS 2013c). No records exist of wolverines denning anywhere but in snow, despite the wide availability of snow-free denning opportunities within the species range (USFWS 2013c). The deep, persistent spring snow layer in the Copeland *et al*. (2010) analysis captures all known wolverine dens in the DPS [Distinct Population Segment] (USFWS 2013c). However, it should be noted that their analysis depicts areas that are snow covered through May 15 in at least 1 out of 7 years (USFWS 2014d). Additionally, except for denning females (denning habitat is not considered scarce or limiting to wolverine reproduction), wolverines are occasionally observed in areas outside the mapped deep, persistent snow zone, and factors beyond snow cover may play a role in overall wolverine distribution (USFWS 2014d).

Wolverines require a lot of space and the availability and distribution of food is likely the primary factor in determining female wolverine movements and home range size. Male home range size and location is likely tied to the presence of active female home ranges and breeding opportunities (USFWS 2013c). The size of adult wolverine home ranges varies widely depending upon geographic location; food availability and distribution; and individual animal age and gender (USFWS 2013c). Wolverine home ranges generally do not occur near human settlements due to differential habitat selection by humans and wolverines, but wolverines do not avoid human development of the types that occur within suitable wolverine habitat (USFWS 2013c).

Inman *et al*. (2012b) described wolverine habitat as "steep terrain with a mix of tree cover, alpine meadow, boulders, and avalanche chutes" (Inman *et al*. 2012b). They also state that wolverines experience a trade-off "…between resource acquisition on one hand and avoidance of predation and competition on the other. Wolverines balance these competing interests by exploiting an unproductive niche where predation and interspecific competition are reduced" (Inman *et al*. 2012b).

Inman *et al*. (2012a) found a link between persistent snow and wolverine foraging strategy. Wolverines appear to rely on the cold and snow to cache carrion. Cold, structured microsites are used to cache food and this reduces competition from insects, bacteria, and other scavengers for this food source. The authors referred to this as the "refrigeration-zone" hypothesis (Inman *et al*. 2012a).

Wolverines are opportunistic feeders and consume a variety of foods depending on availability. They primarily scavenge on carrion, but also prey on small animals and birds, and eat fruits, berries, and insects (Hornocker and Hash 1981, Banci 1994). They are primarily scavengers and feed upon carrion or ungulates killed by large predators, such as wolves, bears, cougars, and humans, or animals that have died from natural causes. They also kill their own prey occasionally, when the opportunity arises, typically small mammals. The constant search for food keeps them moving throughout their range; daily movements of 20 miles are common. Hornocker and Hash (1981) suggested that food availability is the main factor determining movements and range of wolverines in western Montana.

Recent work on wolverine habitat requirements suggests that they are restricted to areas that retain snow until mid-May and where the average temperature in August is less than 72 degrees (Schwartz *et al*. 2009, Copeland *et al*. 2010). Talus slopes and alpine cirques may, therefore, provide important thermal and denning habitat. Based on current research it appears that wolverine habitat is limited to areas at or above the subalpine zone on the KNF. Detailed wolverine population ecology, biology, habitat description and relationships identified by research are described in Hornocker and Hash (1981), Banci (1994), Copeland *et al*. (2007), Schwartz *et al*. (2009), Copeland *et al*. (2010), and USFWS (2013c). These provided additional guidance in evaluating potential habitat and effects to wolverine, and are incorporated by reference.

Johnson (1999) reported wolverine presence was confirmed in seven of the eight planning units on the KNF. Wolverines and their signs have been documented in the Crazy and Silverfish PSUs. A wolverine was photographed in the upper Libby Creek drainage in 2006 and another was videotaped in the Ramsey Creek drainage in 2007 (Williams, pers. comm. 2008). Wolverine tracks were documented in the upper Bear Creek drainage in 1995 and 2001 during winter track surveys conducted by FWP of the Snowshoe, Leigh, Big Cherry, Bear, and Poorman creek drainages. In the Silverfish PSU, there have been 18 track observations and 2 visual sightings of wolverines from 1984 to 2008 (1 in the Porcupine Creek drainage and 1 in the Baree Creek drainage). Eleven sets of wolverine tracks and one potential den site have been documented along the Baree Lake Trail during annual or biannual surveys conducted by the Forest Service since 1989 (Ibid). In June 2014, FWP reported wolverine tracks on Ojibway Peak (Chilton 2014).

While wolverines appear to be relative generalists in selection of habitat for most activities, female wolverines are more selective in their choice of natal denning sites, preferring high-elevation snowy cirque basins where they can dig through deep snow for protective cover for their young. Denning habitat may be a factor limiting distribution and abundance (Copeland 1996), and the persistence of a snowpack into late spring is a strong determining factor in wolverine presence due to its importance in denning (Copeland *et al*. 2010, USFWS 2013c). Persistent spring snow cover may also be a determining factor in wolverine dispersal and has consequences on gene flow (Schwartz *et al*. 2009).

Forestwide, about 555,500 acres of persistent snow (average 1 to 7 years) have been identified of which 89,900 acres have persisted on the landscape until mid-May for 6 to 7 years on average. Such sites, where snow more consistently persists until mid-May, may provide more suitable habitat for denning wolverines. Three blocks of persistent spring snow are found in the analysis area. The largest block consists of the higher elevations within the Cabinet Mountains and is mostly within the wilderness and is 143,025 acres. Two other smaller blocks are potentially impacted by one or more of the transmission line alternatives. These two small blocks are located to the east of the mine facilities. One 120-acre block is between upper Midas Creek and Howard Creek (sections 7 and 18 T27N, R30W). A 360-acre block is between upper Midas Creek and Swamp Creek (sections 8 and 9 T27N, R30W). These two smaller blocks are lower quality habitat. They averaged persistent spring snow in 1 out of 7 years, further limiting the probability that a wolverine would use these areas. The large block within the Cabinet Mountains has 36,735 acres of higher quality habitat and 106,290 acres of lower quality habitat. Features such as large snowdrifts that were not captured by the snow layer coverage may exist within the periphery of the mapped habitat and could be used by denning wolverines (Copeland *et al*. 2010). Persistent snow areas also appear to influence summer habitat use by wolverines and connectivity between wolverine populations and habitat patches (Copeland *et al*. 2010, Schwartz *et al*. 2009).

3.25.4.9.4 *Environmental Consequences*

Alternative 1 – No Mine

Alternative 1 would not affect areas of persistent spring snow or impact trapping, nor would there be any impacts to individual wolverines.

Alternative 2 – MMC's Proposed Mine

In Alternative 2, the Rock Creek Ventilation Adit would be located in the larger Cabinet Mountains block of persistent spring snow. It falls within an area that is classified as lower quality habitat. The site is expected to have persistent spring snow in an average of 5 out of 7 years. The footprint of the ventilation adit would be small, and the ground disturbance area would be 1 acre. About 35 acres of low quality habitat would be within the disturbance area for the Ramsey Plant Site, including the conveyor system from the adit to the plant. The Ramsey Plant Site is expected to have persistent spring snow for an average of 1 to 3 years out of 7. Eight acres of low quality habitat would be within the existing ground disturbance area of the Libby Adit Site. The Libby Adit Site is expected to have persistent snow for an average of 1 to 2 years out of 7. Some water monitoring sites are within areas of persistent spring snow. None of the other components of Alternative 2 would be within areas predicted to have persistent spring snow. Total acres (44 acres) of Alternative 2 within areas of persistent spring snow, all of which are within the larger Cabinet Mountains block, would be 0.03 percent of that block, or approximately 0.2 percent of an average female's home range.

Given the small size of the area affected, that the quality of the habitat is low, and that USFWS (2013c) states that mining is an activity not expected to impact wolverine populations, the effects of Alternative 2 on habitat in areas of persistent spring snow are not expected to impact the wolverine population. The scale at which Forest Service activities occur is relatively small compared to the average size of a wolverine home range and although impacts to individual animals may occur, they do not rise to the level to be a threat to the population (USFWS 2014d). Individual wolverines may be impacted through the alteration of habitat in areas of persistent spring snow, but given the small extent of impacts, the availability of habitat elsewhere within the Cabinet Mountains immediately adjacent to the project, the mobility of the species, and their apparent ability to coexist in areas of human activities, the effects on individual wolverines are likely to be small.

Alternative 2 would have slightly more overlap of project activities with primary wolverine habitat identified by Inman *et al*. (2013). The Ramsey Plant Site and Libby Adit Site would affect 17 acres of primary wolverine habitat outside areas predicted to have persistent snow. The Rock Lake Ventilation Adit would be within primary habitat mapped by Inman *et al*. (2013). All other alternative components would not affect primary habitat. A comparison with Inman *et al*. (2013) maternal habitat map revealed that only the Rock Lake Ventilation Adit and 14 acres of the Ramsey adit/Plant Site overlaps that map. This is less than the overlap with the persistent snow layer. Because the two dispersal habitat maps (male and female) from Inman *et al.* (2013) contain a broad array of habitats, most of Alternative 2 components would be within these habitats. Similar to the persistent spring snow map, the overlap of Alternative 2 acres with the Inman *et al*. (2013) maps (each of the four) are still tiny when looking at the contiguous blocks of habitat that overlap project activities. Similarly to the persistent spring snow map, the overlap with the Inman *et al*. (2013) maps, and the potential effects from this alternative, were based on USFWS (2013c and 2014d) by looking at the factors that would potentially impact wolverine populations. Regardless of how much overlap with wolverine habitat, mining was one of the activities in

USFWS (2013c and 2014d) that was not expected to impact wolverine populations. In other words, it does not matter if the map of persistent spring snow from Copeland *et al*. (2010) or the habitat maps from Inman *et al*. (2013) are used, the effects of the alternative on the population, based on USFWS (2013c and 2014d), would be the same. Also, the effects on individual wolverines would be the same as described previously.

The removal of vegetation for the mine related activities under Alternative 2 would not impact this population of wolverine. As described in USFWS (2013c), wolverine are not tied to any specific vegetation type, and as described in Copeland *et al*. (2010), wolverines generally use areas where the snow persists into the spring. There is very little overlap with the areas of persistent spring snow under this alternative, as described above. Therefore the effects of the loss and/or conversion of vegetation to the ground disturbance under this alternative would be similarly tiny. Given the large home range sizes, mobility of the species, availability of adjacent habitat, and the species' apparent ability to coexist in areas of human activities, the impacts on individual wolverines that may use the analysis area would likely be small. Wolverines have been documented to persist and reproduce in areas with high levels of human use and disturbance, including developed alpine ski areas and areas with motorized use of snowmobiles (USFWS 2013c).

Wolverines may occur in areas outside of persistent spring snow as they move between patches of higher quality habitat (*i.e.*, areas with a greater likelihood of having persistent spring snow). Wolverines may move long distances in an attempt to establish new home ranges. Although they prefer to travel in habitat that is similar to habitat they use for home range establishment, wolverines are capable of long-distance movements through variable and anthropogenically altered terrain (USFWS 2013c). The likelihood of a wolverine occurring outside of areas that have persistent spring snow is low, as wolverines appear to select for these areas even during the summer. "Ninety-five percent of summer locations and 86 percent of winter locations fell within the spring snow coverage…" (Copeland *et al*. 2010). Therefore, there is a low likelihood that a wolverine would wander near the mine-related activities in areas outside of persistent spring snow. This includes all of the impoundment site, LAD areas, and most of the access road. Consequently there is a correspondingly low likelihood of any effects from those activities/facilities on wolverines. Human activity/presence associated with the Evaluation, Construction, Operations, Closure, and Post-Closure Phases of the mine and associated features would not affect wolverine populations. Disturbance associated with human activities during the Evaluation, Construction, Operations, Closure, and Post-Closure Phases would be identical or comparable to the activities USFWS (2013c) found would not impact wolverine populations. Mining was specifically mentioned in USFWS (2013c) as one of the activities not expected to impact wolverine populations. As stated previously, wolverines have been documented to persist in areas with high levels of human use and disturbance (USFWS 2013c). Therefore, human activities associated with the access/haul route (including winter plowing), impoundment site, processing/mill facility, mine adits (including blasting during construction), monitoring sites, ore conveyor system, LAD sites, or any other Montanore-related human activities are not expected to impact wolverine populations in the Cabinet Mountains. It is possible that individual wolverines may be impacted and not use areas near project activities as much as they may have in the absence of those activities, although these impacts to a few individuals would not rise to the level of impacting the population. This conclusion is based on the information described previously regarding the apparent ability of wolverines to coexist in areas of human disturbance, the mobility of the species, and the availability of habitat adjacent to the analysis area within the Cabinet Mountains.

Even with the expected increase in traffic on the haul/access route, wolverines are expected to be able to move through the area. Connectivity between wolverine populations and habitat patches is generally tied to persistent spring snow, and wolverines appear to currently be able to disperse between habitats and through areas where human developments occur (Schwartz *et al*. 2009, USFWS 2013c). As concluded in USFWS (2013c), “the available evidence indicates that dispersing wolverines can successfully cross transportation corridors.”

A wolverine may find it difficult to cross under the 1,200-foot long ore conveyor system between the adit and the plant site across Ramsey Creek. The configuration of the conveyor may allow passage of smaller animals through the framework supporting the conveyor, whereas larger animals the size of a bear or deer would have difficulty passing under (Klepfer, pers. comm. 2014). The noise associated with the conveyor, coupled with the framework that a wolverine would have to negotiate, may deter a wolverine from passing under the conveyor. Wolverines are capable of covering many miles in a day, as described in the beginning of this wolverine analysis, and with the length of the conveyor system being 1,200 feet, a wolverine would be able to bypass this site. The conveyor system would be mostly within areas of persistent spring snow. Connectivity between wolverine populations and habitat patches is generally tied to persistent spring snow, and wolverines appear to currently be able to disperse between habitats and through areas where human developments occur (Schwartz *et al*. 2009, USFWS 2013c). Proposed activities would not affect the overall extent of persistent spring snow that provides connectivity for wolverine populations. Changes associated with motorized access with this alternative, and therefore access for trappers, would likely result in impacts to relatively few individual wolverines, if any, as most of the wolverines in this vicinity would be using the wilderness area where the bulk of the persistent spring snow is located. This also happens to be where motorized use is not allowed and Alternative 2 would not change this. Therefore, there would be no threat to the viability of the species as a result of Alternative 2. Trapping mortality (including incidental trapping) undoubtedly can impact local population levels of wolverine, but in their withdrawal of the proposed ESA listing, the USFWS concluded that based on the best scientific and commercial information available the mortality level from trapping (including incidental trapping in Montana and Idaho) is not by itself a threat to the wolverine population (USFWS 2014d). Seasonal closure and low harvest quotas are the predominant factors affecting trapping mortality, as is the naturally low density of wolverines, which helps minimize the likelihood of incidental trapping mortality.

The chemical makeup of the tailings water is not likely to pose a risk to wildlife, including wolverine. Wolverines are not likely to be in the area of the impoundment or LAD Areas due to a lack of persistent spring snow, as discussed earlier in this analysis. The metals in the water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), and those do not appear to have posed a risk to wildlife (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see section 3.13, *Water Quality*). The Ramsey Plant Site would be fenced, restricting wolverine access.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative and Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

The effects of the Rock Creek Ventilation Adit and the Libby Adit Site in Alternatives 3 and Alternative 4 would be the same as Alternative 2. About 8 acres of low quality habitat is within the ground disturbance acres for the access road between the Libby Adit and the Libby Plant Site, including the existing ground disturbance from the road. This portion of the access road is expected to have persistent snow for an average of 1 to 2 years out of 7. Some of the water monitoring sites would be within areas of persistent spring snow. None of the other components of Alternative 3 lie within areas predicted to have persistent spring snow. Total acres (about 18 acres) of Alternative 3 within areas of persistent spring snow, all of which are within the larger Cabinet Mountains block, would be 0.01 percent of that block, or approximately 0.07 percent of an average female home range.

Given the small size of the area affected, that the quality of the habitat is low, and that USFWS (2013c) states that mining is an activity not expected to impact wolverine populations, the effects of Alternatives 3 and 4 on habitat in areas of persistent spring snow are not expected to impact the wolverine population. The scale at which Forest Service activities occur is relatively small compared to the average size of a wolverine home range and although impacts to individual animals may occur, they do not rise to the level to be a threat to the population (USFWS 2014d). Individual wolverines may be impacted through the alteration of habitat in areas of persistent spring snow, but given the small extent of impacts, the availability of habitat elsewhere within the Cabinet Mountains immediately adjacent to the project, the mobility of the species, and their apparent ability to coexist in areas of human activities, the effects on individual wolverines are likely to be small.

Alternatives 3 and 4 would have slightly more overlap of project activities with primary wolverine habitat identified by Inman *et al*. (2013). In the area of the Libby Adit/conveyor/access road, the Inman *et al*. (2013) primary habitat map would overlap a similar sized area to the persistent spring snow map, just a slightly different set of acres. The result is a net increase of 2 acres of overlap with the Inman *et al*. 2013 primary habitat map. The rest of the alternative activities would not overlap the primary habitat map from Inman *et al*. (2013). The effect on dispersal habitat identified by Inman *et al*. (2013) would be the same as Alternative 2.

The effect of vegetation clearing and increased traffic on access roads would be negligible and the same as Alternative 2. The 6,000 to 7,500-foot conveyor from the adit site to the plant site would be longer than Alternative 2 and may deter a wolverine from passing under the conveyor. The effect would be similar to Alternative 2.

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to wolverines. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

None of the proposed activities in Alternatives 3 and Alternative 4 would affect the persistent spring snow that provides connectivity for wolverine populations. Therefore, there would be no threat to the viability of the species as a result of Alternatives 3 and 4.

Alternative A – No Transmission Line

Alternative A would not affect areas of persistent spring snow or impact trapping, nor would there be any impacts to individual wolverines.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

In Alternative B, about 0.3 miles of the transmission line would be within low quality habitat within the large block of persistent spring snow in the Cabinet Mountains. This section of transmission line is expected to have persistent snow for an average of 1 to 3 years out of 7. About 0.25 miles of the transmission line would cross a 120-acre block of low quality habitat to the east of the Cabinet Mountains. This segment of the transmission line is expected to have persistent snow for an average of 1 year out of 7. As stated in the Affected Environment section, this small block is too small to support an entire home range of a wolverine and would likely only be used as part of a larger home range that includes part of the Cabinet Mountains block of persistent spring snow. None of the other components of Alternative B would be within areas predicted to have persistent spring snow, including the Sedlak Park Substation, and would therefore be unlikely to impact wolverines. Vegetation clearing of 0.6 miles for the transmission line in Alternative B within areas of persistent spring snow would change the vegetation in low quality wolverine habitat. Given the small area affected, that the quality of the habitat is low, and that USFWS (2013c) states that wolverines are not tied to a specific vegetation type Alternative B effects in areas of persistent snow are not expected to impact the wolverine population. The scale at which Forest Service activities occur is relatively small compared to the average size of a wolverine home range and although impacts to individual animals may occur, they do not rise to the level to be a threat to the population (USFWS 2014d). Individual wolverines may be impacted through the alteration of habitat in areas of persistent spring snow, but given the small extent of impacts, the availability of habitat elsewhere within the Cabinet Mountains immediately adjacent to the project, the mobility of the species, and their apparent ability to coexist in areas of human activities, the effects on individual wolverines are likely to be small.

Alternative B would have slightly more overlap of project activities with primary wolverine habitat identified by Inman *et al*. (2013). The transmission line, which would parallel the Ramsey Plant access road, would affect an additional 0.5 miles of primary habitat outside areas of persistent spring snow. The rest of the alternative activities would not affect primary habitat. Alternative B would not affect maternal habitat. Most or all of Alternative B would be within dispersal habitat. Similar to the persistent spring snow map, the overlap of Alternative B activities with the Inman *et al*. 2013 maps (each of the four) are still tiny when looking at the contiguous blocks of habitat that overlap project activities. Similarly to the persistent spring snow map, the overlap with the Inman *et al*. 2013 maps, and the potential effects from this alternative, were based on USFWS (2013c and 2014d) by looking at the factors that would impact wolverine populations. Regardless of how much overlap with wolverine habitat, mining and other land management activities were identified in USFWS (2013c and 2014d) and were not expected to impact wolverine populations. In other words, it does not matter if the map of persistent spring snow from Copeland *et al*. 2010 or the habitat maps from Inman *et al*. 2013 are used, the effects of the alternative on wolverine populations, based on USFWS (2013c and 2014d), would be the same. Also, the effects on individual wolverines would be the same as described previously.

The discussion in Alternative 2 regarding the likelihood of a wolverine occurring outside of areas that have persistent spring snow would apply to all transmission line alternatives. Helicopter use for line stringing and line inspection and repair, as well as road use to monitor/maintain the line, is not expected to impact wolverine populations based on the range of activities discussed in USFWS (2013e). No motorized activity associated with transmission line construction would occur from April 1 to June 15 within bear habitat in the Miller Creek and Midas Creek drainages. Construction would not occur during the winter in big-game winter range areas. Clearing of the vegetation from the transmission line corridor would not adversely impact a generalist forager/hunter like a wolverine. Wolverines are habitat generalists and changes to the vegetative condition of its home range do not appear to negatively impact the species (USFWS 2013c). Additionally, as described above, there is very little overlap with areas of persistent spring snow with this alternative. Connectivity between wolverine populations and habitat patches is generally tied to persistent spring snow, and wolverines appear to currently be able to disperse between habitats and through areas where human developments occur (Schwartz *et al*. 2009; USFWS 2013c, 2014d). Proposed activities would not affect the overall extent of persistent spring snow that provides connectivity for wolverine populations. Therefore, there would be no threat to the viability of the species as a result of Alternative B. It is possible that individual wolverines may be impacted and not use areas near project activities as much as they may have in the absence of those activities, although these impacts to a few individuals would not rise to the level of impacting the population. This conclusion is based on the information described previously regarding the apparent ability of wolverines to coexist in areas of human disturbance, the mobility of the species, and the availability of habitat adjacent to the analysis area within the Cabinet Mountains.

Changes associated with motorized access with this alternative, and therefore access for trappers, would likely result in impacts to relatively few individual wolverines, if any, as most of the wolverines in this vicinity would be using the wilderness area were the bulk of the persistent spring snow is located. This also happens to be where motorized use is not allowed and Alternative B would not change this. Therefore, there would be no threat to the viability of the species as a result of this alternative. Trapping mortality (including incidental trapping) undoubtedly can impact local population levels of wolverine, but in their withdrawal of the proposed ESA listing, the USFWS concluded that based on the best scientific and commercial information available the mortality level from trapping (including incidental trapping in Montana and Idaho) is not by itself a threat to the wolverine population (USFWS 2014d). Seasonal closure and low harvest quotas are the predominant factors affecting trapping mortality, as is the naturally low density of wolverines, which helps minimize the likelihood of incidental trapping mortality.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

In Alternative C-R, about 0.25 miles of the transmission line would cross a 120-acre block of low quality habitat to the east of the Cabinet Mountains described in Alternative B. One of the potential helicopter landing sites associated with the transmission line construction is within this same block of persistent spring snow, with another landing site located farther east near the other small block of persistent spring snow (low quality patch of wolverine habitat). None of the other components of Alternative C-R would be within areas predicted to have persistent spring snow. Total miles (about 0.25 miles) of the transmission line in Alternative C-R within areas of persistent spring snow would change the vegetation on a small amount of low quality wolverine habitat. Other effects on the wolverine would be the same as Alternative B. Proposed activities would not affect the persistent spring snow that provides connectivity for wolverine populations. Therefore, there would be no threat to the viability of the species as a result of Alternative C-R.

Alternative D-R – Miller Creek Transmission Line Alternative

In Alternative D-R, there would be no overlap of transmission line activities and any block of persistent spring snow. Other effects on the wolverine would be the same as Alternative B.

Alternative E-R – West Fisher Creek Transmission Line Alternative

The effect of Alternative E-R would be the same as Alternative D-R.

Combined Mine-Transmission Line Effects

None of the mine/transmission line combined alternatives would result in impacts to wolverine populations. As described above in the individual alternative discussions, the activities associated with the Evaluation, Construction, Operations, Closure, and Post-Closure Phases of the mine and all the constituent components, including the transmission line and Sedlak Park Substation, would not result in habitat changes or disturbance that would impact wolverine populations. Given the small size of the area affected, that the quality of the habitat impacted is low, and that USFWS (2013c) states that mining is an activity not expected to impact wolverine populations, effects of the combined mine-transmission line alternatives on habitat in areas of persistent spring snow are not expected to impact the wolverine population. The scale at which Forest Service activities occur is relatively small compared to the average size of a wolverine home range and although impacts to individual animals may occur, they do not rise to the level to be a threat to the population (USFWS 2014d). Individual wolverines may be impacted through the alteration of habitat in areas of persistent spring snow, but given the small extent of impacts, the availability of higher quality habitat elsewhere within the Cabinet Mountains immediately adjacent to the project, the mobility of the species, and their apparent ability to coexist in areas of human activities, the effects on individual wolverines are likely to be small.

Mining was among the activities that USFWS (2013e) specifically identified that they did not expect to cause negative impacts to wolverine populations. USFWS (2013c) identified the availability of persistent spring snow and trapping mortalities as the two main potential threats to wolverine populations. USFWS (2014d) determined that even those two factors do not threaten the species and therefore wolverine is not warranted for listing under ESA. Climate determines the extent of persistent spring snow, and the state determines if there is a trapping season on wolverines or other species, neither of which is impacted by any of the alternative combinations.

The mitigation plan (Alternatives 3, 4, C-R, D-R, and E-R) for the project is unlikely to greatly improve habitat for wolverines. It is unlikely that the parcels of land that may be purchased as mitigation for grizzly bear would occur in areas of persistent spring snow, particularly high quality wolverine habitat. Most of the wolverine habitat is located at higher elevations, and those higher elevations within the Cabinet Mountains are already National Forest System land. There may be a few parcels that contain wolverine habitat. The acquisition of these parcels would not change the extent of persistent spring snow or change state trapping regulations, the two factors identified in USFWS (2013c) as the main concerns for wolverine populations. If roads are closed on these parcels, particularly in winter, then a reduction in easy motorized access to trappers may result in fewer individual wolverines being caught either incidentally or during a wolverine trapping season if the State re-opens the wolverine trapping season.

Road closures done as mitigation (those done in addition to closures on the parcels purchased for mitigation mentioned above) for grizzly bear are unlikely to greatly benefit wolverine. Most of the roads are at elevations outside of the area of persistent spring snow, and those that do extend to higher elevations are generally already gated. The mitigation, depending on the road, may put in barriers and convert those to trails, but they would still be restricted to motorized use. The segment of road in Bear Creek that would be barriered is only seasonally gated currently but would be barriered under the project. This road is partially within low quality wolverine habitat. The road restrictions would not change the extent of persistent spring snow or change the state's trapping regulations, and wolverines have been shown to persist in areas of human use (USFWS 2013c), so limitations on motorized use as a result of this project are not expected to have more than minimal benefits for wolverines.

The potential mitigation parcels and the mitigation road closures were also compared to the Inman *et al*. (2013) maps. The effects would be the same as discussed above with the persistent snow map. The overlap with the Inman *et al*. (2013) maps was consistent with the alternatives compared to the persistent spring snow map from Copeland *et al*. (2010). There was slightly more overlap with the primary habitat map from Inman *et al*. (2013) due to the slightly larger size of that mapped area compared to the persistent spring snow. On the other hand, there was less overlap with the maternal habitat map from Inman *et al*. (2013) compared to the persistent spring snow map. Again, nearly all the mitigation roads/parcels would overlap the dispersal maps for either male or females from Inman *et al*. (2013). However, the effects would be the same as discussed above. The road restrictions would not change the extent of persistent spring snow or change the state's trapping regulations (the two main concerns for wolverine populations), and wolverines have been shown to persist in areas of human use (USFWS 2013c), so limitations on motorized use as a result of this project are not expected to have more than minimal benefits for wolverines.

It is possible that individual wolverines may be impacted and not use areas near project activities as much as they may have in the absence of those activities, although these impacts to a few individuals would not rise to the level of impacting the population. This conclusion is based on the information described previously regarding the apparent ability of wolverines to coexist in areas of human disturbance, the mobility of the species, and the availability of habitat adjacent to the analysis area within the Cabinet Mountains.

Changes associated with motorized access with the alternatives and mitigation, and therefore access for trappers, would likely result in impacts to relatively few individual wolverines, if any, as most of the wolverines in this vicinity would be using the wilderness area were the bulk of the persistent spring snow, and high quality habitat, is located. This also happens to be where motorized use is not allowed and none of the alternatives would change this. Therefore, there would be no threat to the viability of the species as a result of the alternatives. Trapping mortality (including incidental trapping) undoubtedly can impact local population levels of wolverine, but in their withdrawal of the proposed ESA listing, the USFWS concluded that based on the best scientific and commercial information available the mortality level from trapping (including incidental trapping in Montana and Idaho) is not by itself a threat to the wolverine population (USFWS 2014d). Seasonal closure and low harvest quotas are the predominant factors affecting trapping mortality, as is the naturally low density of wolverines, which helps minimize the likelihood of incidental trapping mortality.

Of all of the phases of the project (Evaluation, Construction, Operations, Closure, and Post-Closure), the most human activity would be during the Construction and Operations Phases. As stated previously, wolverines appear to be able to persist in areas of disturbance (USFWS 2013c). Most of the vegetative changes would occur during the same phase. Being habitat generalists and not tied to a specific vegetative type (USFWS 2013c), wolverines would have habitat elsewhere for foraging. Additionally, as discussed for each alternative, very little of the proposed activity is within areas of persistent spring snow, and wolverines spend most of their time in areas of persistent spring snow (Copeland *et al*. 2010).

Cumulative Effects

Relevant past and present factors influencing the existing habitat conditions in the analysis area are described in the affected environment and environmental consequences sections above. This cumulative effects section summarizes the past actions as well as further describes ongoing and other reasonably foreseeable contributions potentially impacting wolverine habitat and the DPS. As described in the *Analysis Area and Methods* section, the analysis area for cumulative effects consists primarily of the contiguous area of persistent spring snow near the proposed and alternative mine and transmission line facilities, although movement/dispersal through areas outside of persistent spring snow was also considered.

Past Actions and the Existing Condition

Land management activities are not considered to significantly affect the conservation of the distinct population segment (USFWS 2013c and 2014d). Wolverines have been able to use and persist on this landscape over the past in association with land management activities. Wolverines may move long distances in an attempt to establish new home ranges. Although they prefer to travel in habitat that is similar to habitat they use for home range establishment (USFWS 2013c p. 7878), wolverines are capable of long-distance movements through variable and anthropogenically altered terrain (USFWS 2013c p. 7879). Connectivity between wolverine populations and habitat patches is generally tied to persistent spring snow, and wolverines appear to currently be able to disperse between habitats and through areas where human developments occur (Schwartz *et al.* 2009, USFWS 2013c p. 7879). As concluded in USFWS 2013c (p. 7879), “The available evidence indicates that dispersing wolverines can successfully cross transportation corridors.”

Alternative 1 – No Mine; Alternative A – No Transmission Line

The No Action Alternative would not contribute any cumulative effects. The existing persistent snow conditions would continue to support use by wolverines and there would be no impact on trapping activities.

Action Alternatives for the Mine and Transmission Line: Ongoing and Reasonably Foreseeable Actions

Because habitat suitability for wolverines is tied to persistent snow areas (generally higher elevation and rugged habitats) there are no apparent conditions within the analysis area that would contribute to effects to wolverine or its habitat. Implementation of the proposed activities would not impact state trapping regulations related to wolverines or other species. There would be no threat to the viability of the wolverine as a result of this project.

The proposed rule stated: “The available scientific and commercial information does not indicate that other potential stressors such as land management, recreation, infrastructure development, and transportation corridors pose a threat to the DPS [distinct population segment]” (USFWS 2013c). Past, present, and reasonably foreseeable actions within the analysis area fall within this list of potential stressors and consists largely of land management activities. They each occur at a small scale compared to a wolverine home range, are found outside large expanses of suitable habitat found within places like wilderness areas, and do not impact the persistent snow areas that wolverines are associated with. Proposed activities in addition with past, present, and reasonably foreseeable actions would not negatively impact the DPS. Although individual wolverines may be impacted by the project, the effects would not impact the population given the availability of high quality habitat adjacent to the analysis area within the Cabinet Mountains, the mobility of the species, the large size of home ranges, and their apparent ability to coexist with human disturbance. There would be no cumulative effects anticipated that would change the effects determination to the wolverine from implementation of the proposed federal action.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Mineral Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. All mine and transmission line alternatives would comply with 36 CFR 228.8. Mine Alternatives 3 and 4 would minimize effect on the wolverine by siting the plant site outside areas predicted to have persistent snow. Transmission Line Alternatives D-R and E-R would avoid road construction and vegetation clearing in areas of persistent snow.

Endangered Species Act

The USFWS 2014d determined that it was not warranted to list wolverine as a threatened species under ESA. Consequently, wolverine has no federal status and reverts back to being a R1 Sensitive Species.

National Forest Management Act/Kootenai Forest Plan

As discussed in the above analysis, wolverines are generalists that are not tied to a specific vegetation type. The footprint of some of the mine facilities (*e.g.*, adits, mine buildings, processing/mill site, impoundment) would remove vegetation and convert it to a nonvegetated condition during the life of the mine (less than 0.1 percent of the Cabinet Mountains block of persistent spring snow overlaps project activities). The transmission line would generally convert forested types to open habitat conditions that may still provide foraging opportunities for a generalist such as a wolverine.

The analysis area has very little overlap with persistent spring snow areas, and there is a large patch of higher quality habitat (persistent spring snow in an average of at least 6 out of 7 years), as well as a large amount of low quality habitat (persistent spring snow in an average of 1-5 years out of 7) adjacent to the analysis area within the Cabinet Mountains that would not be impacted by the action alternatives and would provide habitat for wolverines; all alternatives would be designed in accordance with FW-GDL-WL-21.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual wolverine or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***Implementation of the action alternatives results in a determination for wolverine of may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.*** In all action alternatives, mining related activities are consistent with those described under the previously proposed special rule of the ESA (USFWS 2013c) and are not considered to result in impacts that would significantly affect the conservation of the species. This determination is consistent with USFWS' withdrawal of the proposed rule (USFWS 2014d) which found that the factors potentially affecting the population are not a threat.

Climate change is no longer considered an immediate threat to the wolverine at the population level (USFWS 2014d). It was also determined that the action alternatives would not affect the presence, absence, or abundance of snow remaining late into the spring at the wolverine home range level. Within the footprint of the ground disturbance, which has little overlap with persistent spring snow at the home range level, those acres may have a lower likelihood of being used by wolverine as denning habitat due to snow removal during the life of the mine. The analysis in the project record shows that the action alternatives would not affect climate change.

Trapping is no longer considered a secondary threat to the wolverine at the population level (USFWS 2014d). The trapping season for wolverines is currently closed in Forest Service Region 1, but trapping for other species does occur and incidental wolverine mortality is a possibility. Proposed changes in the level of access via roads are not likely to facilitate enough of a change in trapping pressure to affect wolverines at the population level.

Land management activities, recreation, infrastructure development, and transportation corridors have all been identified as actions that do not pose a threat to wolverines at a population level (USFWS 2014d). At the local level, there may be impacts to individual wolverines, but population level effects are unlikely because: (1) wolverines can travel long distances and are not adverse to crossing open spaces; therefore, if temporarily displaced, they can easily move into the large areas of undisturbed habitat adjacent to the analysis area; and (2) any habitat impacted will not be rendered unsuitable for wolverines post-project and will continue to contribute toward maintaining wolverine viability post-project. The analysis area has very little overlap with persistent spring snow areas, and there is a large patch of higher quality habitat (persistent spring snow in an average of at least 6 out of 7 years),

as well as a large amount of low quality habitat (persistent spring snow in an average of 1-5 years out of 7) adjacent to the analysis area within the Cabinet Mountains that would not be impacted by the action alternatives and would provide habitat for wolverines.

Land management activities occurring as part of the action alternatives do not pose a threat to wolverines at a population level (USFWS 2014d). Additionally, although the action alternatives may affect individuals, they are of little consequence due to the flexibility of habitat use shown by wolverines and their large home range size. Any effects to individual wolverines caused by the action alternatives would not be elevated directly, indirectly, or cumulatively to a level that would represent a loss of viability. The action alternatives may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53. All alternatives would comply with the Nongame and Endangered Species Act.

3.25.4.10 Townsend's Big-Eared Bat

3.25.4.10.1 Regulatory Framework

General 2015 KFP direction considered in the analysis of sensitive species is described in section 3.25.4.1, *Regulatory Framework*, p. 1133. The additional 2015 KFP direction considered in the analysis of Townsend's big-eared bat is:

> **FW-DC-WL-15.** Caves, mines, and snags with loose bark provide areas for roosting, hibernation, or maternity sites for various species of bats (refer to FW-DC-VEG-07, FW-GDL-VEG-04, and FW-GDL-VEG-05).
>
> **FW-GDL-WL-17.** Townsend's Big-eared Bat. Avoid or minimize disturbance at known active roosts and hibernacula in caves, abandoned mines, or rock outcrops using the best available information.

3.25.4.10.2 Analysis Area and Methods

The analysis area for the Townsend's big-eared bat is described in section 3.25.1, *Introduction.* The boundaries for determination of population trend and contribution toward population viability are is the KNF.

Townsend's big-eared bat population ecology, biology, habitat description, and relationships identified by research are described in Reel *et al.* (1989); Perkins and Schommer (1991); Kunz and Martin (1982); MNHP and FWP (2014); Christy and West (1993); Ross (1967); Whitaker *et al.* (1977); Thomas and West (1991); Pierson *et al.* (1999) and Gruver and Kenaith (2006). That information is incorporated by reference. Townsend's big-eared bat occurrence data come from recent District wildlife survey records and KNF historical data (NRIS Wildlife) and the MNHP.

Conservation assessments for Townsend's big-eared bat (Pierson *et al.* 1999, Gruver and Kenaith 2006) provide recommendations for forest management activities such as vegetative conversions and timber harvest. Primary concerns are for the protection of known and potential hibernating/roosting habitat, especially caves and abandoned mines, and maintenance or enhancement of foraging habitat within proximity of these sites. No specific prescriptions for vegetation management are provided as Townsend's big-eared bat forage in a variety of habitats and knowledge of local conditions that may influence use is limited. Habitat edges (both forested and riparian), riparian corridors, and water quality appear beneficial and provide a suitable prey base, drinking opportunities, and movement areas.

The impacts analysis includes an evaluation of the potential benefits to Townsend's big-eared bat from mitigation measures proposed by MMC or the agencies, such as implementation of the Vegetation Removal and Disposition Plan (section 2.5.2.6.2, *Vegetation Removal and Disposition Plan*), land acquisition associated with grizzly bear mitigation (sections 2.4.6.3, *Grizzly Bear* and 2.5.7.3.1, *Grizzly Bear*).

3.25.4.10.3 Affected Environment

Townsend's big-eared bats are year-round residents of Montana and the KNF and are found in a variety of habitat types from grasslands, shrublands, and forested habitats across the United States. However, availability of suitable hibernating and/or roosting habitat influences local distribution and seasonal use by Townsend's big-eared bat populations. They are highly associated with caves or other cave like rock structures for roosting. Following European settlement, in areas where this habitat is limited Townsend's big-eared bat have been documented to use man-made structures that provide cave like features including abandoned mines, buildings, bridges, and concrete culverts. More recently, they have been documented to also use basal hollows of old growth redwoods for day and maternity roosts (Fellers and Pierson 2002, Mazurek 2004). Townsend's big-eared bats are known to feed along forest edges, and can be associated with either dry or wet type coniferous forests. Tree cavities provide potential roosting habitat for the Townsend's big-eared bat (Perkins and Schommer 1991; MNHP and FWP 2014), and preference is shown for old growth forest (Thomas and West 1991). Caves and mines are used as winter hibernacula, day and night roosts, and maternity roosts, and are important habitat for this species (USDA Forest Service 2003b). Young and mature forests are used for feeding (Ibid.), with primary foraging areas near lakes (Grindal 1995). A KNF status summary of the Townsend's big-eared bat was documented by Johnson (1999). During surveys of the KNF conducted from 1993 to 1995 by Hendricks *et al.* (1995, 1996), the species was located in all planning units, but no key roosting sites such as caves or mines were located. The bat population size on the KNF is unknown.

Observations recorded prior to 1997 by the District, Forest, and MNHP have documented the Townsend's big-eared bat within the Crazy and Silverfish PSUs, specifically at Howard Lake and in the Libby Creek Recreational Gold Panning Area on Libby Creek (Westech 2005a). Abandoned mines potentially providing hibernacula are known to exist within the Crazy and Silverfish PSUs, and include the Gloria, Copper Reward, Golden West, and Snowshoe mines (Hargrave *et al.* 1999). Hibernaculum for Townsend's big-eared bats have been documented at an abandoned mine in the Silverfish PSU. As part of the Abandoned Mine Lands Program, the KNF installed grates designed to allow access for bats and claimants while providing for human safety on adits located at the Gloria, Granite Trailhead, Golden West, and American Kootenai mines.

Larger diameter snags or trees in the analysis area may be used for summer roosting. The Crazy PSU contains 8,350 acres of effective old growth, and the Silverfish PSU contains 5,298 acres of effective old growth. The Crazy PSU contains 465 acres of recruitment potential old growth, and the Silverfish PSU contains 1,491 acres of recruitment potential old growth. These stands and the remaining timbered habitat provide suitable roosting habitat in the form of large snags with cavities, as well as abundant foraging habitat across the forest landscape. Both PSU contain sufficient snag habitat. Environmental Consequences

Alternative 1 – No Mine

There would be no expected change in the existing condition with implementation of Alternative 1. No direct effect to Townsend's habitat would occur. There would be no impacts to roost sites (*e.g.,* caves, mines, old buildings, or large snags). No snags or old growth would be impacted under this alternative. The addition or loss of snags would depend on other factors, such as firewood cutting, wind events, natural attrition, or wildfire. The level of impact from these factors cannot be calculated due to the high uncertainty in predicting occurrence and intensity levels.

Alternative 2 – MMC's Proposed Mine

In Alternative 2, no impacts on potential Townsend's big-eared bat habitat would occur in the Silverfish PSU. Alternative 2 would affect 414 acres of effective and recruitment potential old growth in the Crazy PSU (Table 183), a 5 percent decrease of the total effective and recruitment potential old growth available. Harvest of old growth and losses of other coniferous habitat associated with Alternative 2 would reduce and fragment available day-roosting habitat for the Townsend's big-eared bat in the Crazy PSU. Impacts on coniferous forest, old growth, and cavity habitat are further described in sections 3.22.2, *Old Growth Ecosystems* and 3.25.2.2, *Snags and Woody Debris*. Alternative 2 would not affect caves, mines, tunnels, or lakes in either the Crazy or Silverfish PSU. Although Townsend's big-eared bats prefer caves and mines, disturbance or mortality of bats may occur if bats were using a snag that was cut down during construction. The loss of snags providing potential Townsend's big-eared bat roosting habitat resulting from Alternative 2 would have negligible to minor impacts on this bat, given the existing snag levels and the bat's preference for cave habitat (see section 3.25.2.2, *Snags and Woody Debris*).

Indirect impacts to Townsend's big-eared bats would include potential mortality of injury from collision with haul trucks, contaminant uptake of mine, adit, or tailings water at ponds, and displacement or altered behavior caused by noise. If bats drank from mine, adit, or tailings water or foraged on insects with increased metal loading, they risk ingesting toxins and heavy metals, which may result in reduced reproductive ability or increased mortality (O'Shea *et al.* 2000). The metals in the water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section).

Mine traffic, particularly large, nighttime traffic in riparian areas, may collide with foraging Townsend's big-eared bats, increasing injury or mortality. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1630), which would minimize vehicular-bat collisions during the early morning, evening and night time-periods. During the Construction Phase, waste rock would be hauled to the LAD Areas and the tailings impoundment. Noise and other disturbances, such as blasting, construction of the plant and adit sites, road construction and use, and plant and adit operations may cause Townsend's big-eared bats to avoid nearby habitat, at least temporarily. Disturbance impacts would likely be greatest during the Construction Phase, but may persist through mine operations.

Acquisition of 2,758 acres of private land associated with grizzly bear habitat mitigation would provide additional old growth if bat habitat were present on the acquired parcels. Alternative 2 would not affect caves, mines, tunnels, or lakes in either the Crazy or Silverfish PSU. Although some individual Townsend's big-eared bats may be impacted by Alternative 2, given the availability of surrounding snags and old growth, the proposed project is not expected to reduce local bat populations.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative and Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts on Townsend's big-eared bat from Alternatives 3 and 4 would be similar to Alternative 2. Alternative 3 would have the least effect on effective and recruitment potential old growth of the mine alternatives, affecting 256 acres of effective and recruitment potential old growth in the Crazy PSU. Alternative 4 would affect 277 acres of effective and recruitment potential old growth in the Crazy PSU (Table 183).

Impacts on potential Townsend's big-eared bat habitat would be minimized through implementation of mitigation measures. Bats would be at less risk of contaminant uptake from storage of mine, adit, and tailings water in Alternatives 3 and 4. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to bats. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in the *Water Quality* section, p. 712.

MMC would leave snags within the disturbance area of the Alternatives 3 or 4, unless required to be removed for safety or operational reasons. This mitigation would be incorporated into the Vegetation Removal and Disposition Plan (section 2.5.2.6.2, *Vegetation Removal and Disposition Plan*). The agencies' land acquisition requirement of 5,387 acres (Alternative 3) or 6,151 acres (Alternative 4) of private land (section 2.5.7.3.1, *Grizzly Bear*) would likely be more effective at improving bat habitat because more land would be protected. Although some individual may be impacted by Alternatives 3 and 4, given the availability of surrounding habitat and that no impacts on key roosting habitat or potential hibernacula such as caves, mines, or rock outcrops would occur, Alternative B would not reduce local Townsend's big-eared bat populations.

Alternative A – No Transmission Line

Alternative A would not physically affect cavity habitat or populations of Townsend's big-eared bat. The addition or loss of snags would depend on other factors, such as firewood cutting, wind events, natural attrition, or wildfire. The level of impact from these factors cannot be calculated due to the high uncertainty in predicting occurrence and intensity levels.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would have the greatest impact on effective and recruitment potential old growth of the transmission line alternatives, affecting 27 acres of effective and recruitment potential old growth in the Crazy PSU and 7 acres in the Silverfish PSU (Table 184). Harvest of 27 acres of old growth associated with Alternative B would reduce available day-roosting habitat for Townsend's big-eared bat in the Crazy PSU by less than 1 percent in the both PSUs. Alternative B would remove about 4 acres of old growth providing potential roosting habitat on private land along the Fisher River and a short portion of Miller Creek. Construction of the Sedlak Park Substation and loop line would not affect Townsend's big-eared bat due to lack of suitable habitat. Impacts on old growth are described in section 3.22, *Vegetation*. Disturbance or mortality of bats may occur if bats were using a snag that was cut down during line construction.

Noise from helicopters during line stringing and from other construction-related activities may cause Townsend's big-eared bats to avoid nearby habitat, at least temporarily. Disturbance impacts would be short-term and, with the exception of line maintenance activities, would cease after transmission line construction. None of the transmission line alternatives would affect caves, mines, tunnels, or lakes in either the Crazy or Silverfish PSU. Although some individual may be impacted by Alternative B, given the availability of surrounding habitat and that no impacts on key roosting habitat or potential hibernacula such as caves, mines, or rock outcrops would occur, Alternative B would not reduce local Townsend's big-eared bat populations.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

For Alternative C-R, no effective or recruitment potential old growth would be removed in the Crazy PSU, and 21 acres would be removed in the Silverfish PSU (Table 184). Construction of the Sedlak Park Substation and loop line would not affect Townsend's big-eared bat due to lack of suitable habitat. Impacts on potential Townsend's big-eared bat roosting habitat also would be minimized through implementation of mitigation measures. MMC would leave snags within the clearing width of Alternatives C-R, D-R, and E-R, unless required to be removed for safety or operational reasons. This mitigation would be incorporated into the Vegetation Removal and

Disposition Plan (section 2.5.2.6.2). Although some individual may be impacted by Alternative C-R, given the availability of surrounding habitat and that no impacts on key roosting habitat or potential hibernacula such as caves, mines, or rock outcrops would occur, Alternative B would not reduce local Townsend's big-eared bat populations.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts on the Townsend's big-eared bat from Alternative D-R would be the same as Alternative C-R, except 8 acres of effective or recruitment potential old growth would be impacted by Alternative D-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Alternative E-R would not remove or clear old growth in the Crazy or Silverfish PSU. Seven acres of effective or recruitment potential old growth would be impacted on private and State land where the transmission line would cross the Fisher River and parallel West Fisher Creek. Construction of the Sedlak Park Substation and loop line would not affect Townsend's big-eared bat due to lack of suitable habitat. The agencies' mitigation would be similar to Alternative C-R

Combined Mine-Transmission Line Effects

Impacts on old growth from combined mine and transmission line alternatives before mitigation would be the greatest (453 acres of effective or recruitment potential old growth removed in the Crazy and Silverfish PSUs) for MMC's proposed alternative (Alternative 2B). Effective and recruitment potential old growth removed in the Crazy and Silverfish PSUs for the agencies' alternatives (Alternatives 3C, 3D, 3E, 4C, 4D, and 4E), including private and State land, would range from 214 acres for Alternative 4E-R to 246 acres for Alternatives 3C-R. Indirect impacts to Townsend's big-eared bats, such potential mortality of injury from collision with haul trucks, contaminant uptake of mine, adit, or tailings water at ponds, and displacement or altered behavior caused by noise, would be the same as described for the individual mine and transmission line alternatives. Construction of the Sedlak Park Substation and loop line would not affect Townsend's big-eared bat due to lack of suitable habitat.

Impacts on coniferous forest and old growth are described in section 3.22.2, *Old Growth Ecosystems*. The loss of snags providing potential Townsend's big-eared bat roosting habitat resulting from the combined action alternatives would have minor impacts on this bat, given the existing snag levels (see section 3.25.2.2, *Snags and Woody Debris*). None of the combined mine-transmission line alternatives would affect caves, mines, tunnels, or lakes in either the Crazy or Silverfish PSU. Although some individual Townsend's big-eared bats may be impacted by the combined action alternatives, given the availability of surrounding habitat, all combined mine-transmission line alternatives would not reduce local bat populations.

Cumulative Effects

Past actions are described in section 3.2, *Past and Current Actions,* shown on Figure 50, and listed in Appendix E. Past actions, particularly timber harvest, road construction, and fire-suppression activities, have altered the old growth ecosystems in the analysis area, resulting in a reduction in early and late succession habitats; conditions favoring shade-tolerant, fire-intolerant species; loss of large snags and down wood; and increases in tree density and a shift to a largely mid-seral structural stage (USDA Forest Service 2003b). Firewood cutting would continue to occur where open roads provide access to old growth, contributing removal of snags important to Townsend's big-eared bats. Continuing development of private lands, including timber harvest, home construction, and land clearing would contribute to losses of bat habitat in the analysis area. Impacts on Townsend's big-eared bats on private and State lands would be minimal because of the limited amounts of old growth occur on private and State lands, based on past and current harvest practices. Alternative 1A would not have cumulative impacts on the Townsend's big-eared bat or its habitat.

Activities associated with the Miller-West Fisher Vegetation Management Project, the Coyote Improvement Vegetation Management Project, and the Silverbutte Bugs timber sale, which would occur in the Silverfish PSU, would not directly affect old growth providing potential Townsend's big-eared bat habitat. While the combined action alternatives, in combination with other past, current, and reasonably foreseeable actions, would result in some losses and degradation of bat habitat, cumulative impacts on overall areas of old growth would likely be minimal.

Cumulative noise and other disturbances may occur as a result of the combined action alternatives and other reasonably foreseeable actions. Cumulative disturbance effects may affect individual Townsend's big-eared bats, but would not likely affect their populations in the KNF.

Cumulatively, the timber harvest activities on public and private lands and the removal of dead standing trees, as well as the removal of live trees with cavities (depending on their diameter) may reduce potential summer roosting sites for the Townsend's big-eared bat in other parts of the analysis area. No direct cumulative effects on key hibernacula would occur.

The existing snag levels are greater than 2015 KFP-desired conditions and guidelines for snag and snag recruitment levels. Cumulatively, with all other reasonably foreseeable actions on private and corporate lands considered, sufficient cavity habitat would remain in the Crazy and Silverfish PSUs and the KNF to maintain existing Townsend's big-eared bat populations.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In these alternatives, MMC did not propose to implement feasible measures to minimize effects on the Townsend's big-eared bat or practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would incorporate feasible and practicable measures to minimize adverse environmental impacts on the mountain and wildlife habitat. These measures would include eliminating storage of mine and adit water, eliminating use of the LAD Areas and their associated surge pond, requiring a water management plan that would reduce tailings water concentrations, and implementing the Environmental Specifications and a Vegetation Removal and Disposition Plan.

National Forest Management Act/Kootenai Forest Plan

None of the mine or transmission line alternatives would affect key roosting habitat or potential hibernacula such as caves, mines, or rock outcrops. Although timber harvest activities associated with the action alternatives would reduce potential summer roosting sites for the Townsend's big-eared bat, impacts would be small. All mine or transmission line alternatives would be designed in accordance with guideline FW-GDL-WL-17.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not impact individual Townsend's big-eared bats or their habitat within the analysis area, and would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***Implementation of the action alternatives result in a determination of may impact individuals or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for Townsend's big-eared bats.*** This determination is based on: 1) none of the combined mine-transmission line alternatives would affect key roosting habitat or potential hibernacula such as caves, mines, or rock outcrops, 2) timber harvest activities associated with the combined action alternatives would reduce potential summer roosting sites for the Townsend's big-eared bat, but impacts would be too small to change the existing potential population index for pileated woodpecker and 3) snag levels would continue to be greater than 2015 KFP guidelines KFP- and sufficient cavity habitat would remain in the Crazy and Silverfish PSUs and the KNF to provide roosting habitat for Townsend's big-eared bat populations; and 4) a forested environment suitable for foraging would remain well distributed across the Crazy and Silverfish PSUs and the KNF.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

3.25.4.11 Western Toad

3.25.4.11.1 *Analysis Area and Methods*

Western toad ecology, biology, habitat use, status, and conservation are described and summarized in Maxell *et al*. (2009), Maxell (2000) and Reichel and Flath (1995). That information is incorporated by reference. Western toad occurrence data come from District wildlife observation records and KNF historical data (NRIS Wildlife) and other agencies (MNHP).

Criteria used to compare the alternative impacts on the western toad and its habitat includes impacts on known breeding/rearing habitat, potential breeding habitat, and potential upland foraging habitat. In the analysis area, potential breeding habitat is represented by wetlands and aquatic habitat, as described in sections 3.6, *Aquatic Life and Fisheries* and 3.23, *Wetlands and Other Waters of the U.S.*

Suitable aquatic breeding habitat for western toads was determined by selecting ponds, lakes, seeps and springs, and low gradient (less than 7 percent) perennial streams and rivers. All KNF wetlands and all project specific wetlands and streams were buffered by 2,000 meters. The KNF provided terrestrial habitat broken into "High Quality" and "Other Potential" habitat categories, which were analyzed within the aquatic habitat.

The analysis area for the western toad is described in section 3.25.1, *Introduction.* The area for determination of population trend and contribution toward population viability is the KNF.

3.25.4.11.2 *Affected Environment*

Western toads are largely terrestrial species that are found in a wide variety of habitats including wetlands, forests, woodlands, meadows, and floodplains in the mountains and mountain valleys. They are aquatic species only during the short breeding/rearing season. Western toads require over-wintering, breeding/rearing, and foraging habitat, and may also be dependent on habitats suitable for migration if the three required habitat types are isolated spatially. Over-wintering may take place in underground caverns or in rodent burrows, breeding/rearing takes place in aquatic sites such as shallow areas of large and small lakes or temporary ponds, and foraging habitat consists largely of terrestrial uplands (Maxell 2000). Research by Bartelt and Peterson (1994) showed that western toad movement in foraging areas was significantly influenced by the distribution of shrub cover and toads may have avoided macrohabitats (*e.g.*, forested stand, shrub fields, meadow) with little or no canopy or shrub cover. In Montana, the species has been documented to occur as high as 9,220 feet in elevation.

Quantitative data regarding the western toad's use of upland and forested habitats are limited. Western toads are known to migrate between the aquatic breeding and terrestrial non-breeding habitats (NatureServe 2012). Movement of toads between breeding sites has been documented from 1.6 miles to greater than 3 miles (Corn *et al.* 1998; Bartelt and Peterson 1994). Movement in foraging areas may be influenced by the distribution of shrub cover, and toads may avoid habitats with low canopy closure and shrub cover, such as clearcuts. Down wood may be important in providing refugia for this species (Bartelt and Peterson 1994).

According to the KNF status summary of the western toad (Johnson 1999), the species has been found in seven of the eight planning units in the KNF. The population size is unknown and direct measures of population trend on the KNF are not available. About 35 breeding sites were verified in the KNF between 1995 and 1998 (Johnson 1999).

Results of annual District surveys have not identified any breeding sites in the Crazy or Silverfish PSUs (Johnson 1999). Observation from the late 1980s and early 1990s suggest that western toad breeding may be present in the Little Cherry Creek drainage (Westech 2005a). In 2007, one adult western toad was found in the Poorman Tailings Impoundment Site in the Crazy PSU (Geomatrix 2009b). Potential breeding habitat is present in the Crazy and Silverfish PSUs in aquatic and wetland habitats, including temporal ponds or road ditches. Upland terrestrial habitat providing relatively good shrub or forest cover within the Crazy and Silverfish PSUs is considered potential foraging habitat. About 62,751 and 66,467 acres of upland terrestrial western toad habitat occur in the Crazy and Silverfish PSUs, respectively.

The majority of the private and State lands in the analysis area have high road densities and have been logged in the past 20 to 30 years, resulting in fragmented coniferous forest. Vegetation communities in the analysis area, including private and State land, are shown on Figure 85.

3.25.4.11.3 *Environmental Consequences*

Alternative 1 – No Mine

Alternative 1 would not disturb the western toad or their habitat and would have no effect on this species. Natural successional processes would continue to occur within the upland habitat being used by western toads for foraging and over-wintering habitat. No impacts to riparian areas and breeding/rearing habitat would occur. In the short-term, the toad's use of these habitats would continue at current levels.

However, plant succession would continue on many of the sites and would result in an increasing canopy closure that may not be used as frequently by western toads. Greater fuel accumulations would result in a greater potential for a high severity fire throughout the analysis area, including streamside riparian habitats. Western toads have been reported to use burned areas in the year following fires in western Montana (Guscio 2007; Hossack and Corn 2007) even in high severity burn areas (Guscio 2007). This included colonization of wetlands for breeding use where they had not been documented before (Hossack and Corn 2007). Burned forests may improve thermal conditions (*e.g.,* warmer environment) that may result in physical benefits to the toad (Hossack *et al*. 2009). Although fire appears to provide habitats that benefit western toads there also seem to be some limitations. A high severity wildfire that reduces the overstory vegetation along aquatic breeding habitats could alter the wetland habitat and make it unsuitable for western toads (Hossack and Corn 2008). Additionally, greater exposure and warmer temperatures increases the risk for evaporative water loss. Western toads showed a changed in use from high severity to partially burned habitats during summer where more cover and greater moisture occurred, likely reducing the risk for water loss (Guscio *et al*. 2008, Hossack *et al*. 2009). Therefore, an extensive high severity fire in both riparian and upland terrestrial habitats could impact the suitability, at least seasonally, of large areas for western toads.

Alternative 2 – MMC’s Proposed Mine

Threats to the western toad from the proposed mine include forest clearing for mine facilities, road construction and maintenance, vehicle use on roads, environmental contaminants, and isolation of populations through habitat fragmentation. Alternative 2 would disturb 2 acres of high quality western toad habitat (Table 215). The effects on streams that may provide potential western toad habitat are discussed in sections 3.6, *Aquatic Life and Fisheries* and 3.23, *Wetlands and Other Waters of the U.S*. The feasibility of MMC’s proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands that provide toad habitat is uncertain. MMC’s plan is conceptual and would be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. Section 3.23, *Wetlands and Other Waters of the U.S.* discusses proposed wetland mitigation in more detail. About 2,234 acres of other potential habitat, including upland foraging habitat, would be disturbed by Alternative 2, primarily in the tailings impoundment area (Table 215). Impacted potential habitat would represent about 4.9 percent of the total habitat available in the Crazy PSU. Some down wood and wintering habitat also would be lost as a result of Alternative 2. Relative to existing habitat and down wood, these losses would have minor impacts on the western toad.

Table 215. Available Western Toad Habitat and Potential Effects in the Analysis Area by Mine Alternative.

Measurement Criteria	[1] No Mine Existing Condition	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impound-ment	[4] Agency Mitigated Little Cherry Creek Impound-ment
Crazy PSU				
High quality habitat (acres)	6.970	6,968 (2/<0.1)	6,969 (1/<0.1)	6,969 (1/<0.1)
Other potential habitat (acres)	46,021	43,787 (2,234/4.9)	44,556 (1,465/3.2)	44,431 (1,590/3.5)
Silverfish PSU				
High quality habitat (acres)	2,308	2,308 (0/0)	2,308 (0/0)	2,308 (0/0)
Other potential habitat (acres)	53,950	53,950 (0/0)	53,950 (0/0)	53,950 (0/0)

Number in parentheses is the reduction in habitat acres/percentage compared to existing conditions.

The fragmentation of natural habitats from timber harvesting and road building may impede dispersal and decrease the probability of wetland recolonization by amphibians (Semlitsch 2000). Western toads are considered terrestrial habitat generalists (deMaynadier and Hunter 1998) and tend to be more tolerant than some amphibians of forest edges, tree harvests, and declining patch size (Renken *et al.* 2004).

About 10 miles of the Bear Creek Road (NFS road #278), from US 2 to the Bear Creek bridge, would be widened on its existing alignment and chip-sealed. The roadway width would be 20 to 29 feet wide and designed to handle speeds of 35 to 45 mph. The disturbed area, included ditches and cut-and-fill slopes, is expected to be up to 100 feet wide. Because the Bear Creek Road would be chip-sealed, use of mine or adit water and/or chemical stabilizers for dust suppression along the Bear Creek Road would be unlikely. Widening and improvement of the Bear Creek Road would affect 0.2 acres of wetlands along the road (see Table 187 in the *Wetlands and Other Waters of the U.S.* section) and may remove small area of potential western toad habitat. Some incidental mortality may occur due to forest clearing and increased traffic associated with Alternative 2.

MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section).

Alternative 2 would disturb 266 acres within Riparian Habitat Conservation Areas (RHCAs) on National Forest System land; 152 acres of other riparian areas on private land would be disturbed (Table 75). Portions of LAD Area 2, the tailings impoundment, the Ramsey Plant Site, and the Libby Adit would be within RHCAs or riparian areas on private land under this alternative

(Figure 53). Roads would be constructed or reconstructed within the RHCAs of Little Cherry, Libby, Bear, Poorman, and Ramsey creeks, as well as other unnamed tributaries. Adverse direct effects on toad habitat could occur where roads and facilities were constructed in RHCAs and particularly where roads crossed streams, but the design features and BMPs to be implemented In Alternative 2 would minimize such effects (MMI 2006). Most of the roads planned for reconstruction are existing roads that cross a RHCA only at a stream crossing, but segments of existing roads parallel the RHCAs along Ramsey and Libby creeks.

The KNF's analysis of sediment erosion from roads to streams (KNF 2013) indicates that 79 tons of sediment would be generated during the project in the combined Evaluation, Construction, and Operations Phases in Alternative 2 with BMPs (Table 132, p. 761). This would be a 52-percent decrease from the 163.5 tons of sediment estimated to be produced under existing conditions without the project over the same time frame. The highest percentage of reductions would occur in the Construction Phase. While substantially less sediment is predicted to be delivered overall to analysis area streams from roads under the alternatives than under existing conditions, temporary increases in sediment input would occur at some locations. Any sedimentation that were to occur from roads, sediment pond overflows, or other sources would have the potential to alter western toad habitat by decreasing pool depth and habitat complexity, changing substrate composition by filling in interstitial spaces, and increasing substrate embeddedness (Rieman and McIntyre 1993; Waters 1995). One of the fisheries mitigation projects proposed by MMC would be to conduct a sediment-source inventory in the watershed, and stabilize, recontour, and revegetate priority source areas, which are typically roadcuts in Libby, Hoodoo, Poorman, Midas, and Crazyman creeks. If implemented, this project would reduce the contribution of sediment from priority source areas to the Libby Creek watershed. Because specific priority source areas have not been identified, the effects of the mitigation were not quantified.

Increases in water temperature as a result of Alternative 2 are not anticipated. Mine inflows, discharges, and stream diversions projected for Alternative 2 may change lake levels and streamflows. Flow in Little Cherry Creek would be substantially less, reducing or eliminating western toad breeding may be present in the Little Cherry Creek drainage (Westech 2005a).

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Direct impacts on western toad from Alternative 3 would be less than Alternative 2, affecting less high quality habitat (1 acre) and less upland foraging habitat (1,465 acres) or about 3.2 percent of the habitat available (Table 215). Impacts on wetlands would be mitigated through implementation of the agencies' Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan. The direct effect on the toad from increased traffic would be the same as Alternative 2.

As with Alternative 2, the Libby Creek watershed would be at risk due to short-term impacts from increased sediment. Potential sediment impacts would be reduced in Alternative 3 compared to Alternative 2, but would affect toad populations through the same mechanisms as discussed for that alternative. The locations and structures of the plant and impoundment site in Alternative 3 would decrease disturbance within RHCAs. Alternative 3 would affect 256 acres of RHCAs on National Forest System land and 9 acres of other riparian areas on private land, substantially less than Alternative 2 (Table 75). Because RHCAs are designed to act as a buffer to protect the streams from sediment as well as other impacts (Belt *et al.*1992), fewer disturbances within these areas would reduce the amount of sediment that would reach the streams, particularly during the Construction Phase when sediment impacts have the greatest probability of occurring. Based on the KNF's analysis (Table 132) (KNF 2013), 136.5 tons of sediment would be delivered to analysis area streams from roads over the 25-year period included in the Evaluation, Construction, and Operations Phases, which would be a reduction of 194.0 tons (59 percent) from what was estimated for existing conditions under the same time frame. The tons of sediment predicted to be delivered from roads to streams cannot be compared directly between alternatives as the roads proposed for use under each alternative would different but the percentage decrease from existing conditions is greater In Alternative 3 than Alternative 2 by 7 percent.

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to white-tailed deer. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

The flow in the four drainages below impoundment at the Poorman site would be substantially reduced, reducing or eliminating western toad habitat present in the Poorman Tailings Impoundment Site (Geomatrix 2009b). Flow in Little Cherry Creek also would be reduced (by an estimated 19 percent), reducing toad habitat in that stream. Other indirect effects on the toad from water temperature, mine inflows, discharges, and stream diversions would be the same as Alternative 2.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts on potential western toad breeding habitat from Alternative 4 would be about the same as Alternative 2, but Alternative 4 would affect slightly more other potential habitat (1,590 acres) or 3.5 percent of the habitat available (Table 215). Impacts on wetlands would be mitigated through implementation of the agencies' Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan.

In general, potential sediment impacts would be reduced in Alternative 4 compared to Alternative 2, but would be similar or greater than those predicted for Alternative 3. In Alternative 4, the permit and disturbance boundaries for the Little Cherry Creek Tailings Impoundment Site would be modified to reduce effects on RHCAs in this drainage in comparison to Alternative 2. Alternative 4 would affect 236 acres of RHCAs on National Forest System land and 147 acres of other riparian areas on private land (Table 75). Because RHCAs are designed to act as buffers to protect the streams from sediment as well as other impacts (Belt *et al.* 1992), fewer disturbances within these areas would reduce the amount of sediment that would reach the streams, particularly during the Construction Phase when the sedimentation impacts associated with the mine facilities are expected to be the most severe.

The mitigation plans for Alternative 4 regarding sediment reduction would be the same as Alternative 3. Proposed road BMPs, road closure mitigation, and implementation of sediment abatement and instream stabilization measures designed to reduce sediment contribution from the identified sediment sources would substantially reduce the contribution of sediment over the long-term to most analysis area streams within the Libby Creek watershed (KNF 2013). The estimated sediment delivery from roads to analysis area streams for the Evaluation, Construction, and Operations Phases would be 140.7 tons, compared to 335.3 tons under existing conditions, which would be a 58 percent decrease (Table 132, p. 761). The percentage decrease would be greater than that predicted to occur in Alternative 2 and similar to Alternative 3.

The Diversion Channel in Alternative 4 would be constructed to minimize erosion and effect on toad habitat in Drainages 5 and 10. Some periodic increases in sediment in the lower channels and Libby Creek would occur, particularly during storm events. These increases is expected to only persist in the short term because much of the sediment would likely be flushed out of the upper Libby Creek drainage by the high flows.

Alternative A – No Transmission Line

Alternative A would not affect the western toad and would have the same effect as Alternative 1.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

The clearing area for Alternative B would include about 11 total acres of western toad high quality habitat in the Crazy and Silverfish PSUs and no high quality western toad habitat on private land. About 175 acres of other potential western toad habitat in the Crazy and Silverfish PSUs and 26 acres of other potential habitat on private land would be disturbed by Alternative B, which represents less than 1 percent of the total foraging habitat available (Table 216). Construction of the Sedlak Park Substation and loop line would not affect the western toad due to lack of suitable habitat. The effects on streams that may provide potential western toad habitat are discussed in sections 3.6, *Aquatic Life and Fisheries* and 3.23, *Wetlands and Other Waters of the U.S.* Direct effects to wetlands are expected to be avoided by placement and location of transmission line facilities and roads outside of wetlands and streams. Less than 0.1 acre of wetlands and streams would be affected by new or upgraded road construction.

Alternative B would disturb 8.9 acres for new access roads or roads with high upgrade requirements on soils having severe erosion risk, the majority of which occur along Libby and Miller creeks and Fisher River (see Table 171, p. 910). Most soils with high sediment delivery potential disturbed by access roads occur along Ramsey, Libby, and Miller creeks and Fisher River (Figure 84). Clearing vegetation, constructing new roads, and upgrading roads in Alternative B would disturb 30 acres of RHCAs on National Forest System land and 35 acres of other riparian areas on private land (Table 79). Some sediment increases would occur, particularly during periods of high activity or large storm events, potentially affecting toad habitat. Transmission line maintenance may periodically result in short-term minor sediment increases to streams at locations where the transmission line was located adjacent to or crossed streams. Transmission line decommissioning also may result in a short-term sediment increases to streams that may temporarily affect toad habitat. Relative to existing habitat and availability of down wood in both high quality and other potential habitat, these losses would have minor impacts on the western toad.

Table 216. Available Western Toad Habitat and Potential Effects in the Analysis Area by Transmission Line Alternative.

Measurement Criteria	[A] No Trans-mission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Crazy PSU					
High quality habitat (acres/%)	6,970	6,966 (4/<0.1%)	6,970 (0/0%)	6,970 (0/0%)	6,970 (0/0%)
Other potential habitat (acres/%)	46,021	45,911 (110/0.2%)	45,948 (73/0.2%)	45,949 (72/0.2%)	45,949 (72/0.2%)
Silverfish PSU					
High quality habitat (acres/%)	2,308	2,301 (7/0.1%)	2,292 (16/0.2%)	2,288 (20/0.2%)	2,305 3/0.1%)
Other potential habitat (acres/%)	53,950	53.885 (65/0.1%)	53,826 (124/0.2%)	53,820 9130/0.2%)	53,823 (127/0.2%)
Private and State Land					
High quality habitat (acres/%)	206	206 (0/0%)	206 (0/0%)	206 (0/0%)	20 (0/0%)
Other potential habitat (acres/%)	13,328	13,302 (26/0.2%)	13,293 (35/0.3 0%)	13,293 (35/0.3 0%)	13,265 (63/0.5%)

Number in parentheses is the reduction in habitat acres/percentage compared to existing conditions.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Impacts on the western toad from Alternative C-R would be less than Alternative B, affecting less high quality habitat. The clearing area for Alternative C-R would include about 16 acres of high quality habitat in the Crazy and Silverfish PSUs or less than 1 acre of the habitat available and no high quality habitat would be disturbed on private land. More other potential western toad habitat, including upland foraging habitat, would be disturbed by Alternative C-R than Alternative B in the Crazy and Silverfish PSUs (197 acres instead of 175 acres), as well as on private land (35 acres instead of 26 acres) (Table 216). Construction of the Sedlak Park Substation and loop line would not affect the western toad due to lack of suitable habitat. Fewer miles of new access roads would be constructed for Alternative C-R than Alternative B, and the potential for stream sedimentation would be lower. New access roads and closed roads with high upgrade requirements in Alternative C-R would disturb 3.1 acres of soils having severe erosion risk, and 0.5 acres of soils with high sediment delivery potential (see Table 171, p. 910). Most soils having severe erosion risk along access roads occur along Libby Creek in the extreme western portion of the transmission line, along Miller and West Fisher creeks, and near the Fisher River crossing (Figure 84). Soils having high sediment delivery potential along access roads occur along Libby and Miller creeks and along the Fisher River. Most soils having potential for slope failure along access roads occur just east of Libby Creek, along Miller Creek and east of Fisher River. Some sediment increases may occur, particularly during periods of high activity or large storm events.

Alternative C-R would disturb 24 acres of RHCAs on National Forest System land and 13 acres of other riparian areas on private land (Table 79). Based on a preliminary design, four structures would be in a RHCA on National Forest System land and three structures would be in a riparian area on private land. During final design, MMC would locate these structures outside riparian areas if alternative locations were technically and economically feasible. Minimizing structure locations in riparian areas, decommissioning new access roads on National Forest System land after construction and using a helicopter for line stringing, logging, and line decommissioning would reduce potential contributions of sediment to area streams and toad habitat.

Implementation of the agencies' Vegetation Removal and Disposition Plan and the Environmental Specifications (Appendix D) also would help minimize impacts on western toad breeding habitat. The effect of transmission line maintenance and decommissioning would be similar to Alternative B.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts of Alternative D-R on western toad would be the same as Alternative C-R, except that slightly more other potential habitat would be disturbed (202 acres instead of 197 acres) (Table 216). Construction of the Sedlak Park Substation and loop line would not affect the western toad due to lack of suitable habitat. Alternative D-R would require 5.1 miles of new roads (Table 78). This alignment also would cross less area with soils that are highly erosive and subject to high sediment delivery and slope failure than Alternative B (see Table 171, p. 910). New access roads and closed roads with high upgrade requirements would disturb 2.6 acres of soils having severe erosion risk, and 0.5 acres of soils with high sediment delivery potential. Most of the soils having severe erosion risk that would be crossed by access roads occur along West Fisher Creek and the Fisher River. The majority of soils with high sediment delivery potential along access roads occur along Libby Creek and the Fisher River (Figure 84).

Disturbance within riparian areas would be less than Alternative B, with 35 acres of RHCAs on National Forest System land and 13 acres of other riparian areas on private land (Table 79). Based on a preliminary design, six structures would be in a RHCA on National Forest System land and three structures would be in a riparian area on private or State land. During final design, MMC would locate these structures outside of riparian areas if alternative locations were technically and economically feasible. Minimizing structure locations in riparian areas, and using a helicopter for line stringing and site clearing would minimize contributions of sediment to area streams and toad habitat.

Implementation of the agencies' Vegetation Removal and Disposition Plan and the Environmental Specifications (Appendix D) also would help minimize impacts on western toad breeding habitat. The effect of transmission line maintenance and decommissioning would be similar to Alternative B.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Impacts of Alternative E-R on western toad would be similar to the same as Alternative C-R, except that slightly more other potential habitat would be disturbed (199 acres instead of 197 acres) (Table 216). Construction of the Sedlak Park Substation and loop line would not affect the western toad due to lack of suitable habitat. Alternative E-R would require the construction of 3.2 miles of new roads (Table 78). New access roads and closed roads with high upgrade requirements would disturb 2.9 acres of soils having severe erosion risk (see Table 171, p. 910), which occur primarily along occur along West Fisher Creek and the Fisher River (Figure 84). This alternative would affect 0.5 acre of soil with high sediment delivery potential.

Disturbance within riparian areas would be slightly less than Alternative B, with 32 acres of RHCAs on National Forest System land and 28 acres of other riparian areas on private or State land (Table 79). Based on a preliminary design, eight structures would be in a RHCA on National Forest System land and nine structures would be in a riparian area on private or State land.

During final design, MMC would locate these structures outside of riparian areas if alternative locations were technically and economically feasible. Minimizing structure locations in riparian areas and using a helicopter for line stringing and site clearing would help minimize the potential for sediment movement to area streams and toad habitat.

Implementation of the agencies' Vegetation Removal and Disposition Plan and the Environmental Specifications (Appendix D) also would help minimize impacts on western toad breeding habitat. The effect of transmission line maintenance and decommissioning would be similar to Alternative B.

Combined Mine-Transmission Line Effects

All alternatives would have similar effects to high quality western toad habitat in the Crazy and Silverfish PSUs, ranging from 4 to 21 acres. Potential effects would occur on less than 1 percent of the available high quality under all alternatives. No alternatives would affect high quality habitat on state and private land (Table 217). Construction of the Sedlak Park Substation and loop line would not affect the western toad due to lack of suitable habitat. Other potential western toad habitat in the Crazy and Silverfish PSUs would be affected the most by Alternative 2B, impacting 2, 329 acres or about 2.4 percent of the other habitat available. The agencies' alternatives would affect between 1,658 and 1.788 acres of other potential habitat or about 1.8 percent of habitat available. In the agencies' combined alternatives, implementation of Wetland Mitigation Plans and the Environmental Specifications (Appendix D) would help minimize impacts on western toad breeding habitat. Impacts on western toad habitat would be somewhat reduced through MMC's and the agencies' proposed land acquisition associated with grizzly bear mitigation. Acquired parcels would be managed for grizzly bear use in perpetuity and could improve or contribute suitable western toad habitat if the acquired parcels provided appropriate habitat characteristics. The agencies' alternatives also would minimize impacts through implementation

Table 217. Available Western Toad Habitat and Potential Effects in the Analysis Area by Combined Mine-Transmission Line Alternative.

Measurement Criteria	[1] Existing Condi-tion	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Crazy PSU								
High quality habitat (acres)	6,970	6,964 (6/<0.1)	6,969 (1/<0.1)	6,969 (1/<0.1)	6,969 (1/<0.1)	6,969 (1/<0.1)	6,969 (1/<0.1)	6,969 (1/<0.1)
Other potential habitat (acres)	46,021	43,694 (2,327/5.1)	44,487 (1,534/3.3)	44,488 (1,533/3.3)	44,488 (1,533/3.3)	44,362 (1,659/3.6)	44,363 (1,658/3.6)	44,363 (1,658/3.6)
Silverfish PSU								
High quality habitat (acres)	2,308	2,301 (7/0.3)	2,292 (16/0.7)	2,288 (20/0.9)	2,305 (3/0.1)	2,292 (16/0.7	2,288 (20/0.9)	2,305 (3/0.1)
Other potential habitat (acres)	53,950	53,885 (65/0.1)	53,826 (124/0.2)	53,820 (130/0.2)	53,823 (127/0.2)	53,826 (124/0.2)	53,820 (130/0.2)	53,823 (127/0.2)

Number in parentheses is the reduction in habitat acres/percentage compared to existing conditions.
Source: GIS analysis by ERO Resources Corp. using KNF data.

of the Vegetation Removal and Disposition Plan (section 2.5.2.6.2, *Vegetation Removal and Disposition Plan*).

The fragmentation of natural habitats from timber harvesting and road building may impede dispersal and decrease the probability of wetland recolonization by amphibians (Semlitsch 2000). Alternative 2B would include the most new road construction (about 12.7 miles). New road construction for the combined agencies' alternatives would be comparable, ranging from 4.2 miles for Alternatives 3C-R and 3E-R, to 7.5 miles for Alternative 3D-R. Western toads are considered terrestrial habitat generalists (deMaynadier and Hunter 1998), and tend to be more tolerant than some amphibians of forest edges, tree harvests, and declining patch size (Renken *et al.* 2004). New road construction, while it may affect individual western toads, would not affect the western toad population in the analysis area.

Cumulative Effects

Past actions, particularly timber harvest, road construction, and fire-suppression activities, have altered the old growth ecosystems and high quality western toad habitat in the analysis area, resulting in a reduction in early and late succession habitats; conditions favoring shade-tolerant, fire-intolerant species; loss of large snags and down wood; increases in tree density; and a shift to a largely mid-seral structural stage (USDA Forest Service 2003b). Continuing development of private lands, including timber harvest, home construction, and land clearing, would contribute to losses of western toad habitat in the analysis area.

Timber harvest has occurred in the analysis area since the 1950s and, up until the early 1990s, harvest occurred within riparian habitats resulting in alterations and reduction of riparian habitat. In some cases, past harvests provided habitat conditions favorable for western toad foraging and overwintering habitat; however, it would have also reduced vegetative cover and down woody materials. High levels of road construction to facilitate harvest occurred through the 1980s and resulted in sedimentation into streams. Detailed descriptions of previous vegetation and road management activities are found at the beginning of Chapter 3 and Appendix E lists all past actions considered in the cumulative effects analysis. Since the adoption of the 1987 KFP and 2015 revision, application of KFP direction has resulted in the protection of riparian habitats, less road construction and road closures, and BMP work on existing roads to reduce sedimentation. In unharvested areas, natural disturbances such as wildfire would have contributed to this mosaic of habitats and forage conditions. In contrast, fire suppression since the early 1900s has altered stand structure resulting in more homogenous stands with greater canopy closure, reduced understory vegetation, greater fuels accumulations in some areas, and an increased potential for severe wildfire.

Alternative 1 would not have cumulative impacts on the western toad. The likelihood of mine alternatives directly or indirectly affecting the western toad is low. No other reasonably foreseeable actions would affect any known locations of western toad. All mine alternatives would have no cumulative impacts on this species.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2

and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on the toad or all practicable measures to maintain and protect wildlife habitat. The agencies’ alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. The agencies’ alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit the toad, including reduced mine disturbance areas, implementation of a wetland mitigation plan more likely to provide high quality toad habitat, implementation of access and design changes that minimize sedimentation of toad habitat, revised water management that would reduce the potential for contaminant uptake and compliance with INFS standards and guidelines for any work in a RHCA along an access road.

National Forest Management Act/Kootenai Forest Plan

Less than 1 percent of the high quality habitat available would be impacted by the mine and transmission line alternatives and minimal other potential habitat would be impacted. The agencies’ alternatives would include implementation of several measures that would further reduce any effects on the western toad, specifically: 1) reduced mine disturbance areas; 2) implementation of a wetland mitigation plan more likely to provide high-quality toad habitat; 3) implementation of access and design changes that minimize sedimentation of toad habitat; 4) revised water management that would reduce the potential for contaminant uptake; 5) and as described in section 3.6, *Aquatic Life and Fisheries*, compliance with INFS standards and guidelines for any work in a RHCA along an access road.

Forest Service Sensitive Species Statement of Findings

The no action alternatives would not affect individual western toads or their habitat, and would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. ***All combined action alternatives may impact individuals or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for western toad.*** This determination is based on: 1) disturbed areas would be 5.1 percent or less of available habitat; 2) some incidental mortality could occur due to forest clearing and increased traffic associated with the mine alternatives; 3) the agencies’ alternatives would include implementation of several measures that would further reduce the likelihood of any adverse effects on the western toad, including reduced mine disturbance areas, implementation of a wetland mitigation plan more likely to provide high quality toad habitat, implementation of access and design changes that minimize sedimentation of toad habitat, revised water management that would reduce the potential for contaminant uptake and compliance with INFS standards and guidelines for any work in a RHCA along an access road.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

3.25.5 Threatened, Endangered, and Proposed Species

3.25.5.1 Regulatory Framework

Section 3.6, *Aquatic Life and Fisheries* discusses the regulatory framework for aquatic and terrestrial federally listed threatened, endangered, proposed, or candidate species. In addition, the MFSA directs the DEQ to approve a transmission line if, in conjunction with other findings, the DEQ finds and determines that the facility would minimize adverse environmental impacts, considering the state of available technology and the nature and economics of the various alternatives. An assessment of effects on federally listed threatened and endangered species is part of the transmission line certification process.

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's mineral regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest System surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

The species list for terrestrial threatened and endangered species known or suspected to occur on the KNF is supplied by the USFWS Montana Ecological Field Services Field Office, current as of June 6, 2013 (USFWS 2013d). Species distribution maps and resulting consultation areas on the KNF received prior concurrence from the USFWS (USFWS 2001). The status of federally listed threatened, endangered, and proposed wildlife species in the analysis area and the KNF's effect determination are shown in Table 218.

Table 218. Federally Listed Threatened, Endangered, and Candidate Species Potentially Affected by the Montanore Project.

Species	ESA Status	Determination	Status in Analysis Area and Comments
Grizzly Bear (*Ursus arctos*)	Threatened	May affect, likely to adversely affect[1]	Species documented to occur
Canada Lynx (*Lynx canadensis*)	Threatened	May affect, likely to adversely affect[2] or May affect, not likely to adversely affect[3]	Species documented to occur
Critical Habitat for Canada Lynx	NA	No effect	Analysis area not within designated critical habitat in the Northern Rocky Mountains Critical Habitat Unit #3

[1]Determination of may affect, likely to adversely affect grizzly bear is for all action alternatives (2B, 3C-R, 3D-R, 3E-R, 4C-R, 4D-R, and 4E-R).
[2]Determination of may affect, likely to adversely affect the lynx is for Alternative 2B only.
[3]Determination of may affect, not likely to adversely affect the lynx is for all agency mitigated action alternatives (3C-R, 3D-R, 3E-R, 4C-R, 4D-R, and 4E-R).
Definition of terms are in Chapter 7, *Glossary.*

3.25.5.2 Grizzly Bear

3.25.5.2.1 Summary of Conclusions

Implementation of the action alternatives may affect and are likely to adversely affect the grizzly bear. Within Bear Management Unit (BMU) 5, all action alternatives would result in mine-related activities occurring continuously along the east Cabinet Mountain front during the grizzly bear spring use period (April 1 to June 15) for the life of the project.

Alternative 2B would physically remove 2,598 acres of grizzly bear habitat over the 30+ year life of the mine and no habitat compensation for long-term mine-associated displacement effects is proposed. Alternative 2B would cause additional decreases in core habitat in BMUs 5 and 6 where core standards are not met in the existing conditions, would increase total motorized route densities (TMRD) in BMU 6, and would have no trend toward meeting core or TMRD standards. Alternative 2B mitigation would compensate for habitat physically lost at a 2:1 ratio prior to activity. As a result of this land acquisition, baseline habitat parameters would improve, but as specific parcels are not yet acquired, improvements to core, open motorized route densities (OMRD), and TMRD could not be calculated for this analysis.

The agencies' alternatives would physically remove between 1,560 and 1,926 acres of grizzly bear habitat over the 30+ year life of the mine. Road access mitigation prior to the Evaluation and Construction Phases would bring the directly affected BMUs into compliance with habitat parameter standards of core, OMRD, and TMRD prior to activity. The agencies' alternatives mitigation would compensate for habitat physically removed (at a 2:1 ratio) and displacement effects (1:1 ratio) from the mine prior to activity. Additional improvements to baseline habitat parameters would result from land acquisition/purchase of conservation easement, but as specific parcels are not yet acquired, improvements could not be calculated for this analysis.

Depending on the combination of the proposed combined action alternatives and the acres required for the habitat compensation, this mitigation would result in improvements (Alternative 2B) or additional improvements (all agency combined alternatives) to the baseline habitat parameters of core, OMRD, and TMRD prior to activity within the south Cabinet Mountain portion of the CYE (see Table 226). Alternative 2B would result in the least improvement, while the agencies' combined action alternatives would result in the most improvement to the baseline parameters.

3.25.5.2.2 Data Sources, Methods, Assumptions, and Bounds of Analysis

Grizzly bear population ecology, biology, habitat description, and relationships identified by research are described in the Grizzly Bear Recovery Plan (USFWS 1993a); the Interagency Grizzly Bear Committee Guidelines (IGBC 1986); the annual progress report for the Cabinet-Yaak grizzly bear research (Kasworm *et al.* 2013c; Kasworm and Manley 1988; Westech 2005a); the 2013 Forest Plan FEIS and associated 2015 Errata to the FEIS, (USDA Forest Service 2013c and 2015a), and the 2015 KNF Land Management Plan Revision herein referred to as the 2015 KFP (USDA Forest Service 2015c). The 2015 KFP retains the Amendment for Motorized Access Management with the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones (USDA Forest Service 2011a, 2011b), herein referred to as the Access Amendment, and corresponding biological opinion (USFWS 2011c). These documents are incorporated herein by reference. A summary of these and more recent documents is provided in the *Affected Environment* section. The KNF's Wildlife BA (USDA Forest Service 2013b) and the USFWS' Grizzly Bear Biological Opinion (USFWS 2014a) and transmittal letter (USFWS 2014b) are incorporated herein by reference. Grizzly bear occurrence data come from recent District wildlife observation records, KNF historical data (NRIS Wildlife), other agencies (USFWS and FWP), and Westech (2005a). KNF GIS layers including boundaries for BMUs, the Cabinet Face bears outside the Recovery Zone (BORZ), approach or linkage areas, as well as road location and status, existing and past vegetation treatments, fire history, and others were used in the grizzly bear analysis, including existing conditions, core, OMRD, TMRD, and linear miles of road.

Grizzly Bear Habitat Bounds of Analysis

Cabinet Yaak Recovery Zone

The majority of the proposed activities are within the Cabinet-Yaak Recovery Zone (CYRZ) (USFWS 1993a). The CYRZ is in northwest Montana and northeast Idaho, directly south of Canada and encompassing 2,600 square miles (USFWS 1993a). The Kootenai River bisects the area with the Cabinet Mountains portion to the south and the Yaak River portion to the north. Within the CYRZ, 5.6 percent (94,272 acres) is designated Wilderness Area, with the Cabinet Mountains containing about 60 percent of the Recovery Zone. The extent to which grizzly bear movement occurs between the two portions is unknown but thought to be minimal (Kasworm *et al.* 2013c).

Recovery zones, including the CYE, contain the minimum seasonal habitat components needed to support a recovering grizzly population. Recovery zones are further divided into smaller BMUs, which afford greater resolution for purposes of habitat evaluation and population monitoring (USFWS 1993a). These BMUs approximate the size of annual home ranges of an adult female grizzly bear and are used for effects analysis (IGBC 1998). As these are only approximations, BMUs account for elevation and seasonal distribution of habitats (Ibid). Breaking the ecosystem down into BMUs allows for analysis to consider effects associated with the activity's area of influence and so that potential effects will not be diluted by considering too large an area (IGBC 1990). The BMUs are biologically meaningful to grizzly bears in that they 1) are based on the average size of a female bear's home range; 2) provide seasonal and elevational movement in response to needs (*e.g.,* food and denning habitat); and 3) provide contiguous, unobstructed habitat allowing for displacement (*i.e.,* core) (Christensen and Madel 1982, IGBC 1990). Delineating BMU boundaries using topographical features establishes a recognizable unit for management consistency, allowing for identification of management needs or concerns, activity planning, scheduling, coordination, and monitoring (Ibid) within and among adjacent ranger districts and forests.

Christensen and Madel (1982) in *Cumulative Effects Analysis Process* chose a 515,000-acre cumulative effects analysis area, which represented 56 percent of the CYRZ and was the focal point of mineral exploration and development on the KNF. In this analysis, it was assumed that if each smaller BMU within that analysis area is maintained in a viable condition, then all BMUs would remain a viable habitat. Based on that well-established premise, the BMU has been consistently identified as the analysis area for analyzing and monitoring effects to the grizzly bear (*e.g.,* USFWS 1995a, IGBC 1998).

The Grizzly Bear Recovery Plan (USFWS 1993a p. 22) outlines the process for considering cumulative effects and correlates that to the cumulative effects model (Christensen 1982). The cumulative effects model expressly provides for use of BMUs as the appropriate scale to consider cumulative impacts. The use of the BMU as the most appropriate scale to consider cumulative impacts is fully consistent with the recovery plan direction to assess impacts in a regional context (USFWS 1993a, p. 22).

Individual projects proposed on the KNF include activities to maintain or improve conditions in affected BMUs and move toward compliance with current standards where needed. Progress on this effort is documented by the KNF by BMU in the annual KFP "Monitoring and Evaluation Reports" (USDA Forest Service 2013g).

The Montanore Project analysis area consists of the Crazy and Silverfish PSUs, which are partially within the CYE and the Cabinet Face BORZ and, consequently, the grizzly bear analysis area does not use the PSU boundaries. All three BMUs 2, 5, and 6 directly affected by physical ground disturbing activities are considered occupied (Kasworm *et al*. 2013c). Human activity and development in these BMUs is concentrated along the open roads found in the major drainages, with timber harvest activities and dispersed recreation occurring in those areas as well as over the remaining network of roads and trails. The proposed mine development and transmission line alternatives occur within the lower elevations of the BMUs and are largely concentrated in existing roaded areas. Some existing core along these areas would be lost by the proposed activities while additional core would be created by required mitigation prior to the Evaluation and Construction Phases of project activity. The proposed Rock Creek Project is a reasonably foreseeable action within BMU 4, located west of BMUs 5 and 6, and the potential for both mines to occur simultaneously could constrict the north-south movement corridor. The agencies' combined alternatives would require core creation (acres vary by combined-mine-transmission line alternative), which would reduce fragmentation, mortality risk, and displacement by improving the north-south corridor connectivity and mitigate for the cumulative effect of two mines. Habitat compensation for habitat physically lost (Alternative 2B and all agency combined alternatives) and habitat compensation for displacement and creation of core (only the agencies' combined alternatives) would improve or maintain the baseline habitat parameters of core, OMRD, and TMRD within the CYRZ. Habitat compensation for displacement effects also has potential to improve connectivity outside the Recovery Zone. Activity-free areas of core would be available both within and adjacent to the affected BMUs. Large portions of core habitat within the affected BMUs are located outside of the project disturbance area. Activity-free areas of core are also found in adjacent BMUs to the north and south. Any bears potentially displaced during project activities would have large areas of core providing secure habitat, in both existing core areas and areas of core that would be created by required mitigation.

Displacement effects from transmission line construction activity related to the use of helicopters (effects of helicopters were analyzed within a 1-mile buffer extending from either side of the transmission line alternatives as described in ERO Resources Corp. (2015) and in the following *Methods* section). Small portions of these transmission line buffers would extend into BMU 7; however, displacement effects are expected to have such low potential to affect bears that this BMU was not considered in the detailed analysis for direct affects for the following reasons: 1) no ground-disturbing activities occur in BMU 7; 2) the area affected is adjacent to the outer edge of the buffers, furthest from the helicopter activity and no direct overflight would occur; 3) the area affected by the transmission line buffers is partially located in core, and if a bear was temporally displaced by helicopter noise, adjacent core habitat outside of the buffer is available; 4) Alternative 2B would restrict activity during the winter on big game winter ranges, which overlaps the helicopter zone of influence in BMU 7, and no spring range or denning habitat has been identified within the Alternative B zone of influence in BMU 7; 5) helicopter noise and any potential displacement effects within BMU 7 would not occur consistently during the activity period; 6) the agencies' alternatives would restrict transmission line construction and decommissioning-related activity outside of the grizzly bear denning and spring use period, though, use of the area in BMU 7 would be more likely to occur during spring or summer; and 7) the likelihood of displacing a grizzly bear during the summer activity period is very low and secure summer habitat located in core would be adjacent and available to any grizzly bear potentially displaced by helicopter noise in BMU 7. Therefore, displacement tables for the transmission line displacement effects due to potential helicopter use during the Construction Phase do not include between 114 acres (Alternatives C-R and D-R) and 658 acres (Alternative B) of grizzly bear habitat in BMU 7 potentially affected by noise associated with helicopter activities.

Therefore, BMUs 2, 5, and 6 have been chosen as the appropriate scale for detailed analysis of direct, indirect, and cumulative effects within the Recovery Zone, and on a larger scale, the additional BMUs 1, 4, 7, 8, and 22 will also be considered for cumulative effects. The cumulative effects analysis for grizzly bears considered activities affecting grizzly bear habitat parameters in the Cabinet Mountain portion of the CYE, including the directly affected BMUs 2, 5, and 6, as well as BMUs 1, 4, 7, 8, and 22 for making the effects determination. The directly affected BMUs 5 and 6 comprise the main bulk of the north-south movement corridor and proposed activities could affect movement patterns in this corridor, which connects the BMUs to the south (7, 8, and 22) to BMUs to the west and north (1, 2, and 4). Cumulatively, due to the reasonably foreseeable Rock Creek Project, which would be located in BMU 4 to the west and adjacent to BMUs 2, 5, and 6, the high-intensity long-duration activities and resulting displacement associated with the two mines could affect grizzly bear security and movement by potentially constricting the north-south movement corridor between BMUs to the north and BMUs toward the south. Thus, for the grizzly bear analysis within the Recovery Zone, all of the National Forest System lands within the Cabinet Mountain portion of the CYRZ are considered the "action area" due to these potential cumulative effects of two concurrent mining development projects. As mentioned previously, this grizzly bear analysis area differs from the Montanore Project analysis area, which is comprised of the Crazy and Silverfish PSUs. Private landowners in the Cabinet Mountain portion of the CYRZ and the adjacent Cabinet Face BORZ (see below for discussion of outside the Recovery Zone) include large corporate land owners of Plum Creek and Stimson. Limiting the assessment of cumulative effects to the southern half of the CYRZ and the Cabinet Face BORZ is appropriate. The number of grizzly bears in the south Cabinet portion is not considered dense enough to create sufficient pressure to push bears north to the Yaak portion (W. Kasworm, pers. comm. 2010) and effects to bears in the Yaak portion would not be anticipated.

Bears Outside Recovery Zones

The current distribution of resident grizzly bears includes areas outside of the recovery zones identified in the Grizzly Bear Recovery Plan (USFWS 1993a). An analysis of potential effects to grizzly bears outside the recovery zones on the KNF was completed in the Access Amendment, FSEIS (USDA Forest Service 2011a, Allen 2011). Current grizzly bear distribution outside of the CYRZ has been delineated into four individual polygons, including the Cabinet Face BORZ. The action alternatives have project activities proposed within the Cabinet Face BORZ, which is adjacent to the east side of the Cabinet Mountains. The 2009 re-analysis of the KNF BORZs (as described in Allen 2011) resulted in boundary changes to the previously delineated Cabinet Face BORZ. These changes were based on all grizzly bear use information for the KNF broken down into sixth order Hydrologic Unit Code (HUC) polygons. Sixth order HUCs were selected because of their size (typically 10,000 to 40,000 acres) and their common use as cumulative effects boundaries for watershed, fisheries, and wildlife analysis in environmental documents by the Forest Service. Adjacent HUCs with enough grizzly bear use to be considered recurring use areas were combined to create contiguous areas of recurring use. Standards for determining recurring use include credible observations (see Kasworm *et al.* 2013c for definition of credible) of multiple individuals, females with cubs, multiple years of use, and radio-locations occurring within a timeframe of 15 years or less (Allen 2011). For the Cabinet Face BORZ, this boundary change reduced the number of acres within the total BORZ from 95,718 to 28,052 acres, and National Forest System acres from 53,612 to 27,093 acres. Allen (2011) is incorporated by reference and provides a complete description of the selection criteria and a list of all HUCs south and west of US 2, which were not included in the Cabinet Face BORZ area due to not meeting the selection criteria to be considered occupied.

To evaluate transmission line construction-related activities using helicopters, effects within the Cabinet Face BORZ on federal lands were considered within a corridor 1 mile on each side of the transmission line alignments, while effects to linear open and total miles of road were compared with the baseline standards established by the Access Amendment.

Within the CYRZ and Cabinet Face BORZ

For both the CYRZ and Cabinet Face BORZ, the analysis considers the present effects of past activities, as required in 36 CFR 220.4(f). These effects are reflected in existing conditions (baseline) and generally include the effects of past road building and vegetation management within the BMUs. In addition, the analysis considers the temporal effects of the activities; that is, how long would the effects of the action alternative last. For the grizzly bear analysis, temporal effects were considered to be short-term (2 to 5 years) or long-term (lasting for life of the mine (30 years) or longer).

The effects of a proposed activity on listed species depend largely on the duration of its effects. Three potential categories of effects are: (1) a short-term event whose effects are relaxed almost immediately (pulse effect), (2) a sustained, long-term, or chronic event whose effects are not relaxed (press effect), or (3) a permanent event that sets a new threshold for some feature of a species' environment (threshold effect) (USFWS and National Marine Fisheries Service 1998). These descriptions of short-term and long-term effects are generally not consistent with the definitions provided in section 3.1.1, *Direct, Indirect, and Cumulative Effects* (p. 273), but they are appropriate for analysis of the threatened grizzly bear. Although relatively long-lived (15-25 years in the wild), the grizzly bear has a low reproductive rate due to the late age of first reproduction (4-7 years), small litter size (typically two cubs), long intervals between litters (three years), and limited cub survival (less than 50 percent). Temporal effects also were used to determine what, if any, reasonably foreseeable activities overlap the activities, the project (geographic) area that could cause cumulative effects.

Direct, indirect, and cumulative effects are evaluated within the CYRZ and extended into the Cabinet Face BORZ, where criteria for documented recurring grizzly bear use has been met. See Figure 92 for the CYRZ and Cabinet Face BORZ boundary in relation to the Montanore Mine Project.

Basis for Grizzly Bear Habitat Analysis Framework Inside the Recovery Zone: The analysis incorporates standards and design elements from the 2011 Access Amendment (USDA Forest Service 2011a, b) as incorporated in the 2015 KFP. Standards were set specific to each BMU to reflect the unique biological factors (*e.g.*, high-quality habitat, sightings of family groups, human-caused mortality, adjacency to BMUs having females with young, and ties to linkage areas), as well as other non-biological factors (highways, access to inholdings, and access to popular recreation areas). The corresponding Access Amendment Biological Opinion (USFWS 2011c, 2011d) established an incidental take statement defined by habitat parameters applicable within the recovery zones based upon the benchmark standards for core habitat, OMRD, and TMRD. The effects analysis for the Montanore Project considers the recovery objectives, compliance with management direction, and best science. Table 219 describes the recovery objective, the habitat parameters evaluated, and the basis for the habitat parameters used in the effects analysis.

As noted in Table 219, the core area, OMRD, and TMRD parameters are based on direction in the Access Amendment, which uses the research recommendations found in Wakkinen and Kasworm (1997) as the benchmark standards for BMUs. Wakkinen and Kasworm (1997) applied research techniques from Mace and Manley (1993) and Mace and Waller (1997) to local bear populations in the Selkirk and Cabinet-Yaak Ecosystems (SCYE). The Wakkinen and Kasworm (1997) recommendations are 1) a minimum core habitat of 55 percent, 2) a maximum of 33 percent of a BMU with greater than 1 mi/mi^2 OMRD, and 3) a maximum of 26 percent of a BMU with greater than 2 mi/mi^2 of TMRD.

Outside the CYRZ and BORZ

The analysis area for evaluating project impacts on individuals and their habitat also consists of private and State land potentially affected by the alternatives. To evaluate potential direct, indirect, and cumulative impacts of the transmission line and Sedlak Park Substation on private and State lands as required by the DEQ for MMC’s MFSA evaluation, the analysis area includes all additional non-National Forest System land within a corridor 1 mile on each side of the alternative transmission line alignments (Figure 92) outside of the CYRZ and BORZ boundaries. The 1-mile buffer on either side of the transmission line was guided by DEQ MFSA-2 (DEQ 2004), Section 3.7 Baseline Data and Impact Assessment Requirements for Electric Transmission Lines, item 12(a). To determine the adequate size of an analysis area to measure potential displacement effects from the transmission line on private lands, the 1-mile zone of influence for aircraft as determined by the Cumulative Effects Analysis Process for the Selkirk/Cabinet-Yaak grizzly bear ecosystems (USDA Forest Service *et al.* 1988, USDA Forest Service *et al.* 1990) was considered sufficient to measure potential disturbance to the grizzly bear outside of the CYRZ and BORZ boundaries. The effects of activities in this area are also considered in the context of linkage or approach areas, which extend outside of the transmission line analysis area for the MFSA evaluation.

Table 219. Recovery Objectives, Parameters, and Basis Guiding Grizzly Bear Habitat Analysis.

Objective*	Parameter	Basis for Parameter
1) Provide adequate space to meet the spatial requirements of a recovered grizzly bear population.	a. Core areas b. OMRD c. TMRD d. Point Source disturbance	a., b., c., d.: 2015 KFP FW-WL-STD-02
2) Manage for an adequate distribution of bears across the ecosystem.	a. Juxtaposition of foraging habitat and cover b. Movement corridor c. Seasonal components d. Road density and displacement (core)	a. and b. Forestwide goal for plan communities to trend toward the desired condition for composition, structure, patterns, and processes; 2015 KFP GOAL-VEG-01, FW-DC-WL-19, and the Forest Plan BO b. Access Amendment Biological Opinion (USFWS 2011c) describes importance of habitat connectivity or linkage for the grizzly bear and KFP FW-DC-WL-17 c. 2015 KFP FW-DC-WL-04, FW-WL-STD-02, FW-GDL-WL-01, d. See Objective 1
3) Manage for an acceptable level of mortality risk.	a. Juxtaposition of foraging habitat and cover b. Movement corridor c. Road density d. Displacement e. Attractants	a. See Objective 2 b. See Objective 2 c. See Objectives 1 and 6 d. See Objectives 1 and 6 e. 2015 KFP FW-STD-WL-04
4) Maintain/improve habitat suitability with respect to bear food production.	Objectives 1 and 2 How does project improve food sources (especially huckleberries)	
5) Meet the management direction outlined in the Interagency Grizzly Bear Guidelines (51 Federal Register 42863) for management situations 1, 2, and 3.	Meeting Objectives 1-4 has been determined to meet the intent of the Interagency Grizzly Bear Guidelines (Buterbaugh 1991)	FW-GDL-WL-15
6) Meet management direction specified in the October 18, 2011 incidental take statement (USFWS 2011c, 2011 d).	This objective is met by meeting core, OMRD, and TMRD standards addressed in Objective 1 as well as complying with 2011 Access Amendment design elements, including those for the BORZ areas	

*Objectives 1-5 were formulated to accomplish the KNF grizzly bear management goal to provide sufficient quantity and quality of habitat to facilitate grizzly bear recovery

Montana State Trust Lands

Two parcels of State trust land (section 36 T27N, R30W and section 16 T28N, R30W) are within the Montanore Project analysis area, which is comprised of the Crazy and Silverfish PSUs. The Montana Department of Natural Resources and Conservation (DNRC) developed a voluntary multispecies Habitat Conservation Plan (State HCP) for forest management activities with technical assistance from the USFWS. The State HCP identified species-specific goals for the grizzly bear on State HCP covered lands that include promoting safety for humans and bears, minimizing displacement of grizzly bears from suitable habitat, providing for seasonal habitat use and security through access management, contributing to grizzly bear recovery where conservation of seasonally important grizzly bear habitat would complement federal efforts, promoting grizzly bear connectivity where the State HCP covered lands occur in important locations, and maintaining important habitat features including den sites, avalanche chutes, riparian zones, and other high forage producing areas. On the DNRC Libby Unit, which manages State lands located near the Libby, parcels near town and two other parcels were not included in the State HCP. All other State lands were identified as either in the CYRZ or in non-recovery occupied habitat. The two State trust parcels located in the Crazy and Silverfish PSUs were identified as being located in non-recovery occupied habitat (State HCP, Figure C-15). The State HCP covers forest management activities including timber harvest and associated activities, road construction and maintenance, and forest grazing. Construction, operations, and decommissioning of the proposed transmission line action alternatives are not covered activities under the State HCP. For this analysis, which will fulfill both the MEPA and NEPA requirements of the agencies, proposed activities on State trust land will be evaluated on the effects to grizzly bears and grizzly habitat, and mitigations will be applied consistent with those for affected federal lands. Measurement criteria will be information and education, firearm use, food storage and sanitation, new open road construction in riparian areas, active den site protection, retention of visual screening in riparian and wetland management zones, helicopter use, general open new road construction, spring management restrictions, and distance to visual screening.

Movement Corridor/Linkage Zone Area Outside the CYRZ and BORZ

Additional consideration was given to the area surrounding the transmission line and Sedlak Park Substation located outside of the CYRZ and the BORZ boundary. This portion of the transmission line and the Sedlak Park Substation are within an area identified by several agencies and environmental organizations as important for wildlife as a movement corridor, including grizzly bears. An evaluation of existing and additional human-related development within this linkage movement area is provided in the movement corridor/linkage zone assessment sections**.**

Methods

Data sources used to calculate habitat parameters of core; TMRD; OMRD; miles of open, closed, and new access roads used by action alternatives; and acres were calculated using geographic information systems (ArcGIS) applications by the KNF. ERO Resources Corp. (2015) used ArcGIS to calculate habitat physically lost or cleared and habitat displacement acres using information about the analysis area and BMU and BORZ data as provided by the KNF. Acres and road lengths are in decimal format. Therefore, there may be slight differences in acres or mile totals as presented in the following analysis than elsewhere in the document. Differences in totals and acres presented in tables are due to rounding.

The analysis considered both long-term displacement effects (lasting for life of the mine or longer) due to mine development and associated 24-hour high-intensity use (during operations phase) and the shorter-duration (about two active bear seasons) helicopter use during transmission line construction/decommissioning. The effects of activities potentially resulting in the displacement of bears from their habitat is calculated by applying influence zones and disturbance coefficients for point source and linear disturbances established in Christensen and Madel (1982), USDA Forest Service (1988a), IGBC (1990), Summerfield (2007), and USDA Forest Service and USFWS (2009). For example, to specifically address effects of increased traffic on the access road, effects were considered within a corridor 0.5 mile on each side of the Bear Creek Road #278, which once leaving BMU 5, overlaps both the Cabinet Face BORZ on the east side and BMU 2 immediately adjacent to the west side of the road for 3.5 miles, before heading northeast toward US 2 passing through both BORZ and private lands. For determining displacement effects of a helicopter during transmission line construction, the acres calculated (such as shown in Table 221) do not include areas of overlap with influence zones for mine facilities and access roads or displacement from existing roads or activities. Alternative B helicopter use is at the discretion of the contractor. The helicopter may be used for four activities: structure placement, line stringing, timber harvest, and annual inspection and maintenance. Logging may take 1 to 2 months over the 2-year period. Structure placement and line stringing would take 1 or 2 weeks each. Annual inspections may take about a week. For analysis of Alternative B, the agencies assumed vegetation clearing, including timber harvest and structure placement, would not use a helicopter and helicopter use and displacement were analyzed for line stringing/annual maintenance only. Methods used to evaluate displacement effects from the Montanore Project are described in the *Revised FEIS Analysis of Grizzly Bear Displacement Effects* (ERO Resources Corp. 2015).

The analysis evaluates potential alternative impacts using a 2009 baseline (Bear Year 2009 road layer, modified and available in December 2010). The 2009 road layer for existing conditions was updated in December 2010 to account for those roads temporarily opened for harvest activity (on private or National Forest System lands) or for road repair or other activities during 2009; the access statuses of roads were changed back to their actual access status to better reflect the existing condition as a non-activity baseline. The analysis of core, OMRD, and TMRD effects for Alternative 3D-R were updated in 2012 to reflect changes in the disturbance area boundary since the Supplemental Draft EIS. This analysis incorporated the most recent data, including road status (through summer of 2012) where available. The projected impacts from Alternative 3D-R did not measurably change as a result of the updated analysis. Because disturbance boundaries for the other agency alternatives since the Supplemental Draft EIS had very similar and slight changes, their disturbance area boundary changes would have also resulted in negligible changes to grizzly bear habitat parameters and, thus, their effects were not re-analyzed. In addition, a comparison done September 2012 (USDA Forest Service 2010, 2011m, 2012e) between a 2009 bear-year non-activity baseline and a 2011 non-activity baseline demonstrated that the baselines in BMUs 5 and 6 would remain the same, while the baseline in BMU 2 would slightly improve. This provided additional rationale for not re-calculating effects to grizzly bear habitat parameters as a result of the disturbance area boundary changes in the other agency alternatives.

Evaluation of Effectiveness of Mitigation Plans: The analysis of effects includes an evaluation of the effectiveness of the mitigation plans described in Chapter 2. Analysis of effects on core, OMRD, and TMRD incorporated changes in road status associated with proposed road access changes and mitigation applicable to each alternative, but do not reflect additional potential improvements to baseline habitat parameters that could result from required land acquisition and subsequent motorized access changes that could occur associated with grizzly bear habitat compensation mitigation for each alternative.

Mitigation measures incorporated into MMC’s (Alternative 2B) or the agencies’ alternatives would include making road access changes, acquiring conservation easements or land, prohibiting employees from carrying firearms, removing road-killed big game animals, and busing employees to the work site. The action alternatives prohibit MMC employees from carrying firearms into permit areas. The agencies’ alternatives not only prohibit MMC employees, but also contractors and subcontractors from carrying firearms within the permit area boundary, or along the Libby Creek access road, except for security officers and other designated personnel. All action alternatives would include the funding of one law enforcement officer and one grizzly bear specialist. The agencies’ alternatives would include funding of an additional grizzly bear specialist, identified as a habitat conservation specialist, if the Rock Creek Project and Montanore Mine operate concurrently, and monitoring of bear movements and status.

MMC's proposed combined Alternative 2B included access changes on NFS road #4724 from April 1 to June 30 and a yearlong access change in a segment of NFS road #4784 to mitigate for impacts on grizzly bears. The seasonal closure on NFS road #4724, although benefiting bears by restricting motorized access during the spring use period, would not change the open status of the road during the active bear year and, thus, would not result in changes to core, OMRD, or TMRD. NFS road #4784 was already proposed for an access change by the Rock Creek Project and, thus, was not considered as mitigation in the analysis for direct effects of Alternative 2B.

The access change on NFS road #4784 was not originally proposed as part of the agencies' combined action alternatives road access mitigation changes (see Table 28 and Table 29 in Chapter 2) to improve the baseline for grizzly bears. However, as shown in Table 28, the access change on NFS road #4784 would be implemented prior to the Evaluation Phase by any of the Montanore combined action alternatives if the road closure were not already implemented as part of the Rock Creek Project mitigation. The contribution to improvements in baseline core and habitat security that the closure of NFS road #4784 would provide was determined by the agencies and USFWS as necessary to mitigate for impacts prior to either mine becoming active and, thus, the act of closing the road was assigned to either mine. Therefore, the action is discussed as a potential direct action for the Montanore combined action alternatives but for analysis of direct effects to habitat parameter of core, OMRD, and TMRD, NFS road #4784 was considered open. The mitigation and created core resulting from the NFS road #4784 access change would remain attributable to the Rock Creek Project and, as such, improvements to core or decreases in TMRD and OMRD are only shown in the cumulative effects analysis for the agencies' combined action alternatives.

The agencies' alternatives would include additional yearlong access changes through the installation of barriers or gates in several roads to mitigate impacts on grizzly bear. These road access changes specified in the agencies' mitigation plans are taken into account for determining direct and cumulative effects on core, OMRD, and TMRD calculations. Road access changes associated with mitigation were determined for the combined mine-transmission line alternatives only. It is not possible to attribute these road access changes to individual mine and transmission line alternatives independent of one another.

The analysis for all action alternatives provided does not reflect additional road access changes that would occur as a result of land acquisition for habitat compensation required for grizzly bear habitat physically lost or for displacement associated with the mine activities proposed by MMC or the agencies. Additional road access changes would occur on mitigation lands to further improve grizzly bear baseline habitat parameters, but as the exact locations of which parcels would be obtained and where access changes would actually occur remain unknown, it is not possible to reflect changes in core, OMRD, and TMRD calculations that could occur at this time.

3.25.5.2.3 Affected Environment

Inside Recovery Zone

Habitat conditions in the CYRZ have been improving steadily since 1987 as documented by Johnson (2002), Summerfield *et al.* (2004), Kasworm *et al.* 2013c, and the annual KFP monitoring reports on threatened and endangered species habitat (USDA Forest Service 2013e).

Population Status and Trend

Currently, the CYE grizzly bear population is estimated to have a minimum population of 50 grizzly bears, using a 10-year calculation, with a 57 percent probability of a downward population trend (Kasworm *et al.* 2013c). However, data from the last six years indicate an improving situation (Kasworm *et al.* 2013c). The observed rates of survival and reproduction are used to calculate a rate of change in the population (lambda). This calculation is essentially births - deaths = population change and is measured against a stable population depicted by lambda equaling 1.0. This calculation only involves female adult and sub-adult survival plus all yearling and cub survivals. Since calculations started, the lowest lamba (0.920) occurred in 2006. This meant an annual rate of decline of 8.3 percent. The point estimate of lambda for all data from 1983-2009 was 0.963 (Kasworm 2010a, 2010b). This equates to a declining population at an annual rate of 4.0 percent. The updated lambda for 1983-2012 is 0.992, which corresponds to a negative 0.8 percent annual rate of change (Kasworm *et al.* 2013c). Thus, lambda has improved and moved closer to stability (1.0), again an indication that the CYE grizzly bear population status is improving (USFWS 2014a). Improving survival by reducing human-caused mortality is crucial for recovery of this population (Proctor *et al.* 2004).

Preliminary results from the Cabinet-Yaak DNA study indicate a population of 45 to 49 bears within the CYE (IGBC 2013) and corroborate the estimate by Kasworm *et al.* (2013).

Forty-two credible sightings were reported to this study that rated 4 or 5 (most credible) during 2012. Eighteen of these sightings occurred in the Yaak portion of the CYRZ and 12 sightings occurred in the Cabinet Mountains portion of the Recovery Zone. Twelve sightings came from outside the CYRZ (Ibid). Five credible sightings of a female with cubs occurred during 2012 in BMUs 2 and 5, while eight credible sightings of a female with yearlings or 2-year-olds occurred in BMUs 5, 11, 16, and 17. Occupied BMUs were: 2, 3, 4, 5, 6, 7, 11, 13, 14, 15, 16, 17, and 18. Recovery plan criteria indicate the need for 18 of 22 BMUs to be occupied. Sightings of females with young in BMUs 2, 3, 4, 5, 6, 7, and 18 were indicative of recent reproduction in the Cabinet Mountains (Ibid).

Based on results of a 5-year radio-telemetry study conducted by FWP from 1983 to 1987, home ranges of three collared bears overlapped around the upper portions of Bear Creek, Cable Creek, Poorman Creek, and Ramsey Creek within BMU 5 (Kasworm and Manley 1988). Home ranges extended laterally from this area throughout BMUs 5 and 6. A large male grizzly bear captured in the Bull River drainage in 2005 spent considerable time in the upper Libby Creek drainage during the fall of 2005 and also the spring of 2006. This bear was located on numerous occasions less than 1 mile east of the Libby Adit Site. These drainages contain some of the highest quality grizzly bear habitat in the Cabinet Mountains and form the core area for home ranges of 11 known grizzly bears (see Figure 5 in Wildlife BA, USDA Forest Service 2013b) of the minimum estimated 21 bears from the Cabinet Mountains. Bear activity in the Snowshoe, St. Paul, and Wanless BMUs is summarized in Table 220.

Table 220. Credible Grizzly Bear Sightings, Credible Female with Young Sightings, and Known Human-Caused Mortality by BMU in 2012.

BMU #	Credible Grizzly Bear Sightings	Unduplicated Sightings of Females with Cubs	Sightings of Females with Yearlings or 2-Year-Olds	Human-Caused Mortality
Snowshoe (2)	5	1	0	0
St. Paul (5)	4	1	1	0
Wanless (6)	1	0	0	0

Source: Kasworm *et al.* 2013c.

Mortality

Humans have been identified as one of the main factors in mortality of grizzly bears in the CYE (Kasworm and Manley 1988). At least 38 known human-caused mortalities were documented within 10 miles of the CYRZ (including Canada) from 1982 to 2009 (Kasworm *et al.* 2010). Ten known or probable human-caused mortalities of native grizzly bears occurred in or within a 10-mile radius of the CYRZ in the U.S. between 2007 and 2012 (Kasworm *et al.* 2013c). Two additional mortalities of augmentation bears occurred south of the Clark Fork River within 10 miles of the CYRZ (Ibid.). Causes of grizzly bear mortality have generally been due to factors beyond Forest Service control (*i.e.*, mistaken identity by hunters, defense of life or management removal due to food attractant on private land, or illegal killing by humans). Kasworm *et al.* (2013) suggests that an increase in natural mortalities beginning in 1999 could be attributed to poor food production during 1998 through 2004, when huckleberry production was about half of the 20-year average. Point estimates for human-caused mortality occurring on public lands in the U.S. and British Columbia decreased from 1983–1998 to 1999–2012 (Kasworm *et al.* 2007, Kasworm *et al.* 2013c). This apparent decrease in mortality rates on public lands (from 6.1 to 4.0 percent) is particularly noteworthy given the increase in overall mortality rates (Ibid). Although the specific reason for this decline is unknown, the KNF's wheeled motorized access management over the last decade may play a factor in this trend toward meeting grizzly bear population recovery goals within the CYE by improving BMU parameters with some meeting or exceeding (better than) standards. Implementation of the 2011 Access Management design elements would continue that trend.

Because of the age structure and small size of the population, augmentation of the Cabinet grizzly bear population began in 1990. Fourteen bears have been added to the Cabinet Mountains population since 1990 (11 females and 3 males). Four bears (3 females and 1 male) left the target area and 4 bears are known to be dead, including 1 bear that survived for 16 years in the Cabinet Mountains and produced at least 9 offspring. Those offspring produced at least 8 young (Kasworm *et al.* 2013c). The augmentation effort appears to be the primary reason that grizzly bears remain in the Cabinet Mountains (Ibid). Simulations demonstrate that augmentation alone will not recover a small grizzly bear population when mortality is high (Kasworm *et al.* 2007).

An integral part of grizzly bear management on the KNF is to implement measures within the authority of the Forest Service to minimize human-caused grizzly bear mortalities. The KNF enacted a food storage order (USDA Forest Service 2011k) that includes the proper storage and transportation of food and other attractants on all Forest Service lands on the KNF. This food storage order applies to all KNF system lands, including those lands contained within the CYE.

There has been an increase in bear-resistant garbage containers in developed campgrounds and a pack in/pack out policy for all other campgrounds and dispersed recreation sites. The KNF has also installed signs along popular roads to inform people that they are in grizzly bear habitat and they include grizzly bear identification information.

Other agency efforts include many county refuse sites being fenced to keep bears from attractants. The Lincoln County collection dumpsters located adjacent to US 2 at the eastern edge of the BORZ are a known attractant site. In 2012, the County moved this site several miles north to a more suitable location on National Forest System land along US 2 where it is now enclosed in an electric fence and locked nightly. Public education efforts are ongoing to encourage people to live in a way that is more compatible with the needs and behaviors of bears. This includes FWP assistance with the installation of new electric fencing of chicken and pigeon coops in the Yaak CYRZ to prevent future bear conflicts (Annis 2012). Montana FWP has also instituted a mandatory black bear hunter testing and certification program to help educate hunters in distinguishing bear species and reducing mistaken identity.

Existing Habitat Conditions: Portions of the directly affected BMUs (2, 5, and 6) are within the Crazy and Silverfish PSUs, which comprise the Montanore Project analysis area. Lower elevations of the Crazy PSU are heavily roaded with open, gated, impassable, and bermed roads, and this area overlaps lower elevations located in BMU 2 and BMU 5. Gated or open roads are also located in each of the main drainages in the Crazy PSU rising in elevation almost to the CMW boundary. The Crazy PSU overlaps 15,521 acres or 24 percent of BMU 2 and 32,544 acres or 46 percent of BMU 5. The Silverfish PSU is roaded in the Miller and West Fisher Creeks, has a gated road (Silver Butte Creek Road #594) that goes west toward Green Mountain and the Trout Creek area, and an open road (Silver Butte Pass #148) that passes through from US 2 down to the Vermilion East Fisher Road #154. The Silverfish PSU overlaps 32,879 acres or 51 percent of BMU 6. The Silverfish PSU also extends to the south and overlaps 28,850 acres or 46 percent of BMU 7.

Within BMUs 2, 5, and 6 (totaling 199,603 acres), the CMW provides large tracts of unroaded lands on 66,741 acres or 33 percent of the BMUs combined that provide excellent security and habitat that has not been actively managed, outside of fire suppression. Lands outside of the wilderness have been managed for multiple uses including timber production. Timber harvest methods included regeneration, salvage harvest, as well as pre-commercial thinning. Harvest activities began around 1949 and have continued to the present. Within the directly affected BMUs, when all ownership is considered, regeneration harvest has occurred on 3,028 acres in BMU 2 (5 percent of the total BMU); 1,350 acres of BMU 5 (2 percent of the total BMU); and 3,671 acres of BMU 6 (6 percent of the total BMU). Past harvest has provided a variety of vegetation successional stages across the BMUs and in favorable habitat types, and past harvest and prescribed burning for planting preparation provided conditions favorable for huckleberry production and other forage for grizzly bears and big game. The majority of this past timber harvest occurred prior to 1998 and the units currently have trees and shrubs in a density and size to provide cover. The more recent regeneration harvest units provide forage opportunities.

Stochastic natural events such as wildfire, insects, disease, and windthrow have also provided a variety of successional stages and habitat in unharvested areas. The last large-scale fires occurred between 1885 and 1939, with the 1910 fires affecting large areas within the CYRZ, including BMUs 2, 5, and 6. Fire suppression since the early 1900 has altered stand structure, resulting in more homogenous stands with greater canopy closure and poorly developed understories in some areas. In BMU 2, within the last 15 years, small fires have occurred on the south-facing slopes in Leigh and Big Cherry creeks. Wildfires would reduce timber, promote understory shrub growth, and create additional age classes and species diversity. This would benefit some shrub species such as huckleberry, which provide an important fall food source for grizzly bears. Prescribed burns can also produce similar responses in shrub growth in the absence of wildfire.

Road construction to facilitate timber harvest or mining has occurred within the BMUs, resulting in the matrix of open, restricted with gates or berms, or impassable roads existing today. Open road densities within the CYRZ, including BMUs 2, 5, and 6, have reduced compared to levels in the 1970s and 1980s due to road access changes resulting from decisions that included management objectives to improve hydrological conditions and wildlife habitat, including to facilitate grizzly bear recovery. Past road access management has resulted in the existing conditions related to the habitat parameters of core habitat, OMRD, and TMRD in Table 222 below.

Management Objectives/Grizzly Bear Habitat Parameters

The goal for grizzly bear management on the KNF is to provide sufficient quantity and quality of habitat to facilitate grizzly bear recovery. As mentioned above, an integral part of the goal is to implement measures within the authority of the Forest Service to minimize human-caused grizzly bear mortalities. This goal is accomplished by achieving six objectives common to grizzly bear recovery as described in Table 219.

Objective 1: Provide adequate space to meet the spatial requirements of a recovered grizzly bear population

Habitat parameters of core, OMRD, and TMRD are based on prudently drivable roads and are used to evaluate quality of grizzly bear habitat. Habitat parameters OMRD and TMRD directly measure road density, while core measures the amount of secure habitat within the BMUs located at least 0.31 mile from motorized roads and trails. Displacement calculations estimate the degree to which suitable habitat is used by grizzly bears and consider the effects of both linear features and point source disturbances. Point source disturbances typically pertain to a disturbance originating from a single point rather than a linear feature such as a road; however, roads with consistent 24-hour high-intensity use would be treated as a point source disturbance. Examples include a drill rig, a campground, a garbage collection site, a mine, or other site with concentrated human or mechanized activity.

A. *Disturbance and Displacement:* Displacement area means those acres where nearby human activity may result in underutilization of the available habitat by grizzly bears due to an avoidance behavior. The term displacement does not necessarily mean that grizzly bears would totally avoid an area, or be excluded in some way from ever using an area. Displacement is used in general terms to describe “underuse” of habitat. In research, “significant underuse” of habitat means that bears use habitat “less than expected” compared to its availability. Displacement of grizzly bears from an area can range from short-term or diurnal avoidance to more significant long-term underuse of habitat, depending upon the season, quality of habitat affected, and the age and sex of grizzly bears affected. The length of displacement time also depends on the nature of the disturbance and consequences experienced by grizzly bears. Displacement behavior in grizzly bears may be expressed through a change in diurnal habitat use or movement

> patterns, avoidance, or underuse of otherwise preferred habitat, and/or other behaviors related to stress or fear (USFWS 2006 Rock Creek Biological Opinion p. A-38).

Grizzly bear displacement from disturbances other than roads (*e.g.*, such as mining, seismic activity, and aircraft) is usually related to distance from the activity. Individual bear behavior, the season of use, sex, habitat conditions, and a wide variety of other factors influence grizzly bear response to human presence and activities. Increases in human and or mechanical activities have a number of effects to bears that are well documented (McLellan and Shackleton 1988, 1989a, 1989b; USFWS 1993; Mace and Manley 1993; Wakkinen and Kasworm 1997; Mace *et al.* 1999). McLellan and Shackleton (1988) found that most bears used habitat less than expected within 100 meters of roads, and avoidance of roads was independent of traffic volume. McLellan and Shackleton (1989a) did not find significant displacement in terms of moving away from disturbance when radio-monitored bears were exposed to seismic activities, gas exploration, and timber harvest, although individual bears responded differently. McLellan and Shackleton (1989b) documented avoidance of roads and industrial sites, and that bears responded differently to modes of human transportation (on foot, moving vehicles, and to fixed-wing aircraft) in open habitat as opposed to closed timbered habitat. Grizzly bears can become conditioned to human activity and show tolerance, especially if the location and type of human use are predictable and do not result in outright negative impacts to bears (McLellan and Shackleton 1989a; Jope 1985; Cronin *et al.* 1999).

The analysis of habitat displacement estimates the extent of the displacement, or zone of influence, and the degree to which suitable grizzly bear habitat is used. The extent of a zone of influence is determined based on the type of activity, as recommended in the Cumulative Effects Analysis Process (USDA Forest Service 1988a; IGBC 1990). The degree of habitat use is estimated based on disturbance coefficients and compensation levels assigned to different human activities (Ibid). Methods used to estimate displacement effects from the action alternatives and corresponding required habitat compensation are described in greater detail in the *Revised FEIS Analysis of Grizzly Bear Displacement Effects* (ERO Resources Corp. 2015). Existing displacement within the directly affected BMUs is shown in Table 221. Existing displacement acres for point source disturbances and linear features were calculated by applying a 0.25-mile buffer to open roads, developments, and/or high levels of human activity (MS-3 lands, see Objective 5) during the active bear year. The area within this 0.25-mile influence zone is considered underused by grizzly bears.

Table 221. Existing Displacement Acres Due to Point Source Disturbances (MS-3 Lands) and Linear Features (Roads) within the Directly Affected BMUs.

BMU	Total Acres Within BMU	Overlap Acres of Displacement (MS-3 lands & buffer and existing roads & buffer overlap)	Point Source Disturbances (MS-3 lands & buffer with no overlap)	Linear Disturbances (linear open roads & buffer with no overlap)	Total Acres Currently Affected by Either Linear or Point Source Disturbances or Overlap and % of BMU Affected
2	65,241	4,665	1,734	6,854	13,253 (20%)
5	70,210	5,442	2,957	10,925	19,324 (28%)
6	64,148	7,932	2,925	8,057	18,914 (29%)

Wielgus and Vernier (2003) and Wielgus *et al.* (2002) found most female grizzlies avoided open roads and restricted (gated) roads. Mace *et al.* (1999) found female grizzlies avoided roads in all use classes. They divided road use into three categories: low = less than 1 vehicle a day, moderate = between 1 and 10 vehicles a day, and high = greater than 10 vehicles a day, with all three categories significantly and negatively associated with avoidance by female bears. Graham *et al.* 2010 found that female grizzly bear survival and reproductive output decreased as road densities increased. Proctor *et al.* 2008 also found that human development and highways were avoided by female bears, along with avoidance of spring and riparian habitats associated with roads. Roads in the south Cabinet portion of the CYE tend to occur in the lower elevations where grizzly bear spring habitat is concentrated and where human development and activities are situated. Approximately nine roads, including the roads accessing the Wayup and Fourth of July parcels, partially bisect the southern Cabinet Mountains from east to west in BMUs 5 and 6. Within BMU 5, portions of the East Fork Bull River (#407), Chicago Peak (#2741), East Fork Rock Creek (#150A), and the Rock Lake Trail 150A/#935, Upper Bear Creek (#4784), Upper Libby Creek (#2316) roads, and within BMU 6, portions of the Orr Gulch (#2285), Twin Peaks (#6746), Bramlet (#2332), Bramlet Spur Road #5111 to the Jumbo Mine, and Silver Dollar (#6748) roads enter the north-south corridor. Only the uppermost portion of Road #6746 and Road #5111 off the end of the Bramlet Road are gated to allow access only to landowners with inholdings; the remaining roads are open during the bear year. Open roads occurring within this corridor pose displacement and mortality risks to bears attempting to move north or south through the ecosystem. The displacement resulting from these roads is particularly disruptive to grizzly bears because they cross important spring habitat, which is limited in the ecosystem, and early-season huckleberries, also not abundant within the southern portion of the ecosystem (USFWS 2014a). A few of these roads run from the highways bordering the CYE up to the edges of the CMW, bringing people near secure bear habitat.

Existing habitat parameter levels in the Snowshoe, St. Paul, and Wanless BMUs are listed in Table 222 and are shown on Figure 92. (See project record for habitat parameter outputs.) 2011 Access Amendment standards for percent core, OMRD, and TMRD are specific to each BMU and are shown in Table 222.

Table 222. Existing Habitat Parameter Conditions Compared to Each BMU Standard.

BMU #	Percent Core Habitat	Percent OMRD >1 mi/mi^2	Percent TMRD >2 mi/mi^2
Snowshoe # 2	76 (≥75)	20 (≤20)	16 (≤18)
St. Paul # 5	**58** (≥60)	28 (≤30)	23 (≤23)
Wanless # 6	**54** (≥55)	29 (≤34)	**33** (≤32)

Values in parentheses represent Access Amendment grizzly bear habitat parameter standards.
Bolded values do not meet Access Amendment standards.
BMU = Bear Management Unit.
OMRD = open motorized route density.
TMRD = total motorized route density.

B. *Core area*. A core area or core habitat is an area of high-quality grizzly bear habitat within a BMU that is greater than or equal to 0.31 mile from any road (open or gated), motorized trail open, or high-use non-motorized trail during the active bear season. Blocks of core habitat function as displacement areas for grizzly bears. Core habitat may contain restricted-access roads, but such roads must be effectively closed to all motorized vehicles with a barrier device including, but not limited to, earthen berms/ditch, boulders, or other barriers, or be impassable due to vegetative growth. Core is calculated by buffering roads, motorized trails, and high-use non-motorized trails on all lands, regardless of ownership, in a BMU (IGBC 1998). Federal agencies will work toward attaining established core standards for each BMU, with a benchmark of 55 percent for most BMUs. No net loss of core area will occur on federal ownership within any BMU until all BMUs within the KNF jurisdiction in the CYRZ meet or are better than the standard.

Current core level for BMU 2 is better than its individual standard. BMU 5 does not meet its individual standard of 60 percent, but is above the research benchmark minimum of 55 percent. BMU 6 does not meet its individual core standard and is 1 percent below the 55-percent benchmark. Existing core block sizes are shown in Table 223 below as specified in the Access Amendment Biological Opinion (USFWS 2011c) design element (B).

Existing core blocks within the three BMUs range from 1 to 49,151 acres, with the largest blocks overlapping the CMW and providing secure habitat for connectivity between BMUs. For the CYE, no scientifically based minimum effective size polygon for core has been determined (Wakkinen and Kasworm 1997), though minimum blocks of 2 to 8 square miles were suggested.

A. *OMRD*: Open motorized route density is calculated on a BMU basis using moving window analysis. Any road or trail open to motorized use during the active bear year contributes to OMRD. Results are displayed as a percentage of the analysis area in relevant route density classes. OMRD is expressed as the percentage of the entire BMU, regardless of ownership, with open road density greater than 1 mile per square mile (mi/mi^2). In BMUs not meeting OMRD standards, actions affecting OMRD must result in post-project OMRD better than levels that existed before the action.

Table 223. Existing Core Block Acres in BMU 2, BMU 5, and BMU 6.

Core Block #	BMU 2 (acres)	BMU 5 (acres)	BMU 6 (acres)
1	2	8	1
2	3	24	1
3	29	56	3
4	54	67	8
5	327	239	15
6	49,151[4]	241	65
7		372[1]	959[1]
8		845	1,036
9		1,121	1,354[2]
10		11, 30, 33[3]	1,468
11		37,803[4]	1,636[3]
12			1, 1, 787, 27,067 (27,856)[4]
Total Acres (Total % Core)	49,566 (76% of BMU)	40,851 (58% of BMU)	34,402 (54% of BMU)

[1]Block #7 in BMUs 5 and 6 combine for a total core block of 1,331 acres.
[2]Block #9 in BMU 6 is adjacent to BMU 7 and combines with the main BMU 7 core block.
[3]The 11-, 30-, and 33-acre parcels in BMU 5 and 1,636-acre parcel in BMU 6 combine for a 1,710-acre block of core.
[4]The main 49,151-acre core block in BMU 2, the 37,803-acre block in BMU 5, and the total 27,856-acre block in BMU 6 all combine to form one large core block.

OMRDs within BMUs 2, 5, and 6 are near or lower (better) than levels reported in average female home range (Wakkinen and Kasworm 1997). The existing OMRD levels for BMUs 2, 5, and 6 (20, 28, and 29 percent, respectively) currently meet or are better than their respective standards of 20 percent for BMU 2, 30 percent for BMU 5, and 34 percent for BMU 6 (see Table 222).

B. TMRD: Total motorized route density is calculated for a BMU using moving window analysis. TMRD is expressed as the percentage of the entire BMU, regardless of ownership, with total route density greater than 2 mi/mi^2. Roads or trails open to motorized traffic and gated roads contribute to TMRD, whereas roads restricted with a barrier effectively restricting all motorized vehicles do not. For BMUs not meeting their TMRD standard, actions affecting TMRD must result in post-project TMRD better than levels that existed before the action.

TMRD in BMU 2 and BMU 5 are near or lower than the average reported being used by grizzlies in the CYE (26 percent) (Wakkinen and Kasworm 1997), providing more suitable habitat for a female grizzly bear. The existing TMRD level for BMU 2 at 16 percent is better than its standard of 18 percent, while BMU 5 existing TMRD and standard coincide at 23 percent.

BMU 6 at an existing 34-percent TMRD is higher or worse than the average total motorized access conditions of 26 percent found in the average female grizzly bear home ranges in the CYE (Wakkinen and Kasworm 1997) and 1 percent higher (worse) than the BMU standard of 32 percent (Table 222 and Table 226). BMU 6's numerical standard for TMRD of 32 percent is 6 percent above the Wakkinen and Kasworm (1997) research benchmark of no more than 26 percent TMRD within a BMU, but is an attainable goal based on private ownership within the BMU 6. BMU 6 has 15 percent of its land base in private or Montana State ownership (7 percent private, 1 percent State, 3 percent Stimson, and 4 percent Plum Creek), which has influenced the total number of roads. The density in BMU 6 is due in part to MT 200, which runs along its southwestern boundary and to private roads that access six sections of private corporate timber lands. Areas of higher TMRD could result in avoidance or underuse of the affected area by grizzly bears, potentially increasing mortality risk. The Access Amendment considered BMU 6 and the effect of its standard of 32 percent TMRD along with the other six BMUs set below the benchmark (USFWS 2011c; 2011d p. A-79, Table A-8, p. A-68) and determined that the negative effects would be moderated by conditions in the remaining BMUs. The level of incidental take associated with a baseline TMRD of 32 percent was considered within the Access Amendment Biological Opinion (USFWS 2011c).

Objective 2: Manage for an adequate distribution of bears across the ecosystem

A. *Juxtaposition of foraging habitat and cover/movement corridors*: The availability and proximity of cover may influence the use of foraging habitats by grizzly bears. Historical vegetative conditions and natural disturbance processes resulted in a mosaic of forage and cover habitats that bears evolved with. Consider the effect of actions on availability of bear foods, size and shape of openings, and movement corridors. The Access Amendment Biological Opinion (USFWS 2011c) describes the importance of habitat connectivity or linkage for the grizzly bear. Maintaining habitat linkage and connectivity can allow immigrant grizzly bears to bolster resident populations affected by catastrophic events or poor environmental conditions and reduces negative effects from inbreeding.

The availability and proximity of cover may influence the use of foraging habitats by grizzly bears. Consideration of historic vegetative conditions and natural disturbance processes when developing vegetation management treatments (e.g., seral stage, size and shape of harvest units, species composition) would result in a mosaic of forage and cover habitats similar to what grizzly bears evolved with. Past harvests in the analysis area included regeneration harvest units in a variety of sizes. In most instances, those areas that were harvested 15 or more years ago would now have trees in the units of the size or density to provide cover for a grizzly bear.

On a larger scale, the CYE is a long, narrow ecosystem, bordering Canada and encompassing the Cabinet and Purcell Mountain ranges in northwestern Montana and northern Idaho, is 100 miles long north-south, and ranges from 15 to 35 miles east to west. The CMW is a smaller area with no motorized access in the higher elevations of the Cabinet Mountain portion of the ecosystem, is 34 miles long, and varies in width from 0.5 to 7 miles. The CMW consists of 93,709 acres of the 1,664,000 acres of the CYE (5.7 percent) and contains all or part of BMUs 1, 2, 4, 5, and 6. BMU 7 is adjacent to the southern tip of the CMW. BMU 8 is south of the CMW and contains the Cataract Roadless Area. These unroaded or wilderness areas provide a relatively high quantity of summer habitat, abundant throughout the CYE, but relatively limited important spring habitat. The CMW forms the central section of a north-south movement corridor, connecting the southern Cabinet Mountain BMUs (6, 7, 8, and 22) to the north Cabinet Mountain BMUs (1, 2, 3, 4, and 9) and overall linking the Cabinet Mountains to the Yaak River basin to the north. As described in section 3.9, *Geology and Geochemistry*, the Cabinet Mountains are a rugged, glaciated mountain range of high relief. Along this narrow northwest-trending corridor, the wilderness area is unroaded; however, it is impacted in places by open roads leading near or adjacent to its borders due to human development on the east and west sides. The influence of nearby roads is especially detrimental where the wilderness narrows as they constrict the width of effective grizzly bear habitat, or where habitat in the wilderness is not conducive to grizzly bear movement, such as open areas devoid of cover (USFWS 2014a). The characteristics and importance of the north-south movement corridor are described in detail in the Wildlife BA (USDA Forest Service 2013b).

B. *Seasonal Components*: Grizzly bear use seasons have been defined through grizzly bear research. Although there may be considerable variation between individuals, based on Kasworm *et al.* (2007) and Johnson *et al.* (2008), seasons are defined as: Denning: December 1 – March 31; Spring: April 1 – June 15; Summer: June 16 – September 15; Fall: September 16 – November 30; Non-denning season: same as active bear year; and active bear year: April 1 – November 30 (Johnson *et al.* 2008).

Excellent year-round habitat components are present in BMUs 5 and 6, with documented use by grizzly bears (Kasworm and Manley 1988). The yearly average elevational use occurs at 5,167 feet (1,574 meters, Kasworm *et al.* 2013c). Grizzly bear spring and denning habitat is shown on Figure 92. Roads, human development, and activity tend to be located in the lower elevations where the spring habitat is concentrated. Approximately nine roads, including the roads accessing the Wayup and Fourth of July parcels, partially bisect the southern Cabinet Mountains from east to west in BMUs 5 and 6. Additionally, roads just outside the corridor boundaries on the east side occur in or traverse through important spring habitat, including Libby and Miller Creek roads.

Spring grizzly bear habitat comprises 13,293 acres (20 percent) of BMU 2; 17,625 acres (25) percent of BMU 5; and 14,091 acres (22 percent) of BMU 6. Spring habitat is well distributed throughout all directly affected BMUs and is well represented in core areas (secure habitat) when

Table 224. Existing Seasonal Habitat Components in BMUs 2, 5, and 6.

Habitat Component	BMU 2 (acres)	BMU 5 (acres)	BMU 6 (acres)	TOTAL (acres)
Size	65,241	70,210	64,148	199,599
Spring Habitat	13,293	17,625	14,091	45,009
Existing Road Effects[1]	533	1,915	1,395	3,843
Avalanche Chute	4,389	3,180	571	8,140
Existing Road Effects[1]	124	32	189	345
Denning Habitat	17,492	14,414	12,149	44,055
Existing Road Effects[1]	295	784	615	1,694

[1]Existing habitat affected by open roads (roads opened during active bear year) is within a 0.25-mile buffer.
Source: Wildlife BA (USDA Forest Service 2013b).

compared to its availability within each BMU. The availability of spring and denning habitat and existing displacement effects are described in detail in the Wildlife BA (USDA Forest Service 2013b). In summary, of the 45,009 acres of spring range present within the directly affected BMUs 2, 5 and 6, about 3,843 acres or 8.5 percent are within an existing open road buffer. Of that 3,843 acres, 654 acres (or 17 percent) are located on MS-3 lands. The majority of spring range is located outside of existing road buffers (41,167 acres or 91 percent), with 2,145 acres (or 5 percent) of that unaffected spring range located on MS-3 lands. Overall, 6 percent of spring range is located on MS-3 lands where grizzly use is not encouraged. Low-elevation spring habitat is thought to be less abundant than other seasonal habitats in this ecosystem (USFWS 2014a). Kasworm (1989) analyzed radio locations from three bears to determine the effects of roads on seasonal habitat use patterns, and found that grizzly use in the Cabinet Mountains was reduced 78 percent from that expected during the spring period in areas adjacent (up to 0.28 mile) to open roads. Existing seasonal habitat components are shown in Table 224.

Avalanche chutes, which total 8,140 acres, are also largely unaffected with 7,795 acres or 96 percent outside of existing road buffers (described in detail in the Wildlife BA, USDA Forest Service 2013b).

Grizzly bear den sites in the Cabinet Mountains are generally in remote areas above 5,000 feet that have well-developed soils for excavation and adequate snow accumulation. Mean elevation of den sites in the Cabinet Mountains from 1983 to 2009 was 6,151 feet (Kasworm *et al.* 2013c). The two closest known grizzly bear dens from the generalized location of all action alternatives mine disturbance areas were found 3 miles to the west in the upper Bear Creek and Cable Creek drainages. The majority of all denning habitat is located outside of existing road buffers (42,361 acres or 96 percent), and of that, 1,775 acres or 4 percent are located on MS-3 lands. Denning habitat affected by existing road buffers totals 1,694 acres or 4 percent. Overall, 2,321 acres or 5 percent of denning habitat is located on MS-3 lands. Existing denning habitat is well represented in secure (core) habitat across all three BMUs (described in detail in the Wildlife BA, USDA Forest Service 2013b).

The Bear Creek Road #278, which lies in a north-south alignment, cuts across most of the Libby Creek sub drainages that flow west to east, and divides higher elevation grizzly bear summer, fall, and den habitats to the west of the road from lower elevation spring habitats to the east (USFWS 2014a).

C. *Density, Displacement, and Core Areas*. Road density, displacement, and core areas are discussed in Objectives 1 and 6.

Objective 3: Manage for an acceptable level of mortality risk

During the 1980s, most documented grizzly mortalities in the CYE were the result of interactions between bears and big game hunters (Kasworm and Their 1990). The relatively small size of the Cabinet Mountains portion of the ecosystem, coupled with high accessibility, creates a strong potential for the illegal shooting of grizzly bears (Knick and Kasworm 1989). Grizzly bear vulnerability to human-caused mortality is partially a function of habitat security. Therefore, mortality risk can be assessed to some extent by the use of habitat components that maintain or enhance habitat security (see Objectives 1, 2, and 6). These include juxtaposition of cover and forage or movement corridors (see Objective 2), road densities, and displacement (core) areas (see Objectives 1 and 6).

Management removals due to habituated bears or those related to sanitation issues account for 8 percent of documented mortalities. In this regard, increased law enforcement along with better public education and awareness is of vital importance to grizzly bear recovery in the CYE.

The maximum human-caused mortality level that can be sustained by a grizzly bear population before resulting in population decline is 6 percent, when no more than 30 percent of mortalities are female bears (Harris 1984). The goal for the CYE is less than 4 percent human-caused mortality, with no more than 30 percent of total mortality consisting of female bears (USFWS 1993). Based on a calculated minimum population of 41 individuals (Kasworm *et al.* 2013c) and applying the 4 percent mortality limit resulted in a total mortality limit of 1.6 bears per year. The female limit is 0.5 females per year (30 percent of 1.6). Average annual human-caused mortality for 2007 through 2012 was 1.7 bears/year and 0.5 females/year (however, the sex of two bears was not known at the time) (Kasworm *et al.* 2013c). These preliminary mortality levels for total bears were in excess of calculated limits for 2007 through 2012 and female mortality was at the calculated limit (Ibid). However, it should be noted that the Grizzly Bear Recovery Plan established a human-caused mortality goal of zero for this CYRZ because grizzly bear numbers are so small in this ecosystem (USFWS 1993a).

Objective 3 also addresses attractants for grizzly bears that may result from proposed projects by developing methods to reduce the potential for human/grizzly conflict. Attraction of grizzly bears to improperly stored food and garbage is identified by the Recovery Plan as one of the principal causes of grizzly bear mortality (USFWS 1993a). Bears that lose their natural fear and avoidance of humans, usually as a result of food rewards, become habituated and may become food-conditioned. Current activity occurs on MMC-owned land at the Libby Adit where MMC has enacted sanitation protocols to reduce attractants. As mentioned previously, on KNF lands, bear-resistant garbage containers have been installed in developed campgrounds and dispersed recreation sites to reduce bear attractants. Other primary sources of existing attractants would be associated with private land development.

Objective 4: Maintain/improve habitat suitability with respect to bear food production

Within the Cabinet Mountains, the complex terrain creates steep biophysical and climatic gradients that foster diverse vegetation patterns (Holden *et al.* 2012). The Cabinet Mountains range in elevation from 2,000 to 8,750 feet and have a Pacific maritime climate characterized by short, warm summers and heavy, wet winter snowfalls. Mixed stands of coniferous and deciduous trees, riparian shrubfields, and wet meadows occur along the major drainages (Kasworm *et al.* 1998).

Identifying habitat components on the basis of bear food availability and delineating their specific season of importance helps provide a profile of important grizzly habitat. The process of identifying and mapping important bear foraging and denning habitat was completed for the Cabinet Mountains portion of the CYRZ in the early 1980s, and the process was described thoroughly by Madel (1982). Mapping indicated that the Libby Creek drainage had the highest spring, summer, and fall component acreage of any drainage in BMU 5, and the upper West Fisher Creek drainage had the highest spring and summer component acreage of any drainage in BMU 6. Excellent year-round habitat components are present within and adjacent to the analysis area with documented use by grizzly bears (Kasworm and Manley 1988; Christensen and Madel 1982). The process also recognizes that many high-value foraging components are generally non-forested and many sites may remain in a relatively stable vegetative state for many decades or even longer. Successional processes in wet meadows and marsh habitat are relatively slow, and avalanche chutes may retain their vegetative condition for centuries due to the continual disturbance associated with sliding snow. Other foraging sites that may have developed as a result of disturbance from wildfire or timber harvest may experience more rapid successional processes.

Kasworm *et al.* (2011) notes the importance of huckleberries as a major source of late summer food, along with serviceberries and mountain ash depending upon the year. Based on huckleberry life history, and fire occurrence and timber management within the Cabinet Mountains, huckleberry field production is likely decreasing. The last large-scale fires occurred between 1885 and 1939, with the 1910 fires affecting large areas of the CYE.

Objective 5. Meet the management direction outlined in the Interagency Grizzly Bear Guidelines (51 Federal Register 42863) for management situations 1, 2, and 3.

Within the Recovery Zone, meeting Objectives 1 through 4 has been determined to meet the intent of the Interagency Grizzly Bear Guidelines (IGBC 1986; Buterbaugh 1991) and the 2015 KFP. Habitat parameters within BMU 2 currently meet or are better than its individual standards. BMUs 5 at 58 percent does not meet its core standard of 60 percent, but is above the research benchmark minimum of 55 percent and either meets or is better (lower) than its OMRD and TMRD standard. BMU 6 at 54 percent does not meet its core standard of 55 percent or the research benchmark, but is better (lower) than its OMRD standard and is worse than (higher) than its TMRD standard. These existing conditions within BMU 6 are moderated by conditions in the remaining BMUs (USFWS 2011c, 2011d) in the south Cabinets. Those BMUs meeting or better than their standard would provide habitat for female grizzlies to be successful and survive to adulthood and reproduce and provide cubs, based on CYE research findings (Wakkinen and Kasworm 1997; Allen *et al.* 2011). As described previously, a north-south movement corridor exists through BMU 2, 5, and 6, connecting the southern BMUs (7, 8, and 22) to the northern Cabinet Mountain BMUs 1 and 2 and Yaak River basin portion of the ecosystem. The CMW forms the central section of this corridor. Seasonal habitat components are well distributed across BMUs 2, 5, and 6. Human-caused mortality has occurred as recently as 2011 within BMU 2 and BMU 5.

Objective 6: Meet the management direction specified in the October 18, 2011 Incidental Take Statement (USFWS 2011c, 2011d).

This objective is met by meeting core, OMRD, and TMRD standards addressed in Objective 1 as well as complying with the 2015 KFP features and design elements for the CYRZ and the Cabinet Face BORZ.

Outside Recovery Zone

National Forest System Lands

The 2011 Access Amendment Biological Opinion (USFWS 2011c, 2011d) concurred with the existing motorized access conditions for areas of bear occupancy outside the recovery zones. These conditions were determined and established by the 2010 Level One Team (Access Amendment). As discussed under the *Analysis Methods* section, the SCYE and BORZ were re-evaluated by a multiagency group of biologists in 2009 and linear miles of open and total road were used to document the existing motorized baseline because they are more easily communicated, monitored, and calculated than road densities (Allen 2011). The boundaries of these identified BORZ areas are not static and may be adjusted as grizzly bear use patterns are reevaluated in the future. The baseline conditions for National Forest System lands in the Cabinet Face BORZ polygon are displayed below in Table 225.

Table 225. Cumulative Baseline Condition of Cabinet Face BORZ.

Grizzly Bear Ecosystem	Total Size (acres)	National Forest System Lands		
		Size (acres)	Total Linear Miles of Roads 2013/Baseline	Total Linear Miles of Open Roads 2013/Baseline
Adjacent to Cabinet Mt portion of the CYE	28,052	27,093	164.6/(164.6)	129.5/(129.5)*

*Differs from the 128.0 miles identified in the Access Amendment baseline (USDA Forest Service; KNF 2011a, 2011b) due to corrections in database; no changes occurred on the ground.

Grizzly bear sightings have occurred along the front of the Cabinet Mountains outside of the Recovery Zone. Credible sightings of grizzly bears documented for 15 years (1994-2010) within the Cabinet Face BORZ total 23 sightings with one female with cubs (1997) and one bear mortality (1997 poaching on private land) (Allen 2011; Kasworm *et al.* 2012). During 2012, no sightings of a female with cubs occurred in the Cabinet Face BORZ but a credible sighting of a grizzly bear did occur (Kasworm *et al.* 2013c).

Existing linear miles of road on National Forest System lands in the Cabinet Face BORZ (baseline corrected and updated since the 2011 Access Amendment) are 129.5 miles of open road and 164.6 miles of total road (USDA Forest Service 2012e). Road construction to facilitate timber harvest or mining has occurred within the Cabinet Face BORZ, resulting in the matrix of open, restricted with gates or berms, or impassable roads existing today. Timber harvest activities began about 1949 and have continued to the present. Within the Cabinet Face BORZ on National Forest System lands, 3,346 acres of regeneration harvest has occurred. Past harvest has provided a variety of vegetation successional stages across the BORZ.

Currently no active range allotments or food attractants (refuse collection sites) are on National Forest System lands in the Cabinet Face BORZ. The Lincoln County collection dumpster site, a known black bear attractant, was moved in 2012 to a location along US 2 about 0.6 mile north of the Libby Creek Road/US 2 intersection, is enclosed within an electrified fence, and is locked nightly. This site is 1.5 miles east of the current BORZ boundary. The Cabinet Face BORZ overlaps 14,058 acres of the Crazy PSU and 1,985 acres of the Silverfish PSU. Campgrounds and dispersed camping sites have the potential to provide attractants; however, these areas are managed or checked regularly so that potential attractants do not remain. Private lands within the Cabinet Face BORZ boundary or adjacent to the BORZ likely have both livestock and food attractants present. The 2011 Access Amendment and the management direction specified in the October 18, 2011 Incidental Take Statement (USFWS 2011c, 2011d) directs the KNF to comply with features and design elements for the Cabinet Face BORZ.

Private and State Trust Lands

Within the MFSA transmission line corridor analysis area, road densities on private land are generally high. Many private land parcels have housing and other human-related development. On corporate timberland, most previously harvested areas have well-established conifer regeneration primarily dominated by dry ponderosa pine/Douglas-fir communities. Small areas of cottonwood or spruce/fir riparian habitat provide potential feeding sites for grizzly bears in the Miller Creek, Fisher River, West Fisher Creek, and Hunter Creek riparian corridors.

The two State trust parcels (section 36 T27N, R30W and section 16 T28N, R30W) are located outside of the CYE. State section 36 T27N, R30W, located on the eastern edge of BMU 6 in the West Fisher Creek drainage, is crossed by the year-round open road #231 (Libby Creek/Fisher River Loop Road) through the southeast and southwest quarters. The KNF has mapped spring foraging habitat, which extends down in elevation from inside BMU 6 into the northwest quarter of this section. State section 36 is also partially located in the US 2 – Barren Peak/Hunter Creek approach area described below. The other State section (16 T28N, R30W) is located about 1 mile northeast of BMU 5 and has the Libby Creek Road #231 located through the northwest quarter. Both State trust sections were identified as being located in non-recovery occupied habitat (State HCP, Figure C-15) and are also located in HUCs (West Fisher Creek and upper Libby Creek), which are considered occupied by grizzly bears (Allen 2011).

Linkage/Movement Corridors

The KNF has identified three approach areas for crossing the US 2 fracture zone in the general vicinity of the Montanore Project analysis area (Brundin and Johnson 2008). To the north of Poker Hill 7 miles, the US 2-Deep Creek/McMillian approach area overlaps the northeastern tip of the Crazy PSU where Bear Creek Road #278 intersects US 2, the easternmost edge of BMU 2, and the Cabinet Face BORZ. Four miles south of Poker Hill, the US 2-Horse Mountain/Teepee Lake approach area is adjacent to BMU 5’s eastern boundary and overlaps the Cabinet Face BORZ. The southernmost approach area identified, the US 2-Barren Peak/Hunter Creek, extends from the Miller Creek area southward toward the Jumbo Peak and Fosseum Mountain Area. The Barren Peak/Hunter Creek and most of the Horse Mountain/Teepee Lake approach areas are within the larger landscape scale Lost Trail-Kenelty linkage area identified by American Wildlands (2008), a regional non-profit organization. The Lost Trail – Kenelty linkage area was identified as an important movement area connecting the Northern Continental Divide Grizzly Bear Ecosystem and the CYE (Ibid). Servheen *et al*. (2003) examined grizzly bear habitat linkage between the Cabinet-Yaak and the Northern Continental Divide ecosystems and identified more site-specific linkage areas consisting of small scattered crossings between Libby and Sedlak Park. The linkage areas described by Servheen *et al.* (2003), Brunden and Johnson (2008), and American Wildlands (2008) are referred to collectively as the US 2 linkage zone. National Forest System land both inside and outside the BORZ boundary and private land occurs within the US 2 linkage zone area. Linkage areas between the Cabinet-Yaak and the Northern Continental Divide ecosystems are described in greater detail in the Wildlife BA (USDA Forest Service 2013b). The eastern part of the DEQ MFSA transmission line analysis area is comprised mainly of Plum Creek land, especially in the vicinity of US 2, and is situated within the US 2 linkage zone.

3.25.5.2.4 Environmental Consequences

The effects on grizzly bear core habitat, OMRD, and TMRD in BMUs 2, 5, and 6 are shown for the combined mine-transmission line alternatives in Table 226. Mine development and associated facilities (evaluation adit, plant site, and associated aboveground conveyer belt system, pipe systems, impoundment and associated road construction and reconstruction, and Rock Lake Ventilation Adit) would be located in BMU 5. The transmission line would be located in both BMU 5 and BMU 6. No proposed mine or associated facilities or transmission line locations would be located in BMU 2, only road access mitigation and the proposed access road would affect BMU 2. The access road for all combined action alternatives is the Bear Creek Road #278, which is located in or adjacent to BMU 2.

Transmission line impacts on core, road densities, and displacement may be inferred from impact calculations for the combined mine-transmission line alternatives. For example, for BMU 5 because core and road densities are similar for combined alternatives associated with Alternative 3 and combined alternatives associated with Alternative 4, the effects of the proposed project appear to be due primarily to the mine alternatives. In BMU 6, core and road densities would be primarily affected by the transmission line alternatives, and effects are similar for the combined alternatives associated with Alternatives C-R and D-R.

Transmission line displacement effects on grizzly bears would be short-term (about two active bear seasons) and, depending upon the combined alternative, are mitigated for by timing restrictions on transmission line construction-related activity on National Forest System land within the CYRZ and BORZ and also on State land (section 16 T27N, R30W) where applicable. Mine development-related effects (which would occur for the approximate 30-year life of the mine) are considered long-term for the grizzly bear, and to mitigate for these long-term displacement effects, the agencies' alternatives would require habitat compensation for displacement where Alternative 2B would not.

To illustrate the difference in transmission line and mine-related effects as required by Montana DEQ for MMC's MFSA evaluation, transmission line and mine alternative displacement effects are shown separately (Table 228 and Table 231). Corresponding habitat compensation for the mine alternatives' long-term displacement effects are shown in Table 231. Combined action alternative mitigation for grizzly bear habitat physically lost and for displacement effects is shown in Table 30 in Chapter 2.

No Action Alternatives

(Alternative A – No Transmission Line, Alternative 1 – No Mine, and Alternative 1A – No Combined Mine-Transmission Line)

No direct effects from federal actions would occur under the no action alternatives. No transmission line or mine would be constructed. Existing vegetative structure and current motorized road access would be maintained in BMUs 2, 5, and 6 and the CYE. The Access Amendment (USDA Forest Service 2011a, 2011b; USFWS 2011c) identified reasonably foreseeable federal actions as part of the strategies to bring BMUs into compliance with their individual BMU standards. The Montanore Project was identified as a potential reasonably foreseeable federal action to improve grizzly bear baseline habitat parameters and bring BMU 5 (currently not meeting core) and BMU 6 (currently not meeting TMRD or core) into compliance through road access mitigation. Access Amendment compliance within directly affected BMUs would have been achieved with implementation of any of the agencies' mitigated action alternatives and this would not occur. The agencies' mitigation plan would have required the KNF to manage at a level better than the baseline for the life of the mine once mitigation properties were acquired and this would not occur.

In those BMUs not currently meeting habitat parameter standards of core, OMRD, and TMRD, the KNF would be required to comply with Access Amendment standards within the specified timeframes (USDA Forest Service 2011a, 2011b) independent of the Montanore Project.

Access management on National Forest System lands within the Cabinet Face BORZ would be maintained at current levels. Human activity and associated human development on private land would continue, and motorized access would be expected to continue or expand. Any potential improvements to connectivity and movement corridors or road access changes outside of the CYRZ as identified in the agencies' mitigated combined action alternatives mitigation plan, which included the Cabinet Face BORZ area, would not occur.

Effects of Climate Change on Grizzly Bears

Grizzly bears are a more generalist species that have historically survived in many different climatic zones (Servheen and Cross 2010). Grizzly bears are opportunistic, omnivorous, and highly adaptable and climate change is unlikely to threaten populations due to ecological threats or constraints; however, climate change may play a role in driving grizzly bear/human interactions and conflicts.

Grizzly bear/human interactions are key factors that will affect grizzly bear persistence. Research is needed to understand how and where food sources will change and concerns over denning chronology. Timing of den entry and exit could be altered by warmer autumn temperatures, delayed snowfall, and earlier arrival of spring and could result in an increase in potential for bear/human conflicts in spring/fall (Servheen and Cross 2010). Management efforts to minimize fragmentation will offer benefits to the ability of grizzly bears and other wildlife to respond to climate change (Intergovernmental Panel on Climate Change 2007).

The north-south orientation of the major mountains in western North America provide natural movement areas where bears and other species can respond to climate change effects on preferred habitats and foods (Proctor *et al.* 2012). Grizzly bears currently inhabit much of the territory from their current southern extent in the northern U.S. to the Arctic Ocean, and movement in response to range shifts in vegetation and climate may not be critical (Ibid). As the historical range extends south to northern Mexico and continues to include a range of habitats that include hot dry regions

(Servheen 1999), climate and habitat change alone may not be a threat to grizzly bears along the Canada-U.S. border unless their major foods do not adapt and shift in a timely manner (Proctor *et al.* 2003).

It is difficult to predict any species' response to climate change, thus it is prudent to manage for population and metapopulation resilience, thereby facilitating adaptation to change within and between geographic regions if possible (Anderson *et al.*2009). This management would be best accomplished by reconnecting smaller population units and maintaining larger, more resilient units.

Table 226. Direct Effects on Grizzly Bear Habitat Parameters by the Combined Mine-Transmission Line Alternative.

Habitat Parameter and Access Amend-ment Standard (%)	Existing Conditions	[Alt 2] MMC's Proposed Mine			Prior to Evaluation Agencies' Mitigation Incorpo-rated	Prior to Construc-tion Agencies' Mitigation Incorpo-rated	[Alt 3] Agency Mitigated Poorman Impoundment Alternative									[Alt 4] Agency Mitigated Little Cherry Creek Impoundment Alternative								
		TL-B					TL-C-R			TL-D-R			TL-E-R			TL-C-R			TL-D-R			TL-E-R		
		C	O	R			C	O	R	C	O	R	C	O	R	C	O	R	C	O	R	C	O	R
BMU 2																								
Core (75%)	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
OMRD (20%)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
TMRD (18%)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
BMU 5																								
Core (60%)	**58**	**57**	**57**	**58**	60	65	64	65	65	64	64	65	64	64	65	65	65	65	65	65	65	65	65	65
OMRD (30%)	28	**32**	30	27	27	27	28	28	27	28	28	27	28	28	27	28	28	26	28	28	26	28	28	26
TMRD (23%)	23	**26**	**26**	22	19	19	20	20	18	20	20	18	20	20	18	20	20	18	20	20	18	20	20	18
BMU 6																								
Core (55%)	**54**	**53**	**53**	**54**	55	57	55	57	57	57	57	57	57	57	57	55	57	57	57	57	57	57	57	57
OMRD (34%)	29	32	29	29	29	29	31	29	29	30	29	29	30	29	29	31	29	29	30	29	29	30	29	29
TMRD (32%)	**33**	**35**	**35**	**33**	**33**	32	**33**	32	32	**33**	32	32	32	32	32	**33**	32	32	**33**	32	32	32	32	32

Bolded values do not meet Access Amendment standards.

TL = Transmission Line Alternative.

C = Construction Phase – shown with mitigation in place as mitigation plan requires this before the start of the Construction Phase.

O = Operations Phase – includes all mitigation in place.

R = Closure Phase (post-project) –includes all mitigation in place. Effects to grizzly bear habitat as reclamation activities are implemented were considered the same as the Construction Phase, and are not displayed.

BMU = Bear Management Unit; OMRD = open motorized route density; TMRD = total motorized route density.

Table 227. Physical Loss and Clearing by Transmission Line Alternative.

Effect on Grizzly Bear Habitat	[A] No Trans-mission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Bear Habitat Physically Removed in BMUs 5 and 6[1]	0	20	2	9	7
Bear Habitat Physically Removed in BORZ[1]	0	<1	2	2	0
Habitat Physically Removed Outside of CYRZ and BORZ[1, 2, 3]	0	14	9	9	8
Total Habitat Physically Removed	**0**	**34**	**13**	**20**	**15**
Clearing on National Forest System Land in BMUs 5 and 6[4]	0	159	154	174	229
Clearing on Land in the Cabinet Face BORZ[4]	0	8	51	45	0
Clearing Outside of CYRZ and BORZ[3,4]					
State Trust Land	0	0	10	10	28
Private Land	0	130	101	101	105
Total Habitat Cleared	**0**	**297**	**316**	**330**	**362**

All units are acres.
BORZ = Bears Outside Recovery Zone.
[1]Includes impacts of new roads constructed and existing road improved for the transmission line, based on a 25-foot right-of-way.
[2]Includes 4 acres of habitat physically removed for construction of the Sedlak Park Substation, access road, and loop line.
[3]Acres located outside of the CYRZ and BORZ but within the MFSA Transmission Line Analysis Area required by Montana DEQ.
[4]Potential habitat in transmission line corridor may be altered by tree clearing but is expected to remain usable for movement or foraging habitat due to small trees and low shrubs that would remain.

Table 228. Grizzly Bear Displacement Effects Due to Transmission Line Alternative.

Displacement Effect	[A] No Trans-mission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
In Recovery Zone					
New Displacement[1, 2]	0	5,232	4,268	4,377	4,929
Additional Displacement[2, 3] on Areas Currently Affected by Other Activities	0	2,938	3,096	4,604	6,489
Total Displacement	0	8,170	7,363	8,981	11,418
In the Cabinet Face BORZ					
New Displacement[1, 2]	0	730	868	794	769
Additional Displacement[2, 3] on Areas Currently Affected by Other Activities	0	1,636	1,336	588	217
Total Displacement	0	2,366	2,204	1,382	986

All units are acres.
BORZ = Bears Outside Recovery Zone.
[1] New displacement is the effect of project activities in grizzly bear habitat not currently disturbed by human activity.
[2] In Alternative B, the use of helicopters during line construction would be at the discretion of MMC. The agencies assumed that helicopters would not be used for logging or structure placement in Alternative B. Helicopter use was assumed for line stringing, maintenance, and annual inspections only.
[3] Additional displacement is the additional effect of project activities in grizzly bear habitat currently affected by other activities, such as existing road use or activities on private land.

Table 229. Miles of Open, Closed, and New Access Roads for Transmission Line Construction.

Road Type	Alt. B – North Miller Creek	Alt. C-R – Modified North Miller Creek	Alt. D-R – Miller Creek	Alt. E-R – West Fisher Creek
Existing Open Road Used				
Within a BMU	9.1	7.6	7.4	3.3
Within Cabinet Face BORZ	1.4	2.3	0.0	0.0
Private Land	10.1	12.0	9.4	8.3
State Trust Land	0	0.0	0.0	1.2
Subtotal	20.6	21.9	16.8	12.8
Existing Closed (includes gated or barriered) Road Opened				
Within a BMU	11.1	5.8	1.9	8.4
Within Core Habitat*	0.2	0.0	0.0	0.0
Within Cabinet Face BORZ	0.0	2.7	2.7	0.0
Private Land	0.0	5.7	5.8	5.0
State Trust Land	0.0	0.0	0.0	0.0
Subtotal	11.1	14.2	10.4	13.4
New Road Constructed				
Within a BMU	6.5	0.7	2.7	1.8
Within Core Habitat*	0.8	0.0	0.0	0.0
Within Cabinet Face BORZ	0.1	0.7	0.8	0.0
Private Land	3.3	1.5	1.4	1.3
State Trust Land	0.0	0.2	0.2	0.1
Subtotal	9.9	3.1	5.2	3.2
Total	41.6	39.2	32.3	29.3

All units are miles. Totals may vary due to rounding.
*Core habitat mileage is also included with the mileage of the "Within a BMU" category.
BMU = Bear Management Unit.
BORZ = Bears Outside Recovery Zone.

Action Alternatives

Effectiveness of Mitigation Plans: Habitat Compensation and Improving Habitat Parameters

Effects Common to All Action Alternatives

Although specific acreages would vary by combined alternative, mitigation habitat required in BMUs 5 and 6 would specifically reduce or mitigate for the potential fragmentation of the north-south movement corridor that would result from impacts of the proposed mine development. Mitigation properties would be managed for bear recovery. Depending on the access management changes that could occur and the development potential of the land, connectivity within the north-south corridor would improve, core would increase reducing risk of displacement and poaching, and grizzly bears would benefit throughout the larger area. Acquired land or conservation easements in perpetuity for grizzly bear mitigation would ensure lands that might otherwise be developed in a manner inconsistent with bear needs would be managed for grizzly bear use in perpetuity. Perpetual conservation easements would ensure long-term protection of security habitat for bears currently using these areas and mitigation habitat would preclude development that might occur.

Effects Common to Agencies' Action Alternatives

The agencies anticipate additional land acquisition beyond that proposed by MMC in Alternative 2B would be necessary to mitigate for effects of both habitat physically lost and long-term displacement from the mine and associated facility disturbance. The parcels identified for potential mitigation occur both within the CYE and outside in areas identified as important for linkage and movement. Priority areas are in (or adjacent) to the Cabinet Mountain portion of the CYE. High-priority lands within the north-south constricted corridor area are also ranked with a mitigation credit process for the agencies' alternatives. Any lands within the linkage area east of the CYE would contribute to reducing fracture zones and providing a more secure movement area between the CYE and the NCDE (Northern Continental Divide Ecosystem) located to the east. Management objectives of mitigation lands would be to improve grizzly bear habitat, including the reduction of sources of grizzly bear disturbances and where in the CYRZ to improve baseline habitat parameters by increasing core, and decreasing open and total road densities. Thus, additional increases in core and additional reductions in OMRD and TMRD would likely occur as a result of the mitigation lands. Any changes that may occur however are dependent on where the individual mitigation lands were located and any potential motorized access changes. As described in the *Methods* section, improvements to core, OMRD, and TMRD as a result of mitigation lands are not reflected in the following analysis because the exact location of the lands and which road access changes may occur on the mitigation lands are not known and, thus, improvements cannot be calculated.

The mitigation plan would require the KNF to manage at a level better than the baseline conditions for the life of the mine once mitigation properties are acquired and access management opportunities occur on National Forest System lands. This level of access management would contribute to reducing or mitigating for displacement and fragmentation effects of the mine on grizzly bears (USFWS 2014a). The mitigation plan also considered the effectiveness of the mitigation lands to protect seasonally important habitat, with an emphasis on spring and secondarily on fall habitats. The Comprehensive Grizzly Bear Management Plan would include provisions for adaptive management to ensure that human access to grizzly bear habitat, grizzly bear mortality, and habitat fragmentation would be minimized and that grizzly bear habitat would be maintained and improved, and would allow for development of recommendations for modifications of the mitigation plan based on data collected and new information.

Habitat Physically Removed: To mitigate for habitat physically lost due to mine-related development such as facilities, roads, tailings impoundment, and other features, the agencies' alternatives require habitat compensation at a 2:1 ratio (Table 30 and Table 230).

Habitat Displacement: In addition to habitat replacement for habitat physically lost, the agencies' alternatives would require land acquisition or purchase of a conservation easement in perpetuity for long-term displacement effects associated with the mine development at a 1:1 ratio (Table 30 and Table 231).

The agencies' alternatives mitigation plan would also require MMC to contribute funding to support monitoring of bear movements and population status in the Cabinet Mountains to confirm the effectiveness of habitat acquisition in mitigating the impacts of habitat loss and displacement on grizzly bears. If monitoring indicated that proposed habitat compensation was not adequate, the adaptive management features of the mitigation plan would allow for additional mitigation measures to be developed to address issues identified through monitoring.

In the agencies' alternatives, transmission line displacement effects would be minimized through implementation of helicopter construction timing restrictions. This mitigation would meet Objective 1. The agencies' mitigation plan would require that all transmission line construction, decommissioning, and removal in the CYRZ and Cabinet Face BORZ occur between June 16 and October 14. This timeline would prevent construction and decommissioning-related activity associated with the transmission line during the denning and spring use periods.

In addition to habitat compensation, mitigation designed to offset cumulative effects by changing motorized access conditions to create grizzly bear core habitat would also a) contribute to reducing risk of human-caused bear mortality; b) provide undisturbed habitat area for displaced bears; c) improve habitat conditions in the north-south movement corridor; and d) help meet KFP standards for grizzly bear habitat conditions established by the Access Amendment. Access changes such as the installation of barriers or gates on several roads would also reduce sources of grizzly bear disturbance within the BORZ.

Additional detail of mitigation plans is discussed below under the alternatives discussion.

Effects within Recovery Zone
The environmental consequences analyzes the potential direct, indirect, and cumulative effects of the proposed transmission line alternatives and the combined mine-transmission line alternatives, which consider measures included in mitigation plans. The effects of the action alternatives will be discussed relative to the six objectives common to grizzly bear recovery described in Table 219. The following analysis examines how these measures are implemented and, thus, how the objectives relating to grizzly bear recovery are met by each alternative. Included within this analysis are the effects of direct physical loss of or displacement from grizzly bear habitat resulting from 1) increased human activity and disturbances associated with roads or activities, including changes to OMRD and TMRD, loss of core area, impacts to seasonal habitats, opening size, and corridor width; 2) an increase in mortality risk to grizzly bears resulting from human impacts, including food attractants, recreation, access into grizzly bear habitat, and human settlement; and 3) fragmentation of grizzly bear habitat or narrowing of the relatively narrow north-south corridor connecting the southern Cabinet Mountain BMUs to those habitats to the north.

Grizzly Bear Recovery Objectives: The 2011 Access Amendment provides the habitat parameter standards by BMU for core, OMRD, and TMRD analyzed below and considers the best available science (Allen *et al.* 2011) for the CYE. The estimated grizzly bear population has increased since 1999 (20 bears) through the early 2000s (30 to 40 bears) to a current estimate of 50 bears (Kasworm *et al.* 2000, 2003, 2004, 2013). Although an improvement in the probability of decline does not directly indicate the grizzly bear population is increasing, it means that the calculated growth rate is getting closer to 1.0 (stable population). Even when the growth rate becomes just greater than 1.0 (increasing population), there would still be some probability that the population is in decline due to portions of the bell curve still falling below 1.0. Similarly, an improvement in the percent probability of decline has been observed since 2006, decreasing from 94 to 57 percent (Kasworm *et al.* 2007, 2013). This would suggest the KNF's wheeled motorized access management policy over the last decade has contributed to improving the grizzly population toward recovery goals within the CYE by improving BMU parameters with some meeting and exceeding standards. Implementation of the 2011 Access Amendment design elements would continue this trend.

Objective 1: Provide adequate space to meet the spatial requirements of a recovered grizzly bear population.

All action alternatives have the potential to remove habitat or displace bears and impact core, OMRD, and TMRD through road construction and use. The level of impacts to the habitat parameters of core, OMRD, and TMRD depend on the current and during project activity access status of the roads being used, length of the road, and proximity of the roads with other roads on the landscape. Impacts resulting from displacement were calculated based on the CEM model (as described in the *Methods* section and in ERO Resources Corp. (2015), which considers intensity, frequency, and duration of the disturbance. Proposed activities with potential to increase or decrease displacement occurring within the BMUs and/or impact the habitat parameters include road access mitigation prior to activity; transmission line and mine development (construction of the plant site and associated conveyor belt, aboveground pipelines, adits, impoundment); and all associated road reconstruction and new construction.

Physical Habitat Removal and Displacement

Alternative B – MMC's Proposed Transmission Line (North Miller Creek)

*Physical habitat removal and clearing***:** Within BMUs 5 and 6, Alternative B would require clearing on 159 acres and the physical removal of 20 acres of potential grizzly bear habitat as a result of new road construction (Table 227). In Alternative B, the new road prism would remain during transmission line operations, but roads opened or constructed for transmission line access would be gated or barriered on National Forest System land after construction to prevent public motorized access. All disturbed areas, such as access roads, pulling and tensioning sites, and transmission line clearing areas, would be seeded with grass and shrub species after transmission line construction. Areas where trees were trimmed, but were otherwise not disturbed, would be allowed to establish naturally as grassland or shrubland. In areas where vegetation re-established, disturbed areas would provide forage habitat during the Operations Phase.

The physical removal of habitat on 20 acres would be for the life of the mine. Alternative 2B habitat compensation would offset the loss of these 20 acres. Suitable habitat is widely available and would remain in BMUs 5 and 6 for grizzly bear use, and land acquisition mitigation for habitat physically lost would increase the amount of secure habitat. Low shrubs or trees are expected to remain in the 159 acres of cleared area, although vegetation could be removed at the contractor's discretion.

Roads built for the installation of the transmission line would be re-disturbed during line decommissioning. After the transmission line was removed, all newly constructed roads would be bladed, contoured, and seeded on National Forest System lands. Once vegetation re-established, these areas would provide forage habitat.

*Displacement effects***:** Helicopter use and other construction activities would increase short-term displacement effects to bears inside the Recovery Zone. The 1 mile on either side of the transmission line zone of influence for helicopter-associated activities would include currently undisturbed areas as well as areas currently affected by human activities such as road use or activities on both National Forest System and private land. Within the Recovery Zone, Alternative B would create short-term displacement effects on 5,232 acres of undisturbed grizzly bear habitat and short-term additional displacement effects on 2,938 acres of currently affected grizzly bear habitat (Table 228). Additional and new short-term displacement effects would also occur on 658 acres of habitat in BMU 7.

Situations involving impacts to grizzly bears caused by aerial flights have not been extensively studied (USDA Forest Service and USFWS 2009); however, there is general agreement that helicopters create audible temporary disturbance that can influence bears, but without the longer lasting effects associated with roads (Parametrix 2005, revised 09/2010). Thus, disturbance to grizzly bears caused by helicopters does not typically result in the same extent of impact as permanent roads or other developments (USDA Forest Service and USFWS 2009). The use of a helicopter could have displacement effects to any grizzly bears that may be in the zone of influence (USDA Forest Service and USFWS 2009). Studies suggest that high frequency helicopter use, particularly at low altitudes, in grizzly bear habitat can adversely affect grizzly bears (USDA Forest Service and USFWS 2009; Summerfield 2007). Disturbance from helicopters may cause flight responses and other behavioral changes, increased heart rate and other physiological changes, displacement to lower quality habitat, and increased energetic demands (Ibid, Harding and Nagy 1980; Reynolds *et al.* 1986).

Alternative B would include mitigation for grizzly bears to lower potential for displacement effects associated with the helicopter use. Alternative B would require a timing restriction for restricting motorized activity associated with the transmission line construction from April 1 to June 15 within spring bear habitat in the Miller Creek (BMU 6) and Midas Creek (BMU 5) drainages. In addition, Alternative B construction would not occur during the winter in big game winter ranges (December 1 to April 30) and this would apply to National Forest System and private lands. Alternative B would be located entirely on big game winter range in BMU 6 and therefore construction may not occur from December 1 to April 30, which would extend the timeframe on either side of the grizzly bear spring range displacement mitigation. BMU 5 activity would be mainly restricted in Midas Creek due to the grizzly mitigation, as minimal big range winter range would be affected by Alternative B. For Alternative B, use of helicopters for structure placement, vegetation clearing, and line stringing is at the contractor’s discretion, but for this analysis, the agencies assumed for Alternative B that helicopters would not be used for structure placement or for timber harvest and vegetation clearing. Therefore the analysis limited potential displacement effects related to helicopter use for Alternative B to line stringing (about 10 days) during construction and inspection and maintenance (about 10 days a year) during operations. Potential displacement effects associated with these activities during construction would be short-term with reduced potential to disturb grizzly bears due to most of the activity being expected to occur outside of the spring season, Construction-related activity would not occur during the spring period in Miller and Midas Creek drainages. Due to Alternative B big game winter range mitigation, activity also would not occur during the grizzly bear denning season. Use of helicopters for maintenance during operations would result in infrequent disturbance to grizzly bears.

Disturbance effects could occur from other transmission line construction activities in areas where helicopters were not used, and would be more extensive for Alternative B than the agencies’ alternatives. After construction, displacement effects would diminish through the Operations Phase as roads opened or constructed for transmission line access would be gated or barriered.

During decommissioning when removing the transmission line, helicopter use and other activities would cause similar disturbances with similar durations as during construction. Access roads would be reopened, the transmission line would be removed, roads would be reclaimed, trees along the line would be allowed to grow, and all disturbed areas would be revegetated.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative
Effects to grizzly bears due to habitat physically removed due to the transmission line construction and habitat compensation mitigation for those effects from Alternative C-R would be as described in "*Effects common to all action alternatives*," "*Effects common to agency alternatives*," or as described under Alternative B with the exception of the following:

Physical habitat removal and clearing: Alternative C-R would require a total of 154 acres of clearing within BMUs 5 and 6 and the physical removal of 2 acres of potential grizzly bear habitat due to new roads (Table 227). Habitat compensation would be required for the 2 acres of habitat physically lost. More low shrubs or trees would be expected to remain in the 154 acres of cleared area compared to Alternative B due to the agencies' requirement for preparation and implementation of a Vegetation Removal and Disposition Plan to minimize vegetation removal and minimize use of heavy equipment in riparian areas. After the transmission line was constructed, all roads on National Forest System lands would be placed in intermittent stored service. Intermittent stored service roads would be closed to traffic and would be treated so they would cause little resource risk if maintenance were not performed on them during the operation period of the mine and before their future need during reclamation. New transmission line roads on National Forest System lands would be decommissioned after closure of the mine and removal of the transmission line. Decommissioned roads would be removed from service and would receive a variety of treatments to minimize the effects on other resources. Once vegetation re-established, re-disturbed areas would provide forage habitat. Reclamation of all disturbed areas where habitat was physically removed would be similar to Alternative B; however, native species would be specified and a more rigorous reclamation program is required.

Displacement effects: In Alternative C-R, helicopters would be used for logging, structure placement, line stringing, annual inspections and maintenance, and line decommissioning. Displacement effects from helicopter use and other construction activities related to Alternative C-R would have the greatest impact in BMU 6. The 1-mile zone of influence of helicopter activity on either side of the centerline would include currently undisturbed areas as well as areas currently affected by human activities such as road use or activities on private land. Within the Recovery Zone, Alternative C-R would cause new short-term displacement effects to 4,268 acres of grizzly bear habitat due to helicopter use (Table 228) for up to 2 months over a 2-year period. Vegetation clearing and structure placement where helicopters were not used outside of core habitat could also contribute to short-term displacement effects due to wheeled motorized access and concentrated human activity. Alternative C-R would cause short-term additional displacement effects to 3,096 acres of currently affected grizzly bear habitat in the Recovery Zone. Additional and new short-term displacement effects would potentially occur on 114 acres of habitat in BMU 7. Alternative C-R would increase short-term helicopter displacement effects during construction but would require less use of new or formerly closed (gated or barriered) roads relative to Alternative B (Table 229). Noise associated with transmission line construction would cease after 2 to 3 years when the transmission line was completed. Except for annual inspection and infrequent maintenance operations, helicopter use and other transmission line construction activities would cease after transmission line construction until decommissioning.

No habitat compensation was required for transmission line displacement effects due to incorporated timing mitigation. Alternative C-R potential transmission line displacement effects would be more effectively minimized than Alternative B through implementation of mitigation. According to the agencies' alternatives transmission line construction schedule, helicopter use would be limited to two active bear seasons. In addition, the agencies' alternatives mitigation plan for transmission lines, including Alternative C-R, would limit construction and decommissioning activity to the period between June 16 and October 14 and outside of the grizzly bear spring (April 1 to June 15) and den (December 1 to March 31) seasons, resulting in a very low likelihood of actual displacement of grizzly bears. Alternative C-R would defer access change on North Fork Miller Creek Road (NFS road #4725) and would delay the creation of 1,053 acres of core to after transmission line construction (Figure 94). Consequently, BMU 6 core would remain at 55 percent during construction (meeting the core standard) and TMRD would remain at the existing 33 percent, 1 percent above the standard. As a result of Alternative C-R, less available secure habitat would be available for displacement during the Construction Phase compared to Alternatives D-R and E-R. After construction of Alternative C-R, the road access change on North Fork Miller Creek Road would be implemented and BMU 6 core would increase to 57 percent, and TMRD would decrease to the standard, therefore providing all habitat parameters suitable for a female grizzly bear's successful survival and reproduction based on research (Wakkinen and Kasworm 1997). During the Operations Phase of Alternative C-R, maintenance of the transmission line corridor could result in an increased potential for displacement of grizzly bears within the two separate blocks of core where the line would be located due to helicopter noise and any associated human activity compared to Alternatives D-R and E-R, which are not within core.

Alternative D-R – Miller Creek Transmission Line Alternative
Effects to grizzly bears due to habitat removal and displacement and mitigation for those effects from Alternative D-R would be as described in Alternative C-R with the exception of the following:

Physical habitat removal and clearing: Alternative D-R would clear 174 acres of grizzly bear habitat within BMUs 5 and 6 and physically remove 9 acres of grizzly bear habitat (Table 227).

Displacement effects: Effects from Alternative D-R would be the same as described for Alternative C-R, except that in Alternative D-R, the extent of short-term displacement effects from helicopter construction and line stringing would be slightly greater due to the length of the alignment. The timing of helicopter activities would be the same as Alternative C-R. Potential new short-term displacement effects would occur on 4,377 acres of grizzly bear habitat and additional short-term displacement effects would occur on 4,604 acres in the CYRZ (Table 228). As a result of the mitigation limiting construction and decommissioning activities to certain times of year described under Alternative C-R, Alternative D-R displacement effects would be minimized as 1) the transmission line is primarily in spring habitat; 2) grizzly bears are highly unlikely to use the area outside the spring period; 3) no activities are allowed on National Forest System land within the CYRZ or BORZ during the spring period; 4) other undisturbed areas of quality spring habitat would be available should a bear be disturbed; and 5) the availability of secure summer habitat would be improved with road access mitigation and habitat compensation associated with the agencies' combined alternatives prior to activity and any bear potentially displaced would have ample secure summer habitat within proximity of the activity for displacement. In addition, Alternative D-R would implement an access change on NFS road #4725 prior to the Construction Phase (Figure 94). As a result, OMRD and TMRD road densities and security core habitat would either meet or be better than the affected BMU standards prior to construction activity. Within BMU 6, the baseline habitat parameter of core would improve to 57 percent prior to activity and would allow for more available secure habitat for a grizzly bear to use if a bear was temporarily displaced during the Construction Phase compared to Alternative C-R. By not deferring the road access change on NFS road #4725, Alternative D-R would also result in BMU 6 TMRD meeting the standard prior to the Construction Phase. Thus, prior to Alternative D-R construction activity, road densities and security core habitat would either meet or be better than the BMU standards in both BMU 5 and BMU 6 and would provide improved baseline habitat parameters suitable for a female grizzly bear's successful survival and reproduction based on research (Wakkinen and Kasworm 1997).

Alternative E-R – West Fisher Creek Transmission Line Alternative

Effects to grizzly bears due to habitat removal and displacement and mitigation for those effects from Alternative E-R would be as described in Alternative D-R with the exception of the following:

Physical habitat removal and clearing: Physical habitat disturbance resulting from Alternative E-R would be similar to Alternatives C-R and D-R, except that Alternative E-R would clear 229 acres within BMUs 5 and 6 and physically remove 7 acres of grizzly bear habitat (Table 227).

Displacement effects: Displacement effects from Alternative E-R would be the same as Alternative D-R, except that the extent of short-term displacement effects from helicopter construction and line stringing would be greater due to the greatest number of structures being placed by helicopter. The duration of helicopter activities would be the same as Alternatives C-R and D-R. New short-term displacement effects would occur on 4,929 acres of grizzly bear habitat and additional short-term displacement effects would occur on 6,489 acres of currently affected habitat in the CYRZ (Table 228). Additional and new short-term displacement effects would potentially occur on 268 acres of habitat in BMU 7.

Combined Mine-Transmission Line Alternatives

As described previously, mine and transmission line development would occur within BMU 5. BMU 2 would be affected only by the access road and BMU 6 would be affected only by the transmission line alternatives. The mitigation plan for the agencies' combined action alternatives required more habitat compensation for habitat physically lost and displacement as a result of the mine development than Alternative 2B, which compensated for habitat physically lost at an approximate 1:1 ratio.

*Physical habitat removal and clearing***:** All combined action alternatives would result in the direct loss of grizzly bear habitat due to the construction of mine facilities and new or upgraded roads (Table 230). Alternative 2B would remove the most grizzly bear habitat, while Alternatives 3C-R, 3D-R, and 3E-R would remove the least. Grizzly bear habitat physically removed by the combined alternatives mine facilities and associated new/upgraded roads would not be available for the life of the mine. Some level of forage or cover would be expected to remain in the transmission line clearings, with greater amounts retained for the agencies' alternatives.

Table 230. Physical Loss of Grizzly Bear Habitat by Combined Mine-Transmission Line Alternative.

Project Component	[1] No Action	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Mine components in BMU 5	0	2,564	1,547	1,547	1,547	1,906	1,906	1,906
Transmission line in BMUs 5 and 6[1]	0	20	2	9	7	2	9	7
Transmission line in BORZ[1]	0	<1	2	2	0	2	2	0
Transmission line outside of CYRZ and BORZ[1, 2]	0	14	9	9	8	9	9	8
Mine and transmission line	0	2,598	1,560	1,567	1,562	1,919	1,926	1,921
Proposed habitat replacement	0	2,826	3,120	3,134	3,124	3,838	3,852	3,842

All units are acres.
[1] Includes impacts of new roads constructed and existing roads upgraded for the transmission line, based on a 25-foot right-of-way.
[2]Includes 4 acres of habitat physically removed for construction of the Sedlak Park Substation, access road, and loop line.

For all combined action alternatives, construction and improvement of access roads during transmission line construction would temporarily remove habitat. All areas physically disturbed for transmission line construction, such as access roads, pulling and tensioning sites, and transmission line clearing areas, would be seeded with grass and shrub species after transmission line construction. Areas where trees were trimmed, but otherwise were not disturbed, would be allowed to establish naturally as grassland or shrubland. After revegetation, disturbed areas of the transmission line would provide forage habitat as forage species become established. Habitat in the disturbance footprint for temporary access roads would be disturbed for a short time when the transmission line was removed.

For all combined action alternatives, all physically disturbed areas would be reclaimed after mine closure. New transmission line roads on National Forest System lands would be decommissioned after closure of the mine and removal of the transmission line. Decommissioned roads would be removed from service and would receive a variety of treatments to minimize the effects on other resources. Once vegetation re-established, reclaimed areas would provide forage habitat, but forest habitat would not re-establish for several decades.

In all combined action alternatives, the impacts of physical habitat loss associated with mine development or transmission line construction would be offset by MMC's and agencies' land acquisition or conservation easement in perpetuity requirements. In Alternative 2B, to mitigate for habitat physically lost, MMC would acquire 2,826 acres (an approximate 1:1 ratio of habitat lost to replacement) and if MMC transferred mitigation lands to the KNF, the lands would be managed as MS-1 grizzly bear habitat.

In the agencies' alternatives, 2 acres of habitat would be acquired for every 1 acre of grizzly bear habitat physically lost, and either acquisition or conservation easement in perpetuity could occur (Table 230).

Displacement effects: Underuse or displacement of grizzly bears may already occur in existing influence zones around roads and point source disturbances, such as the Libby Creek or Bear Creek Road, Libby Adit, or other developed private lands. In all combined action alternatives, mine construction and operations, road construction and use, and helicopter use would increase displacement effects to bears inside the Recovery Zone. The agencies would require 1 acre of habitat for every 1 acre of grizzly bear habitat affected by long-term mine displacement.

Transmission Line: The extent of displacement would be greater for transmission line construction activities than for mine activities (Table 231) due to the length of the line and helicopter use, but would be of shorter duration compared to the mine associated activities. The detailed effects are discussed under the individual transmission line alternatives sections. Except for Alternative 2B, transmission line displacement effects would be generally proportional to the length of the transmission line component of the combined alternative (Table 228). The analysis of transmission line displacement effects does not include areas where mine displacement effects and transmission line displacement effects overlap. The areas of overlap between transmission line and mine displacement would be greatest for Alternative 2B; therefore, a larger proportion of the displacement effects are attributed to long-term mine disturbance effects. Transmission line displacement effects in the CYRZ would be the greatest for Alternatives 3E-R and 4E-R (11,418 acres), followed by Alternatives 3D-R and 4D-R (8,981 acres), Alternative 2B (8,170 acres), and Alternatives 3C-R and 4C-R (7,363acres) (Table 228 and Table 231). Alternative 2B, as described under Alternative B, would restrict helicopter use during construction and decommissioning outside of the spring use period for bears in the Midas Creek and Miller Creek drainages and would restrict winter activity to outside of December 1 through April 30 on big game winter ranges, providing for lower levels of disturbance in denning habitat. In the agencies' alternatives, transmission line displacement effects would be minimized through implementation of construction timing restrictions described in section 2.5.7, *Mitigation Plans* and under the transmission line alternatives. As described under Alternative C-R, the agencies' alternatives mitigation plan would limit construction and decommissioning activity to the period between June 16 and October 14, outside of the spring use period, resulting in a very low likelihood of actual displacement of a grizzly bear. The timing restriction also would minimize displacement during the general big game rifle hunting season (October 24 – November 29) and potential disturbance during the denning period. Undisturbed summer habitat is widely available within the BMUs should a grizzly bear be displaced by construction activity during the summer. Alternative C-R would defer access change on NFS road #4725 and core creation in BMU 6 to post-construction, resulting in less available secure habitat available for displacement during construction compared to Alternatives D-R and E-R, which would not delay the road access change (Figure 94).

Mine Facilities and Associated Roads: Displacement effects during mine construction and operations are not as widespread as those related to the short-term effects of the transmission line construction, but would affect grizzly bears more because the effects would be long-term and last for the life of the mine, or possibly longer. As discussed previously, displacement can, but does not always, mean that grizzly bears totally avoid areas. Those areas affected by the mine impoundment and facilities and associated roads, and the access road with high-intensity 24-hour point activity may be underused or avoided.

Table 231. Grizzly Bear Displacement Effects of Mine Alternatives in BMU 2, BMU 5, and the Cabinet Face BORZ.

Displacement Effect	[1] No Action	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative	[4] Agency Mitigated Little Cherry Creek Impoundment Alternative
Displacement in Recovery Zone[1] BMU 2 and BMU 5				
In North-South Corridor				
New Displacement[2]	0	2,639	1,154	1,075
Additional Displacement[3]	0	926	728	732
Total Displacement	0	3,565	1,882	1,807
Outside of North-South Corridor				
New Displacement[2, 3]	0	346	397	367
Additional Displacement[3]	0	2,392	2,215	2,590
Total Displacement	0	2,738	2,612	2,958
Total Inside and Outside of North-South Corridor				
Total New Displacement	0	2,985	1,551	1,442
Total Additional Displacement	0	3,916	3,536	3,920
Total New and Additional Displacement	0	6,901	5,087	5,362
Corresponding Habitat Compensation[4]	0	0	2,293	2,339
In the Cabinet Face BORZ				
New Displacement[2]	0	55	0	40
Additional Displacement[3]	0	2,800	2,577	2,799
Total Displacement	0	2,855	2,577	2,838

All units are acres. Totals may not match due to rounding.
[1] No displacement effects from mine-related activities would occur in BMU 6.
[2] New displacement is the effect of project activities in grizzly bear habitat not currently disturbed by human activity.
[3] Additional displacement is the additional effect of project activities in grizzly bear habitat currently affected by other activities, such as road use or activities on private land.
[4] Corresponding habitat compensation based on displacement effects only, as determined using the CEM model.

Initial access to the mine site would be NFS roads #231 and #2316. Since November 2007, the KNF has authorized MMC to plow snow on NFS roads #231 and #2316 for access to the Libby Adit for maintenance. As part of this authorization, the KNF implemented seasonal restrictions on these two roads from April 1 to May 15 so that only mine traffic is allowed access behind the gate. In addition, seasonal restrictions on NFS roads #4778, #4778E, #5192, and #5219A were implemented as part of this authorization. These restrictions were implemented to reduce displacement and mortality risk to grizzly bears on spring range. With Forest Service authorization of the Evaluation Phase, MMC would continue to snowplow NFS roads #231 and #2316 to allow access during winter. These segments would continue to be plowed during the Evaluation Phase and for the first year of reconstruction of NFS road #278 during the Construction Phase.

Long-term displacement would be greatest for Alternative 2B, mostly because the Ramsey Plant Site would be in a separate drainage than other mine components (Table 231). Alternatives 3C-R and 3D-R would result in the least displacement effects. The zone of influence for combined action alternative activities would include currently undisturbed areas as well as areas currently being affected by human activities such as road use or activities on private land. Within the Recovery Zone, new displacement effects of mine activities to undisturbed grizzly bear habitat would range from 1,442 acres in Alternatives 4C-R, 4D-R, and 4E-R to 2,985 acres in Alternative 2B (Table 231). Additional displacement effects of mine activities to currently affected grizzly bear habitat would range from 3,536 acres in Alternatives 3C-R, 3D-R, and 3E-R to 3,920 acres in Alternative 4E-R.

In all combined action alternatives, the Bear Creek Road (NFS road #278) access road would extend 18 miles between the potential mine sites and US 2. Of the 18 miles, approximately 14.2 miles cross through or are adjacent to BMU 5 and BMU 2 and in MS-1 habitat. The Bear Creek Road (NFS road #278) is considered a high-use road based on the CEM model (greater than 10 vehicles per day) in the existing condition and is usually impassible from mid to late November through spring break-up in May. Widening, improvement, and yearlong use of the Bear Creek Road would lead to increased vehicle volumes and speed. Overall, improved road conditions that allow higher vehicle speeds and increased traffic could increase the risk of grizzly bear mortality due to vehicle collisions.

Estimates of increased annual traffic volume range from 187 percent to 234 percent, about three times existing levels throughout the life of the mine (Table 177 in section 3.21, Transportation). The Wildlife BA (USDA Forest Service 2013b) and USFWS' Grizzly Bear Biological Opinion (USFWS 2014a) considered an estimated 255 percent increase in traffic volume over the existing condition. Traffic volume estimates for percent increases in Table 177 differ from the Wildlife BA and Biological Opinion due to several reasons, one being an error (years of increase) in Johnson's (2013) calculations used in both the BA and the Biological Opinion. The KNF revised Johnson's calculations (2013) due to this error, and the revision is available in the project record. Estimated future traffic volumes based on a 1.2% increase shown in (Table 177 in section 3.21, Transportation) are the same as obtained from the revised KNF calculations, except that the revised KNF calculations considered these estimates to be over a 7-month period, not a 12-month period. Johnson (2013) calculations were based on the likelihood the baseline traffic data shown in Table 176 were not collected during the January 1 to May 31 time period as the Bear Creek Road is usually impassible mid to late November through spring break-up in May. In addition, unlike Table 176, estimated percent increases in traffic began in 2013, an appropriate environmental baseline (a "snapshot" of a species' health at a specified point in time) for the USFWS Grizzly Bear Biological Opinion analysis (USFWS 2014a).

The KNF revised Johnson (2013) calculations used 212 days (a 7-month period) to divide the estimated average future traffic volumes to estimate the increase in daily traffic, and to estimate future traffic. The revised Johnson (2013) estimates daily future traffic over a 7-month period ranging from 232 to 253 vehicles a day, and a 109 percent to 132 percent increase in traffic during this same 7-month period. Estimating daily traffic and percent increase in traffic over this 7-month period coincides with the active bear year. In comparison, Table 177 in section 3.21 *Transportation*) percent increases are based on a 12-month period (365 days) and this would result in an estimate of daily future traffic ranging from 188 to 203 vehicles a day, and a 187 to 234 percent increase in traffic during this same 1-month period. Although the *Transportation* section 3.21, Johnson (2013), and the revised KNF Johnson (2013) calculations differ, all reflect a substantial increase in traffic volume.

In all combined action alternatives, the mine would generate an estimated additional 132 vehicles per day (an additional 66 trips) on the Bear Creek Road. At peak production about 420 tons of concentrate, or 21 trucks per day, would be trucked daily via NFS road #278 Bear Creek Road and US 2 to the loading site in Libby. The speeds on the Bear Creek Road would increase from the existing 15 to 25 mph to 35 to 45 mph, equating to a 40-percent to 80-percent increase in potential traffic speeds over the existing conditions. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1600), which would minimize traffic and the potential for vehicular-grizzly collisions outside of this time period. MMC would provide transportation to employees using buses, vans, and pickup trucks, thereby limiting the use of personal vehicles. MMC would report road-killed animals to the FWP as soon as road-killed animals were observed. The FWP would either remove road-killed animals or direct MMC on how to dispose of them.

Ruediger *et al.* (1999) summarized that traffic volume more than 4,000 vehicles per day would create significant habitat fragmentation and wildlife mortality. Chruszcz *et al.* (2003) study in Banff National Park in Alberta, Canada defined high-volume roads as annual daily traffic volume of 14,600 to 21,500 vehicles per day, whereas low-volume roads ranged from 2,000 to 3,000 vehicles per day. Traffic volume was found to be the single greatest determinate of road crossings and that grizzly bears were reluctant to cross roads with high traffic volume (Ibid). Waller and Servheen (2005) studied the area along US 2 separating Glacier National Park from the Bob Marshall Wilderness Complex to the south. During their study, traffic volume between the east and west counters ranged from 77 to 87 vehicles per hour and mean daily traffic from 1,806 to 2,066 vehicles per day. Traffic levels on US 2 are already near this range with average annual daily traffic volume along US 2 near the intersection of US 2 and NFS road #278 (Bear Creek Road) from 2002 through 2011 ranging from 1,740 vehicles per day in 2002 to 1,940 vehicles per day in 2010 (MDT 2012) (see *Transportation* section 3.21.3.1*).* Waller and Servheen (2005) found most wildlife crossings of US 2 occurred at night and when highway traffic volume could be expected to be low. Hourly mean traffic during crossings averaging 10 vehicles per hour was half that of normal daytime traffic levels. Waller and Servheen (2005) hypothesized that the threshold traffic volume beyond which highways become significant barriers to grizzly bear movement occurs near 100 vehicles per hour. The projected increase in traffic volume on the Bear Creek Road #278 would not approach levels that are likely to result in a complete barrier to movement of grizzly bears based on existing research (Waller and Servheen 2005; Chruszcz *et al.* 2003; Ruediger *et al.* 1999).

Existing roads already result in displacement effects to grizzly bears within the influence zones surrounding the roads. According to the CEM, the influence zone extends 0.25 mile from roads considered to have “low linear motorized use.” The significant increase in daily traffic (in both numbers of vehicles and 24-hour activity period) on the Bear Creek Road #278 would result in additional displacement effects so that the road was categorized as a motorized point 24-hour disturbance and the ability of the influence zone was reduced to about 10 percent of its potential to support grizzly bears. Where these significant increases in vehicle traffic were projected, additional reduction in grizzly bear use was expected and corresponding replacement habitat was required.

Mitigation for the estimated projected increase in traffic volume, duration, and intensity is addressed in the grizzly bear mitigation plan and was based on the estimate of 255-percent increase in traffic volume over the existing condition. Thus, the proposed mitigation plan would mitigate for potential effects from the revised estimated increases in traffic volume. It should also be noted that the estimated projected traffic levels may be substantially less than shown in Table 177 in section 3.21, *Transportation*, based on the assumption that logging or other traffic would remain at a substantial decrease compared to the 1986-1991 timeframe used to develop the estimated baseline traffic volume. Long-term displacement from, or underuse of MS-1 habitat within portions of the affected drainages by some grizzly bears could occur for the life of the mine, or longer, as an indirect effect from increased mine-related high-intensity motorized traffic on the Bear Creek Road. Females may teach avoidance of disturbed area to cubs, extending the displacement for an unknown period of time after the mine is reclaimed. In addition, Bear Creek Road, which lies in a north-south alignment, cuts across most of the Libby Creek sub-drainages that flow west to east. The increased traffic levels would contribute to fracturing habitat connectivity between summer, fall, and den habitats west of the road from spring habitats to the east. Long-term high-intensity 24-hour use on Bear Creek Road may also affect grizzly bear movements toward the east where linkage areas across US 2 connect to the NCDE. Traffic along US 2 also would increase by about 4 percent from the Bear Creek Road intersection to the Libby loadout site. This intersection is located in the US 2-Deep Creek/McMillan Approach area identified by Brundin and Johnson (2008), where grizzly bears have been documented outside of the Recovery Zone. Mine traffic would be substantially less in the Closure Phase. Future traffic volume on the Bear Creek Road when all activities at the mine were completed in the Post-Closure Phase would be higher than the No Action Alternative (Alternative 1) because of the reconstruction of Bear Creek Road and loss of the Little Cherry Loop Road beneath the impoundment. In the Post-Closure Phase, mortality risk to grizzly bears would decrease on the Bear Creek Road compared to Operations, but the permanently improved road conditions (increased road width, improved sight distance, and paving) and higher traffic speeds would result in an increased grizzly bear mortality risk compared to pre-mine conditions.

Noise levels could be a factor contributing to the displacement of grizzly bears. Construction, operations, and reclamation or decommissioning would raise background noise levels substantially during the life of the operation (see section 3.20.4.1 in *Sound, Electrical and Magnetic Fields, and Radio and TV Effects*). Equipment noise can vary considerably depending on age, condition, manufacturer, use during a time period, and a changing distance from the equipment to a listener location. Noise generated by construction and blasting for adits would occur sporadically for about two weeks. Blasting would then mostly occur underground. The noise generated by the adit blasting would be short and sporadic and likely not audible to degrees that would significantly impact grizzly bear behavior. Generators would be used to supply power as the adits were developed, and ventilation fans would be located outside of the portals during construction. Noise from the generators and fans would extend into the CMW, at slightly higher levels than existing conditions. Noise from generators would cease after the transmission line was constructed. Highest noise levels would be associated with blasting, would be greatest during initial adit construction, and would decrease as the adits increased in depth. Very short-term blasting noise would be associated with the Rock Lake Ventilation Adit when it hit the surface on private land. Noise would also be associated with the excavation of the impoundment, hauling of waste rock to the impoundment, and construction of the dam, and would be experienced in areas within 2.5 miles of the source. Traffic noise would be the highest during construction on the Bear Creek Road and use of Libby Creek during that time. During operations, increased noise and increased night lighting within and adjacent to the mine facilities would occur. The conveyor, crushing plant, and ball mill would be the loudest continual disturbances. As described for the Ramsey Plant Site, during operations noise levels between 30 and 55 dBA would extend into the CMW to Elephant Peak and down the Ramsey Creek drainage to about the LAD Area 1 (Big Sky

Acoustics 2006) (see section 3.20.4.1 in *Sound, Electrical and Magnetic Fields, and Radio and TV Effects*), equating to about 2 air miles in either direction from the mill site. Noise sources and general magnitude of effects during all phases of operations in the agencies' alternatives would be similar to Alternative 2. For the agencies' alternatives, mitigation required prior to initiation of the Operations Phase would limit potential sound effects. This includes limiting sound levels of all surface and mill equipment, vehicle backup beepers, and intake and exhaust ventilation fans (acceptable sound levels are detailed in the agencies' mitigation plan).

It is not expected that the construction and operation of evaluation adits would result in similar levels of displacement as mine facility construction and operation. Disturbance effects of the evaluation adit would not approach levels associated with the construction and operation of the combined mine transmission line alternatives, considering the habitat condition (moderate motorized route densities and abundant core), number of employees, level of road use along an existing open road, and disturbances generated by construction and operation of the adit (see project description). Given the existing road management in the action area, effects would be moderate. The number of employees working on the evaluation adit would be 30 to 35, as compared to more than 300 during construction and up to 450 during the Operations Phase of the mine. Crews would assemble at an area designated by MMC and from there would be bused to the adit site. Busing employees would minimize traffic on NFS road #278, which is already an existing open road.

Unmitigated long-term displacement effects from mine activities could reduce grizzly bear movement in the north-south movement corridor in the Cabinet Mountains. Near the proposed combined alternatives, the CYE narrows to 15 miles, its' narrowest portion. Human development on the east and west slopes impacts the north-south movement corridor for grizzly bears in BMUs 2, 5, and 6. Figures 9 through 12 of the Wildlife BA (USDA Forest Service 2013b) provide a detailed description of this north-south movement corridor and existing and potential sites that, if developed, may constrict the corridor and impair movement of bears through the area. Distances between existing or potential sites of high human use could be less than 2 miles in some cases and when displacement distances are considered, it could be less than 1 mile. This corridor is critical as it links grizzly bear habitat in the southern Cabinet Mountains, specifically BMUs 7, 8, and 22, with habitat in the Cabinet Mountains BMUs to the north.

Unmitigated, the disturbance and displacement of grizzly bears from the proposed mine activities and existing roads on the east side could affect movement of bears traveling north and south along the Cabinet Mountains. Alternative 2B would have the greatest displacement effects in the north-south movement corridor, affecting 3,565 acres (Table 231). These displacement effects would not be offset by MMC's proposed road access changes (NFS road #4784 was proposed under Alternative 2B but this mitigation was already included in the Rock Creek Project mitigation, and would not be considered for direct effects of Alternative 2B, and the seasonal change on NFS road #4724 South Fork Miller Creek would not contribute to core). Alternative 2B would not include any other habitat replacement or compensation for long-term displacement effects associated with the mine activity.

Displacement effects in the north-south movement corridor would be less in the agencies' alternatives, with displacement effects in the north-south movement corridor occurring on 1,882 acres in Alternatives 3C-R, 3D-R, and 3E-R and 1,807 acres in Alternatives 4C-R, 4D-R and 4E-R (Table 231). Compared to Alternative 2B, which would not mitigate for displacement effects, the agencies' alternatives would mitigate long-term displacement effects from mine activities by acquisition or conservation easement of grizzly bear habitat at a 1:1 ratio, as described in section 2.5.7, *Mitigation Plans*. The agencies' alternatives habitat compensation for displacement effects was based on existing effects and types of proposed activities, and reflects the degree to which habitat within the zone of influence of the alternative activities is anticipated to remain effectively useable by bears (ERO Resources Corp. 2015).

The habitat compensation for long-term mine displacement effects in the agencies' alternatives would be between 2,293 acres and 2,339 acres (Table 231). Habitat compensation for displacement effects differ from those in the Wildlife BA (USDA Forest Service 2013a) and the USFWS' Grizzly Bear Biological Opinion (USFWS 2014a) due to revisions in the displacement and habitat compensation analysis used in the Wildlife BA and Biological Opinion. Compensation requirements for displacement were recalculated for the FEIS (ERO Resources Corp. 2015). In the combined agencies' alternatives, to maintain grizzly bear movement in the Cabinet Mountains, long-term displacement effects in the north-south movement corridor would be mitigated through acquisition or easement of an equal amount of grizzly bear habitat in the north-south movement corridor, where possible. To mitigate for displacement effects due to evaluation adit activities, the first 500 acres acquired or put into conservation easement would be within the north-south corridor in BMU 2, 5, or 6. In addition to the agencies' alternatives habitat compensation for long-term mine displacement effects, additional conservation measures in the agencies' mitigation plan would offset impacts to grizzly bears. These include the increased and substantial core areas and moderated road densities due to road access changes that would provide alternative habitat for grizzly bears potentially displaced from using habitat near the mine and related facilities, including the evaluation and ventilation adits, plant site, impoundments, and access roads.

Alternative 2B effects from long-term mine, facility, and road disturbance would displace grizzly bears on 9,756 acres in both the CYRZ and BORZ or 6 percent of the average home range, with 6,716 acres of this total currently affected by existing disturbances. The area affected by long-term mine, facility, and road disturbance in both the CYRZ and BORZ in the agencies' alternatives (7,664 acres for Alternative 3 and 8,200 acres for Alternative 4) would be small compared to the size of an average grizzly bear home range, approximately 5 percent. Native adult female life ranges in the CYE averaged 165,000 acres (258 square miles) (Kasworm *et al.* 2013c). The acres from which grizzly bears would be displaced over the life of the mine, and long-term is small compared to the size of an average grizzly bear home range. Of these total acres of displacement, 6,113 to 6,719 acres are already impacted by existing disturbances associated with roads and private land development.

In summary, compared to Alternative 2B, the agencies' combined alternatives mitigation plan includes the following measures to reduce and avoid displacement of grizzly bears from suitable habitat areas due to long-term mine displacement: 1) design road access changes to offset cumulative effects by creating grizzly bear core habitat, which would provide undisturbed habitat area for displaced bears; 2) acquire additional grizzly bear habitat (acres depending upon the agencies' combined alternative (Table 30)) that is at risk of development in or near the CYE and requiring those lands be managed to benefit grizzly bear in perpetuity and increase core and improve OMRD and TMRD to further improve BMU standards for the life of the mine especially in BMUs 2, 5, and 6; 3) effectively control the time when transmission line construction and decommissioning work may be conducted (not during the spring grizzly bear use period, general big game rifle season, or grizzly bear denning period) resulting in very low potential to displace a grizzly bear; and 4) MMC would contribute funding to support monitoring of bear movements and population status in the Cabinet Mountains to confirm the effectiveness of habitat acquisition in mitigating displacement effects. If monitoring indicated that proposed habitat acquisition was not adequate, mitigation measures would be developed to address issues identified through monitoring. Alternative 2B would not include grizzly bear monitoring.

Core

The transmission line action alternatives' detailed effects to core blocks are available in the Project record (*Wildlife Resources* section, Bear Management Unit Core Block Analysis Summary Tables for Grizzly Bear Analysis, Revised 26 July 2014 and associated maps) and are summarized here. Within the Recovery Zone, the transmission line action alternatives are within BMUs 5 and 6 and would have no effect to BMU 2.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek)
The effects of Alternative B on core habitat can be inferred from Table 226 and is shown on Figure 93. Newly constructed roads and some previously barriered roads that would be opened would contribute to a decrease in core habitat. Small isolated blocks of core habitat may provide lower quality habitat than large interconnected blocks. Research suggests that grizzly bears prefer larger blocks of core habitat, although a minimum block size was not determined due to small sample sizes (Wakkinen and Kasworm 1997).

BMU 5: Alternative B would remove 356 acres of core habitat in the southern half of an existing 845-acre block of core in the upper Midas Creek drainage as a result of opening an existing barriered road and construction of new roads, reducing the core block to 489 acres for the Construction and Operations Phases. The main BMU 5 core block of 37,803 acres would be reduced by approximately 54 acres adjacent to the Alternative B transmission line in Ramsey Creek, leaving 37,749 acres of core. Construction of Alternative B would contribute to approximately 70 percent (463 acres) toward the 1-percent reduction in existing core from 58 percent down to 57 percent. This would further decrease core to 3 percent lower than the BMU's 60-percent standard and would maintain this level of core for the Construction and Operations Phases. After reclamation and removal of the transmission line, BMU 5 core would return to 58 percent and would still not meet its standard.

BMU 6**:** One core block in BMU 6 largely located in an unnamed tributary of Miller Creek slightly crosses over into BMU 5, and totals 1,710 acres between BMU 6 and BMU 5. During transmission line construction, new road construction in Alternative B would divide and reduce the existing 1,710-acre block (1,636 acres in BMU 6) into three smaller habitat blocks of 26, 58 (46 acres in BMU 6 and 12 acres in BMU 5), and 1,254 acres (1,237 acres in BMU 6 and 17 acres in BMU 5) (Figure 93). Overall, this block would lose a total of 327 acres of core, due entirely to Alternative B. Construction of Alternative B would decrease the existing 54 percent of core habitat to 53 percent in BMU 6 during the Construction and Operations Phases, a total of 2 percent below the standard. After reclamation, road closures with barriers and decommissioning would re-create core and would return the BMU to the existing condition of 54 percent, still 1 percent below the BMU standard.

BMU 5 and BMU 6 Summary**:** The Access Amendment requires in-kind replacement of core either prior to activity or concurrent. The decrease in core from opening barriered roads and constructing new roads during the Construction Phase and the potential for use of those newly constructed roads for maintenance would prevent those areas previously providing core from returning to core in the Operations Phase. Displacement effects from helicopter activity associated with the 10 days of line stringing during construction and infrequent annual (no more than 10 days of maintenance) would be short-term and would not occur over the entire length of the line at any one time. Effectiveness of core remaining within the 1-mile helicopter influence zone on either side of the transmission line may be reduced during helicopter activity, but the area would remain core if no barriered road was accessed by motorized vehicles. During construction, transmission line clearing in habitat previously providing core habitat would convert 3 acres and 7 acres, respectively, of forested core habitat in BMUs 5 and 6 to grass-shrub habitat. Alternative B clearing during construction and maintenance of the line and right-of-way clearing is expected to occur by motorized wheeled access and core would not be provided in these impacted core areas during the Construction, Operations, or Closure Phase. Forest cover would return slowly after the line was decommissioned.

Reductions in core habitat were analyzed as remaining for the duration of the project for a worst-case scenario. Alternative B would not create core habitat prior to the Evaluation Phase, prior to construction, or during operations by road access changes. With the known effects on core considered, Alternative B would not comply with the Access Amendment Design Elements due to the following: 1) core levels in BMU 5 and BMU 6 are currently below their individual core standard and Alternative B would reduce or contribute to an additional reduction in core for the life of the mine; 2) Alternative B would not compensate for the loss of core with in-kind replacement as required by the Access Amendment, either concurrently or prior to incurring the loss in core; and 3) as analyzed, post-project, Alternative B would not contribute to an increase in core or trend toward the standard.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

The effects of Alternative C-R on core habitat can be inferred from Table 226 and Table 232. If Alternative C-R was selected, the agencies' combined alternatives 3C-R or 4C-R pre-construction road access mitigation in BMU 6 on North Fork Miller Creek road #4725, creating 1,053 acres of core habitat, would not occur until after construction of the transmission line was completed (Table 226, Figure 94). The remaining road access mitigation associated with the combined agencies' alternatives (3C-R and 4C-R) would be implemented prior to the Evaluation Phase and prior to the Construction Phase and would increase the existing acreage of core in BMU 2, BMU 5, and BMU 6 prior to activity. BMU 6 would reach the 2015 KFP standard of 55 percent prior to the Construction Phase.

No core habitat would be physically removed by Alternative C-R. Transmission line structures for Alternative C-R would be placed by helicopter in or adjacent to grizzly bear core habitat and no new access roads in existing core habitat would be needed (Table 232). Because core is determined by the amount and location of open or gated roads, using a helicopter in these areas would avoid decreases to core habitat. Core has no motorized road or trail access by definition and utilizing a helicopter would allow the activity to meet the criteria. However, two separate blocks of existing core habitat would be crossed by the transmission line in Alternative C-R (Figure 94), with one block increasing in size after construction with the access change on the NFS road #4725.

Table 232. Effects on Core Habitat During Construction and Operations by Combined Mine-Transmission Line Alternative.

Effect on Core Habitat	[1A] No Action	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
BMU 5								
Physical Habitat Loss in Core [1]	0	130	11	11	11	3	3	3
Core Lost Due to Road Disturbance [2]	0	572	242	237	242	70	70	70
Miles of Transmission Line Located in Existing Core	0	0.4[4]	0.4[5]	0	0	0.4	0	0
Vegetation Removal in Core [3]	0	8	16	0	0	16	0	0
Core Created by Road Access Changes Prior to Activity	0	0	4,587	4,587	4,587	4,587	4,587	4,587
BMU 6								
Physical Habitat Loss in Core [1]	0	1	0	0	0	0	0	0
Core Lost Due to Road Disturbance [2]	0	319[4]	0	0	0	0	0	0
Core Lost Temporarily Due to Road Disturbance[6]	0	0	0	18	18	0	18	18
Miles of Transmission Line in Existing Core	0	0.5[4]	0.5[5]	0	0	0.5[5]	0	0
Miles of Transmission Line in Created Core	0	0[4]	2.1[5]	0	0	2.1[5]	0	0
Vegetation Removal in Core [3]	0	7	12	0	0	14	0	0
Core Created by Road Access Changes Prior to Evaluation and Construction [7]	0	0	1,092	2,145	2,145	1,092	2,145	2,145
Core Created by Road Access Changes Post-Construction [8]	0	0	1,053	0	0	1,053	0	0

Units are acres unless specified as miles.

Acres of core created are shown for alternatives without implementation of any road access changes associated with land acquisition mitigation.

[1]Core habitat physically lost as a result of impoundments, plant sites, other mine facilities (facility disturbance areas), or new road construction in Alternative B.

[2]Core habitat lost due to being within 0.31 mile of new or opened roads, not already accounted for in facility disturbance areas.

[3]Vegetation removed in transmission line clearing area but not already accounted for in facility disturbance areas. Vegetation removal within the clearing would occur for life of the mine, although in areas some cover may remain.

[4]Alternative 2B existing core lost would occur at start of construction and continue for life of mine. Affected core would not remain during operations, and vegetation removal would occur in an area no longer core.

[5]Alternative C-R would maintain existing and created core by use of helicopters and no wheeled motorized access.

[6]Alternatives 3D-R, 4D-R, 3E-R, and 4E-R core lost in BMU 6 of 18 acres would be temporary and would occur during Construction Phase up to two summers as a result of opening a 0.2-mile segment of NFS road #4724. These effects may also occur during decommissioning of the transmission line. The 18-acre loss of core would be mitigated at a 2:1 ratio prior to activity.

[7]Agency Alternatives D-R and E-R would create all 2,145 acres of core prior to activity in BMU 6.

[8]Agency Alternative C-R would not create 1,053 acres of core in BMU 6 until after transmission line construction was completed.

BMU 2: Alternative C-R would not located in BMU 2 and would not affect BMU 2 core.

BMU 5: The percentage of core in BMU 5 would increase to 60 percent prior to the Evaluation Phase and would increase to 65 percent prior to the Construction Phase due to implementation of road access mitigation. This would result in a 7-percent increase over the existing condition, which did not meet the core standard and, as a result of mitigation, the BMU would be 5 percent better (above) than the core standard for BMU 5.

Prior to the Evaluation Phase: Agencies' combined alternative road access mitigation implemented prior to the Evaluation Phase would result in an increase in core (Table 226). Existing small blocks of 24 acres and 241 acres would be combined with newly created core connecting to the main core block for a total of 1,436 acres added to the existing main core block and increasing that to 39,239 acres. Additional road access changes would increase an existing 239-acre core block to 463 acres, and another existing 845-acre core block to 1,067 acres. Total core within BMU 5 prior to the Evaluation Phase would increase from 40,851 acres of core to 42,468 acres of core. Effects on core blocks in BMU 5 are available in the Project record.

Prior to the Construction Phase: Road access mitigation implemented prior to the Construction Phase would result in additional increases in core. The main core block of 39,239 acres would increase by 2,972 acres to a total of 42,210 acres. Total core within BMU 5 prior to the Construction Phase would increase from 42,468 acres of core to 45,439 acres of core.

During Construction/Operations/Reclamation: No removal of core habitat would occur in BMU 5 as a result of Alternative C-R because transmission line structures would be placed by helicopter in or adjacent to grizzly bear core and no new access roads in core habitat would be needed. During construction and operations, where the transmission line was located in core habitat, an increased risk of displacement to grizzly bears may occur within this core block due to the helicopter noise and any associated human activity.

BMU 6: The percentage of core in BMU 6 would increase to 55 percent prior to the Evaluation Phase. Core would not increase to 57 percent until after the Construction Phase due to deferring the implementation of road access mitigation on NFS road #4725. This would result in BMU 6 meeting its 55-percent core standard prior to the Evaluation Phase and during construction. Less secure core habitat would be available during the Construction Phase compared to Alternatives D-R and E-R due to deferring the creation of 1,053 acres of core. BMU 6 would not improve over the standard by an additional 2 percent until the Post-Construction Phase (Table 226).

Prior to the Evaluation Phase: Prior to the Evaluation Phase, core created by road access changes would combine two existing discontiguous core blocks of 787 and 1,036 acres to create a larger 2,915-acre block, which would connect to the main BMU 5 core block. Total core within BMU 6 prior to the Evaluation Phase would increase by 1,091 acres from 34,402 acres to 35,493 acres. Effects on core blocks in BMU 5 are available in the Project record.

Prior to the Construction Phase: Road access changes identified in the mitigation plan and specific changes for Alternative C-R would be implemented. Alternative C-R would defer the access change on NFS road #4725 until after construction.

Prior to Operations: For Alternative C-R, once construction was completed, additional core would be created by installing a berm on North Fork Miller Creek Road #4725 (Figure 94). The access change would occur on the entire length of the NFS road #4725. This would increase the existing 1,710-acre core block to 2,763 acres. Total core within BMU 6 would then increase by an additional 1,053 acres from 35,493 acres to 36,546 acres, resulting in 57 percent core.

During Construction/Operations/Reclamation: If the core in BMU 6 was created prior to the Construction Phase, it would only be in place for at the most 2 years and would not meet the definition of core, thus no in-kind replacement as specified by the Access Amendment would be required. No existing core would be reduced. Core would meet the Access Amendment standard of 55 percent during the Construction Phase due to core created prior to the Evaluation Phase. During the Construction Phase, Alternative C-R would result in core habitat provided in BMU 6 at the minimum core recommended for a female grizzly bear’s successful survival and reproduction based on research (Wakkinen and Kasworm 1997). Prior to operations, core would increase to 57 percent and would remain better than the core standard during operations and reclamation.

Displacement or Clearing Effects to Core in BMUs 5 and 6: Displacement effects from helicopter activity during construction, annual maintenance throughout the project, and transmission line decommissioning in Alternative C-R could reduce effectiveness of two core habitat blocks. However, potential to displace grizzly bears is considered low due to timing mitigation that restricts transmission line construction and decommissioning activity to the period between June 16 and October 14 (see Objective 1.a).

During Operations: Alternative C-R would result in a total of 3 miles of transmission line being within two blocks of core habitat during the Operations Phase. Alternative C-R would maintain the corridor clearing for the life of the project and would provide for easier recreation and hunting access within these core blocks. This would result in a potential higher risk of mortality and displacement of grizzly bears within these core blocks compared to Alternatives D-R and E-R.

Transmission line clearing in the unnamed tributary of Miller Creek would convert 23 acres of forested core habitat within this block to grass-shrub habitat. In the upper Midas Creek drainage, transmission line clearing would convert 10 acres of forested core habitat within this block to grass-shrub habitat. Maintenance of this shrub habitat located in core in the transmission line right-of-way during the Operations Phase would be required to occur by non-wheeled motorized access to maintain this core. By definition, any motorized wheeled access into core would remove that area as core for 10 years. By requiring use of helicopters in core for construction and maintenance within the right-of-way to not use wheeled motorized vehicles, no in-kind core replacement for losses of core would be required prior to the Evaluation or Construction Phases.

Alternative D-R – Miller Creek Transmission Line Alternative

Effects to core habitat and grizzly bears and mitigation for those effects from Alternative D-R would be as described in Alternative C-R with exceptions as follows. Alternative D-R differs from Alternative C-R in that the transmission line would not be located in existing core or in any core created for mitigation. The effects of Alternative D-R on core habitat can be inferred from Table 226 and Table 232. All road access changes in the agencies’ alternatives resulting in improvements to core habitat would occur before the Evaluation Phase and before the Construction Phase. Transmission line structures would be placed by helicopter in or adjacent to core habitat and no new access roads would be constructed in core habitat.

BMU 6:
Prior to the Construction Phase: Alternative D-R differs from Alternative C-R in that the road access change in BMU 6 on NFS road #4725 would occur prior to the Construction Phase. Creation of the 1,053 acres of additional core resulting from this road access change would be created prior to construction activity. By not delaying this road access change, Alternative D-R allows BMU 6 to reach 57 percent core prior to the Construction Phase, allowing for more available secure core habitat for any grizzly bear potentially displaced during the Construction Phase compared to Alternative C-R.

During Construction: Alternative D-R would result in the short-term temporary loss of existing core during the Construction Phase. In BMU 6, a short segment of the currently bermed segment of NFS road #4724 would be opened and used for helicopter landing access. Motorized access would occur by a fuel truck, log-loading equipment, or trucks, removing 18 acres from functioning as core. Prior to construction activity, the loss of these 18 acres of core would be replaced at a 2:1 ratio, for a total of 36 acres, meeting (and better than) the Access Amendment requirement of in-kind (1:1) replacement. A total of 2,145 acres of core would be created in BMU 6 as mitigation prior to the Evaluation and Construction Phases. Of that, 36 acres is 2:1 replacement core, leaving a net core increase of 2,109 acres. Any potential short-term displacement effects resulting from the temporary loss of the 18 acres of core are mitigated for by core creation prior to activity. The affected core block within BMU 6 would increase by 1,053 acres from 1,710 acres to a total of 2,763 acres prior to the temporary 18-acre loss. Prior to the Construction Phase, Alternative D-R would maintain BMU 6 core at 57 percent, better and higher than the BMU standard.

In both BMU 5 and BMU 6, Alternative D-R road access mitigation would increase core to meet the individual BMU standard prior to the Evaluation Phase, and would increase it to 5 percent (BMU 5) and 2 percent (BMU 6) above the BMUs' standard prior to the Construction Phase. Core habitat provided in these BMUs during all phases would provide more than the minimum core suitable for a female grizzly bear's successful survival and reproduction based on research (Wakkinen and Kasworm 1997).

Alternative E-R – West Fisher Creek Transmission Line Alternative
The effects of Alternative E-R on core habitat can be inferred from Table 226 and Table 232. Effects to core habitat and grizzly bears and mitigation for those effects from Alternative E-R would be as described in Alternative D-R.

Combined Mine-Transmission Line Alternatives
Alternative 2B proposed mitigation on the Upper Bear Creek Road, which would have improved core, was already included in the Rock Creek Project and therefore was not considered as mitigation for Alternative 2B. This road closure and effects to core are addressed in cumulative effects as a reasonably foreseeable action. As previously discussed under Alternative B, the Alternative 2B mitigation plan for land acquisition and the potential to increase core prior to activity, is expected to result in Alternative 2B meeting the Access Amendment standard.

In the agencies' alternatives, road access changes associated with mitigation would be implemented before project activities affecting core habitat, with an exception for one road in Alternatives 3C-R and 4C-R, which would be deferred. Mitigation implemented before the Evaluation Phase would improve existing core habitat conditions in BMUs 5 and 6 to meet Access Amendment standards. Similarly, mitigation implemented before the Construction Phase would further improve core habitat conditions in BMUs 5 and 6. Alternatives 3C-R and 4C-R would defer the road access change on NFS road #4725 and core creation until after construction of the transmission line was completed. The agencies' combined alternatives 2:1 replacement for the loss of core habitat prior to the Evaluation and Construction Phases would create more core habitat than the in-kind (1:1) replacement required for core habitat loss by the Access Amendment. The agencies' core habitat mitigation achieved through road management access changes would provide core at levels higher and better than the individual Access Management standards and the minimum 55 percent core recommended by Wakkinen and Kasworm (1997) for the life of the mine. Providing BMUs with better habitat parameters (including core) than the minimum known to provide for a female grizzly bear to successfully survive, reproduce, and provide for cubs for the life of the mine, was designed to offset cumulative effects of two mines. Reducing motorized access conditions would contribute to reducing risk of human-caused bear mortality, provide undisturbed habitat for bears potentially displaced, improve habitat conditions in the north-south movement corridor, and help meet KFP standards for grizzly bear habitat conditions.

BMU 2: Core habitat in BMU 2 would not be removed by any of the combined action alternatives. Alternative 2B would not affect core in BMU 2 and no road access changes are proposed in BMU 2. Road access changes associated with the agencies' combined alternatives implemented prior to the Evaluation Phase would result in an additional 274 acres of core, increasing the main existing core block of 49,151 acres to 49,425 acres. Total core within BMU 2 would increase from 49,566 acres to 49,840 acres. The percentage of core would remain at 76 percent, 1 percent better than the BMU's standard.

BMU 5**:**
All Combined Action Alternatives: The access change on NFS road #4784 would be implemented for all action alternatives only if it was not already implemented as part of the Rock Creek Project mitigation. Core created would be attributable to the Rock Creek Project and is accounted for under cumulative effects as a reasonably foreseeable action.

Alternative 2B: Relative to other combined action alternatives, Alternative 2B would have the greatest impact on core habitat in BMU 5 (Table 226 and Table 232).

Physical Removal: Alternative 2B would remove existing core, with 2 acres of a 24-acre block, a small 8-acre block, and 117 acres of core of a 241-acre block physically removed by the impoundment (total of about 130 acres). Tables displaying the effects to individual core blocks are available in the project record (*Wildlife Resources* section, Bear Management Unit Core Block Analysis Summary Tables for Grizzly Bear Analysis, Revised 26 July 2014 and associated maps).

Disturbance: An additional 92 acres of the 241-acre existing block of core would be removed due to road disturbance, leaving approximately 30 acres. An additional 490 acres of core would be lost due to open road influences from the transmission line or LAD Areas and associated new road construction and the use of new or previously bermed roads. As these roads could be used for maintenance of the transmission line, loss of this core due to open and gated road buffers was assumed for the life of the mine. Core areas must be managed undisturbed for 10 years, and it could not be assumed this would occur. After reclamation, barriering of roads in some areas would return areas to core, while other areas would not return to core. A newly created core block of 250 acres due to Alternative 2B road removal or barriering in the impoundment area would offset some of the existing core loss and contribute to the return of core to pre-activity levels of 58 percent.

As previously described, Alternative 2B proposed an access change on NFS road #4784 but this action was already included as Rock Creek Project mitigation and was not considered in the analysis of direct effects. Core habitat would not be created by the seasonal access change (April 1 to June 30) proposed by MMC for NFS road #4724 because it would not be in effect for the entire active bear year. Potential improvement to core as a result of mitigation lands is described above in "*Effects common to all action alternatives*." Without considering the effects of land acquisition, Alternative 2B would not meet the Access Amendment design element for core as described under Alternative B.

As a result of mitigation land acquisition, it is expected that Alternative 2B would meet core standards, but as the location of which lands would actually be acquired is not known at this time, improvements to core cannot be calculated. Alternative 2B would not monitor to determine effectiveness of the habitat acquisition, or the road access change.

Agency Alternatives: During construction and through the Operations Phase, use of newly constructed or opened roads previously bermed or impassable would result in the loss of core.

Physical Removal: Of an existing 241-acre block of core, 9 to 11 acres would be physically lost due to Alternatives 3C-R, 3D-R, and 3E-R and 3 acres would be lost due to Alternatives 4C-R, 4D-R, and 4E-R, primarily from construction of the tailings impoundment. Tables displaying effects to core blocks are available in the project record (*Wildlife Resources* section, Bear Management Unit Core Block Analysis Summary Tables for Grizzly Bear Analysis, Revised 26 July 2014 and associated maps).

Disturbance: For Alternatives 3C-R, 3D-R, and 3E-R, the remaining 232 acres of the existing 241-acre block would be lost to open or gated road disturbance, while about 25 acres of the main core block would be lost due to open roads within the Libby Creek Plant site. For all agency alternatives, an approximate 20 to 37 acres of road access mitigation created core would also be removed in BMU 5 due to the impoundment and other mine related development or roads. These small decreases in the core areas created by road access mitigation prior to the Evaluation or Construction Phases under Alternatives 3C-R, 3D-R, 3E-R, 4C-R, 4D-R, and 4E-R (Table 232) in BMU 5 would occur during the Construction phase due to construction of the impoundment and mine facilities, newly constructed roads and some previously barriered roads that would be opened. These small decreases do not technically impact core habitat as core must be in place for 10 years, and more importantly the areas only resulted from the creation of larger areas of core in BMU 5 that were meant to function as core or core replacement for the life of the mine. However, for this analysis, a worst-case scenario was used and the loss of core displayed in the tables includes both existing core and mitigation-created core lost during construction of the impoundment and mine related facilities and roads

BMU 6: Within BMU 6, the principal activity for the combined action alternatives would be construction and operation of the transmission line, and the effects are described in detail under the individual transmission line alternatives.

Alternative 2B Effects in BMU 6: Alternative 2B would decrease core habitat to 53 percent during all phases of the project. In BMU 6, only 1 acre of core habitat would be physically removed by Alternative 2B due to new road construction; however, use of new or opened access roads during transmission line construction would remove 326 acres of core habitat located in the northeast portion of BMU 6, mostly located along and adjacent to the ridges between Miller and Midas Creek, and Miller and Schreiber Creek. This loss is largely due to new roads built off of or opening of spurs associated with either the Midas Howard Creek Road NFS road #4778 or the North Fork of Miller Creek Road NFS road #4725. These effects are described in detail under the transmission line Alternative B.

Agency Alternatives: The agencies Alternatives 3D-R, 3E-R, 4D-R, and 4E-R would create all core habitat resulting from road access change mitigation by initiation of the Construction phase, while Alternatives 3C-R and 4C-R would defer 1,053 acres of the total core created to after the Construction Phase.

The transmission line alignments in the agencies' alternatives 3C-R and 4C-R would cross the same narrow band of existing core habitat in located along the ridge between Miller and Midas Creek as Alternative 2B (Figure 94), but due to the use of helicopters for construction activities of tree removal, structure placement, and line stringing, no roaded access would be needed in any existing core, and no reduction to core habitat would occur. All combined agencies' alternatives would improve core habitat by 1 to 3 percent in BMU 6 during all phases of the project as a result of road access changes and less new road construction along the transmission line corridors. All of the combined agencies' alternatives would include an access change on the entire length of NFS road #4725 that would create the same amount of core in the North Fork Miller Creek (BMU 6), only the timing of implementation would differ. For Alternatives 3D-R, 4D-R, 3E-R, and 4E-R, the access change would be implemented prior to transmission line construction. As a result, percent core in BMU 6 would be better than the standard and more secure core habitat would be available for displacement during the Construction Phase for these alternatives compared to Alternatives 3C-R and 4C-R, which defer this core creation. The entire length of NFS road #4725 would be used during construction of Alternatives 3C-R and 4C-R, and the access change would occur after it was no longer needed for transmission line construction and prior to operations. As a result, less secure core habitat would be available for displacement during the Construction Phase for Alternatives 3C-R and 4C-R. Alternatives 3C-R and 4C-R would result in a total of 3 miles of transmission line being within two blocks of core habitat throughout the Operations Phase. This would result in a potential increase in displacement and mortality risk to grizzly bears within these two core blocks due to the maintenance of the corridor allowing for easier human access compared to the other agency alternatives.

Displacement effects to core habitat blocks are described above for the individual transmission line Alternatives C-R and D-R. During construction of Alternatives 3D-R, 3E-R, 4D-R, and 4E-R, a short segment of the currently bermed segment of NFS road #4724 would be used for helicopter landing access, including fuel or logging trucks, resulting in a short-term loss of 18 acres of core during construction (Table 232). This short segment of NFS road #4724 may also be accessed during removal of the transmission line for decommissioning, which would result in the same short-term loss of the 18 acres of core. The effects and mitigation for the loss of these 18 acres of core is described in detail under the transmission line Alternative D-R and Alternative E-R and is applicable to these combined alternatives.

Other effects to core habitat from the transmission line component of the combined action alternatives would be as previously described for individual transmission line alternatives.

BMU 5 and BMU 6 Summary:
Alternative 2B: Alternative 2B would result in both physical removal and loss of core due to the mine and associated facilities and transmission line development and associated opening of existing bermed or impassable roads and constructing new roads. Both BMU 5 and BMU 6 do not meet their individual core standards in the existing condition and Alternative 2B would decrease core during construction and for the life of the mine, would not create core prior to incurring the losses, and would not improve core post-project. Without knowing what mitigation lands would be acquired and what improvements to the baseline core habitat parameter would occur, and based on known calculable effects, Alternative 2B would not comply with the Access Amendment Design Elements for the same reasons described for the individual transmission line Alternative B.

Agencies Mitigated Combined Alternatives: Prior to the Evaluation Phase and prior to the Construction Phase, the combined agencies' alternatives would compensate for any loss of existing core within both BMU 5 and BMU 6 at a 2:1 ratio, better than the Access Amendment standard, which requires 1:1 in-kind replacement of core concurrently or prior to incurring the losses. To achieve this, the agencies' alternatives would implement road access changes associated with mitigation to create new core and would require fewer new temporary access roads and open fewer bermed roads along the transmission line corridors to maintain existing core. The agencies' combined alternatives mitigation plan would require yearlong road access changes prior to either Evaluation or Construction Phase activity, (or post Construction for Alternative 3C-R and 4C-R) which would create 4,534 acres of core habitat in BMU 5 and 2,145 acres of core habitat in BMU 6 (Table 232). This created core includes both the core acres required for compensation for loss of core, as well as additional core created to improve the core habitat parameter baseline for grizzly bears, provide additional security, reduce fragmentation in the north-south corridor, improve the baseline grizzly bear habitat conditions to assist in reversing the downward population trend, and provide mitigation for cumulative effects of both the Rock Creek Project and the agencies' action alternatives (see *Cumulative Effects* section for additional detail on the Rock Creek Project). Remaining effects to percentage core within the BMUs are described under the agencies individual transmission line Alternatives C-R, D-R, and E-R.

As discussed previously, additional improvements to the baseline core as a result of land acquisition or conservation easements in perpetuity and any additional road access changes are not quantified in this analysis. In the agencies' alternatives, MMC would contribute funding to support monitoring of bear movements and population status in the Cabinet Mountains to confirm the effectiveness of habitat acquisition and road access changes in mitigating impacts on grizzly bears. If monitoring indicated that proposed habitat acquisition and road access changes were not adequate, mitigation measures would be developed to address identified issues.

OMRD

For all action alternatives, additional improvements to baseline OMRDs in BMU 2, BMU 5, and BMU 6 are likely to occur as a result of the habitat compensation mitigation. This has been previously summarized in "*Effects common to all action alternatives*" and in "*Effects common to agency alternatives*." Any decreases and improvement to baseline OMRD in the affected BMUs may result in lower OMRD during activity than displayed in Table 226.

Within BMU 2, the transmission line or combined mine-transmission line action alternatives mitigation plans do not propose any road access changes that would affect existing OMRD.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)
Of all of the transmission line alternatives, Alternative B would require the most construction of new roads (Table 229). The effects of Alternative B on road densities can be inferred for BMU 5 and are displayed for BMU 6 in Table 226. Newly constructed roads and some previously gated or barriered roads that would be opened would contribute to increases in OMRD. Areas of OMRD higher than a BMU standard could result in avoidance or underuse of the affected area, potentially increasing mortality risk to grizzly bears.

BMU 5: Alternative B would contribute to the increase in existing OMRD by 4 percent and expansion in the existing spatial distribution of roads in the BMU to levels higher (worse) than levels reported in average female home range (Wakkinen and Kasworm 1997) and 2 percent above (worse) the Access Amendment standard for the BMU. During operations, OMRD would decrease by 2 percent, meeting the BMU standard of no more than 30 percent OMRD, but would remain 2 percent above the existing condition during the Operations Phase. Post-project OMRD due to road closures (removal or barrier) associated with the combined Alternative 2B in the impoundment area would decrease by another 2 percent, further reducing OMRD to 27 percent, lower and better than the existing condition by 1 percent.

BMU 6: The greatest effects of Alternative B on OMRD would be in BMU 6 where the majority of the line would be built. BMU 6 OMRD is currently 29 percent, 5 percent below and better than the BMU standard of no more than 34 percent. Alternative B would increase OMRD by 3 percent to 32 percent during the 2-year Construction Phase, and OMRD would return to existing condition levels during operations and post-reclamation. Within BMU 6, Alternative B would be within Access Amendment standards in all phases.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

More closed roads (currently gated and barriered roads) would be opened for Alternative C-R than for the other alternatives, but fewer new roads would be constructed (Table 229). Road access changes affecting OMRD associated with mitigation would be implemented before project activities affecting OMRD. The effects of Alternative C-R on OMRD can be inferred for BMU 5 and are displayed for BMU 6 in Table 226. During construction, grizzly bears would likely avoid the areas of increased activity; however, the potential to displace grizzly bears as a result of increased OMRD is low due to the agencies' transmission line timing mitigation as described under Part A, Displacement.

BMU 5: Road access mitigation prior to the Evaluation Phase decreases the existing 28-percent OMRD to 27 percent and 3 percent better (lower) than the BMU standard of 30 percent. As a result of this mitigation, the 1-percent increase during the Construction/ Operations/Decommissioning Phases would result in a return to the existing condition of 28 percent. Post-reclamation OMRD would return to the 27 percent attained due to mitigation prior to the Evaluation Phase, thus improving OMRD over the existing condition post-project.

BMU 6**:** The greatest effects of Alternative C-R on OMRD would be in BMU 6 where the majority of the transmission line would be built. Within BMU 6, all construction, operations, decommissioning, and reclamation effects to OMRD shown in Table 226 are due to the transmission line. BMU 6 OMRD is currently 29 percent, 5 percent below and better than the BMU standard of no more than 34 percent. Alternative C-R would increase OMRD to 31 percent during the Construction and Decommissioning Phases, staying below and better than the BMU standard by 3 percent. OMRD would return to the existing 29 percent during operations and post-reclamation.

Alternative D-R – Miller Creek Transmission Line Alternative

Effects to OMRD and grizzly bears and mitigation for those effects from Alternative D-R would be as described for Alternative C-R except for as follows: Alternative D-R would require fewer new roads than Alternative B, but slightly more than Alternatives C-R and E-R. The least amount of closed roads (gated or barriered) would need to be opened for access during construction of Alternative D-R than for the other alternatives (Table 229). The effects of Alternative D-R on OMRD can be inferred for BMU 5 and are displayed for BMU 6 in Table 226.

BMU 6: As displayed in Table 226, Alternative D-R would result in a 1-percent increase in OMRD to 30 percent during construction (and decommissioning). OMRD would return to the existing OMRD of 29 percent for the Operations Phase and post-reclamation. In Alternative D-R, a short segment of the currently bermed segment of NFS road #4724 would be used for helicopter landing access during construction, resulting in a short-term increase in linear miles of open road, but no change in percent OMRD would occur. These effects could also occur during decommissioning of the transmission line.

Alternative E-R – West Fisher Creek Transmission Line Alternative

The effects of Alternative E-R on OMRD can be inferred for BMU 5 and are displayed for BMU 6 in Table 226. More roads would be opened for the construction of Alternative E-R than for the other alternatives (Table 229). However, this would not result in a different OMRD percentage than Alternative D-R. The effects of Alternative E-R on percent OMRD would be as described for Alternative D-R.

Combined Mine-Transmission Line Alternatives

OMRD within BMUs 2, 5, and 6 are near or lower (better) than levels reported in average female grizzly bear home range (Wakkinen and Kasworm 1997). Newly constructed roads and previously barriered or gated roads that would be opened would contribute to an increase in OMRD. All combined action alternatives would increase OMRD in BMUs 5 and 6 during construction and operations (Table 226).

***BMU 5*:**

Alternative 2B: Alternative 2B would have the greatest effect on OMRD compared to the agencies' alternatives. Alternative 2B would increase OMRD to 32 percent during construction (4 percent over the existing condition of 28 percent and 2 percent over the BMU standard). During operations, OMRD would decrease to 30 percent, meeting the BMU standard, but 2 percent worse than the existing condition. Post-reclamation and decommissioning, OMRD would drop to 27 percent, better than the BMU standard.

Agencies' Alternatives: In the agencies' alternatives, road access changes in BMU 5 associated with mitigation would be implemented before project activities affecting OMRD. Agency mitigation implemented before the Evaluation Phase would improve BMU 5 existing 28-percent OMRD by reducing it 1 percent to 27 percent or 3 percent better than the 30 percent standard. During construction and operations, OMRD would return to the existing 28 percent. OMRD in BMU 5 would improve compared to existing densities after reclamation in all combined action alternatives, decreasing by 2 percent for Alternatives 4C-R, 4D-R, and 4E-R and 1 percent for

Alternatives 2B, 3C-R, 3D-R, and 3E-R, with all resulting decreases either better than or meeting the OMRD standard for BMU 5.

BMU 6**:** In the agencies' alternatives, road access changes in BMU 6 associated with mitigation would be implemented before project activities, except where previously described for Alternatives 3C-R and 4C-R. Existing OMRD is 5 percent better than the standard. OMRD in BMU 6 during construction and decommissioning would be worse than existing densities for all combined action alternatives, and would increase the most in Alternative 2B, but all action alternatives would be lower (better) than the BMU standard during construction, operations, and decommissioning. After the transmission line was built, OMRD in BMU 6 would return to existing densities during operations and after reclamation in all combined action alternatives.

Summary: For all combined action alternatives, habitat compensation/land acquisition mitigation may lower the baseline OMRDs in the affected BMUs, which in turn would result in lower OMRDs than displayed in Table 226 during activity. As analyzed, Alternative 2B would increase OMRD above BMU 5's standard during construction/reclamation and decommissioning, and meet the standard during operations. Increases in OMRD above the standard may displace bears, and Alternative 2B would also not meet core standards in either BMU 5 or 6, or provide the 55-percent minimum recommended by research. Any additional core that would result from the mitigation land habitat compensation would contribute to secure areas for grizzly bears displaced from areas affected by increased OMRD. The agencies' alternatives would be more effective in providing secure areas for displacement of grizzly bears as a result of both the road access changes prior to activity creating core and the habitat compensation that is expected to result in additional decreases in OMRD and increases in core. In addition to road access changes, the agencies' alternatives would include monitoring the effectiveness of closure devices at least twice annually. In the agencies' alternatives, MMC would contribute funding to support monitoring of bear movement and population status in the Cabinet Mountains to confirm the effectiveness of road access changes in mitigating the effects to grizzly bears. If monitoring indicated that proposed access changes were not adequate, mitigation measures would be developed by the Oversight Committee and implemented by MMC, as described in Chapter 2, to address identified issues.

TMRD

Alternative 2B proposes no access changes in BMU 2 and would have no effect to the existing TMRD. The agencies' combined action alternatives mitigation plan would include access changes in BMU 2, installing barriers (rendering the roads impassable to motorized vehicles) on existing gated roads in BMU 2, resulting in a slightly lower linear miles of total road, but no change to the existing percentage of TMRD would occur.

For all action alternatives, additional improvements to baseline TMRDs in BMU 2, BMU 5, and BMU 6 may occur as result of the habitat compensation mitigation. This has been previously summarized in "*Effects common to all action alternatives*" and in "*Effects common to agency alternatives.*" Any decreases and improvements to baseline TMRDS in the affected BMUs may result in lower TMRD during activity than displayed in Table 226.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)
Of all of the transmission line alternatives, Alternative B would require the most construction of new roads (Table 229). The effects of Alternative B on road densities are displayed for BMU 6

and can be inferred for BMU 5 from Table 226. Newly constructed roads and some previously barriered roads that would be opened during construction and operations would increase TMRD.

BMU 5**:** Alternative B would contribute to a 3 percent increase in TMRD during construction that would result from both the transmission line and mine development.

BMU 6: The greatest effects of Alternative B on road densities would be in BMU 6 where the majority of the transmission line would be built. Alternative B would increase TMRD in BMU 6 during construction and operations 2 percent over the existing 33 percent and 3 percent above the standard of 32 percent. This increase would be maintained for the life of the mine. Post-reclamation, after decommissioning of all new roads built for access, and re-barriering of previously barriered roads, TMRD would return to the existing level. However, it should be noted, under the Access Amendment, the KNF is required to comply with the BMU standard within a specified timeframe, and this would occur independent of Alternative B.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

The effects of Alternative C-R on TMRD are displayed for BMU 6 and can be inferred for BMU 5 from Table 226. Alternative C-R would defer an access change on NFS road #4725 until after construction, but implements all others prior to project activities affecting road densities. During construction and operations, newly constructed roads and some previously barriered roads that would be opened would contribute to an increase in TMRD. More closed roads (gated or barriered) would be opened for Alternative C-R than for the other alternatives, but fewer new roads would be constructed (Table 229).

BMU 2: Road access change mitigation would berm existing gated roads in BMU 2 and slightly decrease the total linear miles of road, but no change to the existing percent of TMRD would occur.

BMU 5**:** Road access change mitigation associated with the agencies' combined alternatives in BMU 5 prior to activities would reduce TMRD to 19 percent, 4 percent better (lower) than the existing condition and BMU standard of 23 percent. During construction and operations, TMRD would increase to 20 percent, remaining 3 percent better than the standard. Alternative C-R would contribute to the increase in TMRD due to opening of closed roads and construction of new roads associated with the transmission line.

BMU 6**:** The greatest effects of Alternative C-R on road densities would be in BMU 6 where the majority of the transmission line would be built. Construction Phase TMRD for Alternative C-R would not increase over the existing condition of 33 percent (Table 226), which does not meet the BMU standard because unlike the other agencies' mitigated transmission line alternatives, Alternative C-R would defer the access change on NFS road #4725 that would decrease TMRD in BMU 6 until after the road was no longer needed for transmission line construction. After construction was completed, the access change on NFS road #4725 would decrease TMRD by 1 percent to meet the BMU standard. During operations, due to the access change, TMRD in BMU 6 would meet the BMU standard of 32 percent. During line decommissioning, TMRD would again briefly increase to 33 percent, but would return to the standard of 32 percent after reclamation.

Alternative D-R – Miller Creek Transmission Line Alternative

Effects to TMRD from Alternative D-R would be as described for Alternative C-R, except for as follows: The effects of Alternative D-R on TMRD are displayed for BMU 6 and can be inferred for BMU 5 from Table 226. Alternative D-R implements all of the road access changes proposed by the agencies' alternatives prior to project activities affecting linear miles of road and/or road densities. Alternative D-R would require fewer new roads than Alternative B, but slightly more than Alternatives C-R and E-R.

BMU 6**:** As previously mentioned, Alternative D-R differs from Alternative C-R in that the road access change in BMU 6 on the North Fork Miller Creek Road #4725 would occur prior to the Construction Phase and thus the 1-percent decrease in TMRD, bringing BMU 6 into compliance with its TMRD standard, would occur prior to activity.

Alternative E-R – West Fisher Creek Transmission Line Alternative
Effects to TMRD and grizzly bears and mitigation for those effects from Alternative E-R would be as described under Alternative D-R, except for as follows: The effects of Alternative E-R on TMRD are displayed for BMU 6 and can be inferred for BMU 5 from Table 226.

BMU 6: Differences in road access used for Alternative E-R compared to the other agency alternatives would result in TMRD remaining at the 32-percent level achieved by road access mitigation prior to activity. TMRD would meet the BMU standard in all phases.

Combined Mine-Transmission Line Alternatives
Effects to TMRD are as described for the individual transmission line alternatives and as summarized here for the combined mine-transmission line alternatives.

Newly constructed roads and previously barriered roads that would be opened would contribute to an increase in TMRD. All combined action alternatives would increase TMRD (Table 226). As previously described, in the agencies' alternatives, most road access changes associated with mitigation would be implemented before project activities affecting TMRD, except for implementation of the access change on NFS road #4725 in BMU 6, which would be deferred until after construction for Alternatives 3C-R and 4C-R.

BMU 5**:**
Alternative 2B: In BMU 5, TMRD would increase the most during construction and operations of Alternative 2B to 26 percent and would not meet the BMU standard. After reclamation, BMU 5 TMRD would drop to 22 percent, 1 percent better than the existing condition and standard of 23 percent.

Agencies' Alternatives: Mitigation implemented before the Evaluation Phase would decrease existing TMRD in BMU 5 to 19 percent, better than the existing condition and BMU standard of 23 percent. This reduction in TMRD prior to activity would allow the 1-percent increase resulting from the agencies' combined alternatives during construction, operations, and decommissioning and reclamation activities to be 3 percent less than the standard. TMRD would increase to 20 percent during construction, operations, and reclamation. Post-reclamation TMRD would decrease to 18 percent (a 5-percent improvement over the existing condition) (Table 226).

BMU 6**:**
Alternative 2B: In BMU 6, TMRD would increase over the existing condition, which does not meet the standard. Of all the action alternatives, Alternative 2B would increase TMRD the greatest during Construction and Operations (to 35 percent) and would not meet the BMU standard during these phases. Post-reclamation, TMRD would return to 33 percent and would not meet the standard.

Agencies' Alternatives: Mitigation implemented before the Construction Phase would decrease TMRD in BMU 6 to 32 percent to meet Access Amendment standards. The 32-percent TMRD achieved through mitigation prior to the Construction Phase would be maintained during construction and operations for Alternatives 3E-R, and 4E-R. During construction of Alternatives 3C-R, 3D-R, 4C-R, and 4D-R, TMRD would be the same as existing levels (33 percent) and would not meet the standard. During operations, all agency alternatives would meet the standard of 32 percent. The effects to TMRD during decommissioning would be the same as during construction. Post-reclamation TMRD would remain at 32 percent and would meet the Access Amendment standards. Mitigation and monitoring related to TMRD would be the same as discussed above for OMRD.

Objective 2. Manage for an adequate distribution of bears across the ecosystem

Juxtaposition of foraging habitat and cover/movement corridors

The availability and proximity of cover may influence the use of foraging habitat by grizzly bears. Consideration of historical vegetative conditions and natural disturbance processes when developing vegetation management treatments (e.g., availability of bear foods, size and shape of harvest units, and movement areas) would result in a mosaic of forage and cover habitats similar to what grizzly bears evolved with. This element of managing habitat for grizzly bear recovery addresses concerns regarding availability of cover in proximity to foraging habitat. Openings of various shapes and sizes as well as remnant patches of cover in wetter sites (e.g., riparian habitats) occurred historically in the project area through natural disturbance processes such as wildfire. Large, stand replacing fires occurred over tens of thousands of acres whereas more frequent, mixed severity fires resulted in smaller patches in the range of 1 to 1,000 acres in size. These smaller patches introduced diversity through stand age, tree size, species composition, and edge habitats. Other disturbance processes such as wind, insects, and disease can similarly introduce stand and vegetative diversity and all are ecological conditions with which grizzly bears evolved with here. Edge habitats can provide unique combinations of cover and a diversity and abundance of forage species that may be beneficial for grizzly bears.

All action alternatives remove vegetation, including timber for mine or transmission line construction. The Access Amendment Biological Opinion (USFWS 2011c) describes the importance of habitat connectivity or linkage for wildlife including the grizzly bear at a landscape scale.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B does not specify that vegetation cover would be maintained in the transmission line clearing during construction or operations, but low shrubs and trees may remain or re-establish in portions of the clearing and would provide some cover for movement. Alternative B construction or decommissioning activity could deter grizzly bears from moving along the Miller Creek, Howard Creek, and Ramsey Creek drainages. The effects to grizzly bears include the disturbance and potential avoidance of the activity. Areas of cover would remain adjacent to the transmission line clearing, and although grizzly bears may change their pattern of use, the clearing area would continue to provide for movement between more secure habitat.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R mitigation requires a Vegetation Removal and Disposition Plan that would minimize vegetation removal in the transmission line clearing. Alternative C-R would retain a greater amount of cover in the form of low trees and shrubs than Alternative B. Alternative C-R construction or decommissioning activity could deter grizzly bears from moving along the West Fisher Creek, Miller Creek, Howard Creek, and Libby Creek drainages, but due to timing, mitigation potential displacement resulting from construction or decommissioning activity would not occur during the grizzly bear denning or spring activity periods.

Alternative D-R – Miller Creek Transmission Line Alternative
Alternative D-R effects to juxtaposition of forage habitat and cover and movement across the transmission line clearing would be as described for Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative
Alternative E-R effects to juxtaposition of forage habitat and cover and movement across the transmission line clearing would be as described for Alternative D-R.

Combined Mine-Transmission Line Alternatives
All combined action alternatives would create one linear opening in forest cover as a result of transmission line clearing. The maximum transmission line clearing, estimated at 200 feet wide, would total approximately 330 acres but would be linear, and would provide some level of forage for grizzly bears. In all combined action alternatives, surface disturbance from the impoundments would consolidate two smaller forest cover openings into one large opening. These openings are associated with mine development, including the impoundment, facilities, and evaluation adits, not timber harvest, and grizzly bear use in these disturbance areas would not be encouraged.

Alternative 2B would create three additional openings due to mine facility development. The mine components of the agencies' alternatives would create two additional openings.

In all combined action alternatives, except for removal of vegetation for the impoundment disturbance, unharvested corridors would continue to be maintained between the proposed activity and unrecovered existing harvest units.

Between and within BMUs 5 and 6, movement corridors consisting of blocks of vegetative cover and core habitat are available. As discussed for displacement effects, mine activities could affect grizzly bear movement in the north-south movement corridor. All combined action alternatives due to the high-intensity level and duration (24-hour) activities associated with the mine facilities may result in underutilization of habitat within the zone of influence. This includes movement along the upper portions of the Libby Creek corridor. Alternatives 2B, 4C-R, 4D-R, and 4E-R could also disrupt grizzly bear movement in the Little Cherry Creek riparian area. Alternative 2B would have additional effects on grizzly bear movement in the Ramsey Creek corridor. These displacement effects would potentially last until mine closure. Displacement effects over time may be minimized in part because over the life of the mine, activities would be temporarily and spatially predictable and people associated with the work would be regulated against carrying firearms or having attractants available to grizzly bears (USFWS 2014a).

Due to disturbance associated with transmission line construction, all combined action alternatives could temporarily displace grizzly bears from moving along the Howard Creek and Libby Creek corridor. Grizzly bear movement along the Miller Creek corridor could be affected by Alternatives 2B, 3C-R, 3D-R, 4C-R, and 4D-R; and movement along the West Fisher Creek corridor could be affected by Alternatives 3D-R, 3E-R, 4D-R, and 4E-R. Potential disruption of grizzly bear movement during transmission line construction would be short-term, would subside during operations, and would not occur during the grizzly bear denning or spring activity periods.

In all combined action alternatives, mine-related activities in Libby Creek also would occur in proximity of the CMW and core grizzly bear habitat, and would potentially affect grizzly bear movement in the north-south movement corridor. For all combined action alternatives due to habitat compensation mitigation, an improvement in connectivity and reduction of fragmentation in the north-south corridor would occur. Mitigation for displacement effects in the north-south movement corridor are described under the *Displacement* discussion. Mitigation lands acquired within the north-south movement corridor would mitigate for the narrowing of the north-south corridor and reduce the risk of continued human development within the corridor. The agencies' combined alternatives mitigation designed to offset cumulative effects by changing access conditions to create grizzly bear core habitat would improve habitat conditions in the north-south movement corridor. The access change of NFS road #150A/Trail #935 from motorized access to restricted with a berm would increase the east to west undisturbed distance between existing disturbances (end of the Trail #935 below Rock Lake to the Wayup Mine) from 0.9 mile to 3.4 miles. This access change would create more than 1,000 acres of new core and specifically mitigate for the Libby Adit effects in the north-south corridor. This access change and others within the north-south movement corridor would create additional core; reduce displacement, mortality risk, and fragmentation; and improve connectivity in the South Cabinet portion of the CYE. The effects of the road access mitigation within the north-south corridor on the constricted area would result in increasing distances (widths) of secure (core) habitat between existing disturbances, and also between existing disturbances and proposed combined action alternatives related project disturbances, improving secure habitat for movement, and further reducing the mortality risk to grizzly bears. Blasting associated with the Rock Lake Ventilation Adit would be short-term and necessary when the adit daylighted on private land east of and above Rock Lake. During operations, the noise level of the fans due to mitigation would not be audible over ambient noise levels as described under *Displacement*. Grizzly bears may temporarily avoid the area during the short duration of blasting, but otherwise, bear movement would continue. Additional detail and analysis of the north-south corridor is provided in the Wildlife BA (USDA Forest Service 2013b).

In the agencies' alternatives, mitigation measures that would reduce disturbance from increased motorized activity along roads in forested corridors between mine components include a transportation plan to reduce traffic levels that would require busing employees to the mine facilities and limiting private vehicles (Mitigation Plan item A.1.b). The Bear Creek Road (NFS road #278) is considered a high-use road for the bear analysis (greater than 10 vehicles per day) in the existing condition, and the mine would add traffic volume, increase speeds, and result in yearlong use of the Bear Creek Road. Effects from increased traffic volume are discussed previously (p. 1266). The projected increased traffic volume would contribute to fracturing habitat connectivity between summer, fall, and den habitats west of the road from spring habitats to the east, and use on the Bear Creek Road may affect grizzly movement toward the east where linkage areas cross US 2. Effective cover along the Bear Creek Road would also be compromised by the estimated percent increase in traffic volume. Existing cover areas may also be impacted by the increased recreational use anticipated with the increase in human population. As discussed in the *Displacement* analysis, combined mine-transmission line alternatives, the increase in traffic volume on NFS road #278 would not approach levels that are likely to result in a complete barrier to movement of grizzly bears, based on existing research (Waller and Servheen 2005; Chruszcz *et al.* 2003; Ruediger *et al.* 1999).

MMC would contribute funding to support monitoring of bear movements in the Cabinet Mountains. In addition, MMC would provide funding to monitor bear movement along US 2 between the Cabinet Mountains and the Yaak River and/or the area between the CYE and NCDE. If monitoring indicated that proposed habitat acquisition and access changes were not adequate, mitigation measures would be developed to address any identified issues. Alternative 2B would not include grizzly bear monitoring.

Seasonal Components

Kasworm (1989) analyzed radio locations from three bears to determine the effects of roads on seasonal habitat use patterns, and found that grizzly use in the Cabinet Mountains was reduced 78 percent from that expected during the spring period in areas adjacent (up to 0.28 mile) to open roads. Research has indicated that loss of a single denning area following human disturbance will not always lead to adverse effects, if alternative denning areas are available within the home range (Linnell *et al.* 2000).

Alternative B – MMC's Proposed Transmission Line (North Miller Creek)

There are 4,140 acres of seasonally important habitat within the influence zone of Alternative B (Table 233). MMC's transmission line would be constructed directly across grizzly bear spring and denning habitat in the Miller Creek and Midas Creek drainages (Figure 92). In Alternative B, no motorized activity associated with transmission line construction would occur during the grizzly bear spring use period from April 1 to June 15 within spring bear habitat in the Miller Creek and Midas Creek drainages, minimizing potential for grizzly bear displacement on 787 acres in Midas Creek (out of the 2,103 acres total) within the influence zone in BMU 5, and on 341 acres (in Miller Creek) in BMU 6 Table 233). This restriction would also minimize disturbance on 92 acres of denning habitat (out of the 1,062 acres total) in BMU 5. In addition, the South Fork Miller Creek Road would be closed seasonally for spring range from April 1 to June 30 for the life of the mine.

A timing restriction on transmission line construction activity on big game winter ranges from December 1 to April 30 is proposed and would also provide some benefit to grizzly bears where spring range or denning habitat was also within big game winter ranges. Seasonal habitat where displacement effects would be minimized to a very low potential as a result of the big game timing restriction would include the 311 acres of denning habitat in BMU 6. The likelihood for grizzly bear displacement on the 341 acres of spring habitat in BMU 6 is also very low as the area is covered by both the grizzly and big game timing restrictions (Table 233).

Avalanche chute habitat is located in the Ramsey Creek drainage and would be within the 1-mile buffer on either side of the transmission line. Outside of the 0.5-mile influence zone of the mine facilities in Ramsey Creek, about 323 acres of avalanche chutes exist within the Alternative B transmission line buffer. No timing restriction for activity would occur within the Ramsey Creek drainage due to the proximity of the mine-related development.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would potentially have the greatest short-term displacement effects on seasonally important habitat over the two year construction phase and helicopter use, with 2,586 acres (Table 233) within the transmission line influence zone. However, the agencies' mitigation plan would require that all transmission line construction, reclamation, and removal on National Forest System land in the CYRZ and Cabinet Face BORZ occur between June 16 and October 14 and, as a result, disturbance to grizzly bears due to noise and the presence of humans and machinery would be minimized during the spring (April 1 to June 15) period. The timing restriction also would minimize displacement during general big game rifle hunting (October 24 – November 29) and disturbance during denning (December 1 to March 31) seasons. The timing of activity outside of spring use, as well as outside of the denning period or fall rifle season would make the likelihood of displacement or disturbance very low. The timing restriction would mitigate for the very low potential displacement effect. The agencies' alternatives would include a big game

Table 233. Displacement Effects on Grizzly Bear Seasonal Habitat in the Directly Affected BMU 5 and BMU 6 by Combined Mine-Transmission Line Alternative.

Seasonal Habitat and Displacement Effect	[1A] No Action	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
BMU 5 (Mine and Transmission Line Effects)								
Spring Habitat	17,625							
Existing road effects	1,915[1]							
Mine effects	0	1,410	716	716	716	716	716	716
Transmisson line effects	0	2,103[2]	1,359[3]	922[3]	922[3]	1,359[3]	922[3]	922[3]
Avalanche Chute	3,180							
Existing road effects	32[1]							
Mine effects		397	53	53	53	53	53	53
Transmission line effects		323[2]	54[3]	54[3]	54[3]	54[3]	54[3]	54[3]
Denning Habitat	14,414							
Existing road effects	784[1]							
Mine effects	0	896	453	453	453	453	453	453
Transmisson line effects	0	1,062[2]	236[3]	180[3]	180[3]	236[3]	180[3]	180[3]
BMU 6 (Transmission Line Effects Only)								
Spring Habitat	14,091							
Existing road effects	1,395[1]							
Transmission line effects	0	341[2]	599[3]	1,171[3]	765[3]	599[3]	1,171[3]	765[3]
Denning Habitat	12,149							
Existing road effects	615[1]							
Transmission line effects	0	311[2]	338[3]	23[3]	150[3]	338[3]	234[3]	150[3]

All units are acres,

Mine related displacement effects are long-term: persist for life of mine (30 years) or longer; Transmission line construction and reclamation effects are short-term – 2 active bear seasons

[1]Existing habitat affected by open roads (roads opened during active bear year) is within a 0.25-mile buffer, and existing data are taken from the Wildlife BA (USDA Forest Service 2013b).

[2]Alternative 2B would mitigate for displacement effects on 787 acres of spring habitat by not allowing motorized activity associated with transmission line construction to occur during the spring use period within bear habitat in the Miller and Midas Creek drainages; and would avoid transmission line construction in big game winter ranges.

[3]All agency alternatives would restrict transmission line construction and decommissioning to between June 16 and October 14, outside of the spring use period, and outside of the hunting season denning period, resulting in very low likelihood of actual displacement.

Source: Avalanche habitat GIS analysis by KNF, other GIS analysis by ERO Resources Corp. using KNF data.

winter range restriction with no transmission line construction or decommissioning in big game winter range (December 1 through April 30) unless a waiver was approved by the agencies. This waiver would not apply on National Forest System lands in the CYRZ or BORZ, or on State trust lands. Alternative C-R would be within existing core during construction and in both existing and created core during the remaining phases. An increased risk for displacement and mortality risk to grizzly bears would occur in spring and denning habitat within the two affected core blocks where it would be impacted by the transmission line corridor compared to Alternatives D-R and E-R, which would not within core.

Alternative D-R – Miller Creek Transmission Line Alternative

Alternative D-R would potentially result in displacement effects on 2,350 acres of seasonally important habitat located with the transmission line influence zone, however as described under Alternative C-R, the agencies' mitigation would restrict construction and reclamation activity to outside the spring and den use periods would result in very low potential for grizzly bear displacement. Effects of Alternative D-R would be less than Alternative C-R because no spring or denning habitat within existing or created core would be affected by the transmission line corridor clearing as Alternative D-R would not be within core.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Due to the agencies' timing requirement for transmission line construction and reclamation activity to outside the spring and denning use periods, displacement effects to grizzly bears from the 2,071 acres of seasonally important habitat within the influence zone of Alternative E-R would be the same as Alternative D-R.

Combined Mine-Transmission Line Alternatives

The following sections discuss the combined mine-transmission line alternatives disturbance and displacement effects on the seasonal components of spring, avalanche and denning habitats.

Physical Loss of Seasonal Habitat

No physical loss of avalanche habitat would occur. The physical loss of grizzly bear spring habitat would be minimal. Alternative 2B would remove 15 acres of grizzly bear spring habitat and Alternatives 3D-R and 4D-R would remove 2 acres. Alternatives 3C-R, 3E-R, 4C-R, and 4E-R would not directly remove spring habitat. Only Alternative 2B would directly impact denning habitat, removing 17 acres within BMU 5.

Long-term Displacement Effects on Seasonal Habitat

Effects common to all Combined Mine-Transmission Line Alternatives

All combined alternatives would use the Bear Creek Road (#278) as the main access haul route, which extends up to 18 miles between the combined alternatives mine location sites and US 2. No mapped seasonal habitat (spring, denning, or avalanche) is within the 0.25-mile influence zone of the Bear Creek Road #278 haul route located from the impoundment areas northward to US 2 in either BMU 2 or BMU 5. About 14 miles of NFS road #278 cross through or are adjacent to BMU 2 and BMU 5 and in MS-1 habitat. Widening, improvement, and yearlong use of the Bear Creek Road would lead to increased vehicle volumes and speed. The effects of estimated projected traffic volume increases are described in the grizzly bear displacement analysis on p. 1262. The decrease in traffic volumes Post Closure and effects to bears and their habitat are also discussed in the grizzly bear displacement analysis. Long-term displacement or underuse of MS-1 habitat (lasting for the life of the mine or longer) within portions of the affected drainages by some grizzly bears could occur as an indirect effect from increased high-intensity 24-hour use associated with the mine facilities and associated increases in motorized traffic. Females may teach avoidance of disturbed areas to cubs, extending the displacement for an unknown period of time after the mine was reclaimed. In addition, NFS road #278, which lies in a north-south alignment, cuts across most of the Libby Creek sub-drainages that flow west to east. The increase in mine-related 24-hour traffic would contribute to fracturing habitat connectivity between summer, fall, and denning habitats west of the road from spring habitats east of the road. Due to the increased magnitude and duration of the disturbances associated with the mine development (impoundment, plant site, Libby Adit, and, in Alternative 2B, the LADs), and year-round open Bear Creek Road #278 and Libby Creek Road #231, all of which would be affected by the increased traffic volume and significant human activity, spring or denning habitat within these zone of influences would be underused by grizzly bears.

In BMU 5 all combined action alternatives mine-related activities associated with the facilities (*e.g.*, impoundment, mill site, conveyer system, adits, and associated roads) would occur continuously along the east Cabinet front during spring (April 1 to June 15) throughout the life of the project. Due to the nature of construction, operations, and reclamation within the influence zone of the mine facilities in BMU 5, no timing restrictions are feasible on spring range and are not proposed. The mine associated activities would result in long-term displacement effects lasting for at least the life of the mine, and would increase the amount of spring range (and other seasonal habitat) affected by human development and noise. Disturbance from mine activities would reduce the effectiveness of adjacent grizzly bear spring range. Bears that may have traditionally used the impacted areas during the spring would likely change their normal behavior patterns, possibly seeking foraging sites in less productive areas or areas closer to human disturbance.

Alternative 2B

Alternative 2B would cause additional long-term disturbance and displacement on spring, denning, and avalanche habitat compared to the agency combined alternatives due to the plant site and other facilities being located in the upper Ramsey Creek drainage, which is directly adjacent to the CMW and core grizzly bear habitat. Within BMU 5, Alternative 2B mine-related long term displacement effects on spring habitat would occur on 1,410 acres, while short-term displacement effects associated with the transmission line construction would affect 1,316 acres out of the 2,103 acres within the influence zone (Table 233). The 2,726 acres of spring habitat affected would increase the amount of spring habitat within a disturbance influence zone by 16 percent in BMU 5, and by 6 percent in all of BMUs 2, 5, and 6 combined.

Within BMU 5, long-term displacement effects associated with the mine would occur on 896 acres of denning habitat, while short-term transmission line construction displacement effects would occur on 970 acres out of the 1,062 acres within the influence zone (Table 233). Total physical disturbance (17 acres) and displacement (1,866 acres) would increase the amount of denning habitat within a disturbance influence zone by 13 percent in BMU 5, and 4 percent in all of BMUs 2, 5, and 6 combined.

As described under Alternative B, Alternative 2B would include two timing restrictions that result in reduced displacement effects on spring and denning habitat; no transmission line construction in the Miller Creek and Midas Creek drainages during the grizzly bear spring use period of April 1 to June 15; and no transmission line construction or decommissioning in big game winter range from December 1 to April 30. The big-game timing restriction would mitigate for displacement effects where big-game habitat overlaps with spring and denning habitat, primarily in BMU 6.

Within Alternative 2B's transmission line influence zone, no avalanche habitat is located in BMU 6 or in the Midas Creek area in BMU 5, and the timing restrictions would not reduce displacement effects on avalanche habitat. Alternative 2B displacement effects on avalanche habitat would occur in BMU 5 with 720 acres affected. Of that total, long-term displacement effects associated with the mine would occur on 397 acres, while short-term effects associated with transmission line construction would occur on 323 acres (Table 233). Alternative 2B would increase the amount of avalanche habitat within a disturbance influence zone by 23 percent in BMU 5, and by 9 percent in all of BMUs 2, 5, and 6 combined.

Agency mitigated Combined Mine-Transmission Line Alternatives

The effects of the agencies' combined alternatives would be less than combined Alternative 2B because of alternative mine facility locations and transmission line construction and decommissioning timing restrictions. In the agencies' combined alternatives, transmission line construction and decommissioning would be limited to June 16 to October 14, avoiding spring use, as well as hunting season and the denning period. The transmission line construction activity would result in short-term disturbance (about two active bear seasons) by aircraft during the construction phase (and decommissioning phase) within the transmission line influence zone. Restricting construction and decommissioning of the transmission line to outside the grizzly bear spring (April 1 to June 15) and den (December 1 – March 31) seasons would make the likelihood of actual displacement very low. Displacement effects would be so unlikely to occur that if the effect would occur it would not be measurable or detectable due to 1) the lines primarily are located in lower elevations used for spring habitat; 2) grizzly bears are highly unlikely to use the areas within the transmission lines influence zones outside the spring period; 3) no activities are allowed during the spring or denning periods; and 4) other undisturbed areas of quality spring, denning and avalanche habitat would be available should a bear be disturbed. The very low potential for displacement effects on spring, denning, and avalanche habitat associated with construction of the transmission lines in the agencies combined mine-transmission line alternatives are mitigated through timing of the activities (see Table 233 for acres of seasonal habitat within transmission line influence zones where short-term displacement effects have been minimized).

Alternatives 3C-R and 4C-R would differ from the other agency combined alternatives in effect on seasonal habitat. After the construction phase when an access change would be implemented on NFS road #4725, approximately 3 miles of the C-R transmission line route would cross two blocks of core which contain spring and denning habitat (Figure 93). Due to continued maintenance of the transmission line corridor for the life of the project, the mortality risk and displacement effects on the spring and denning habitat within these two core blocks would be higher compared to the other agency combined mine-transmission line alternatives, which would not have transmission lines within core.

The agencies combined alternatives long-term displacement effects associated with mine-related development would only occur in BMU 5, and would affect 716 acres of spring range, 53 acres of avalanche habitat, and 453 acres of denning habitat (Table 233). The displacement of 716 acres of spring range in the agencies' combined alternatives, plus the 2 acres of physical loss in combined Alternatives 3D-R and 4D-R would increase the amount of spring habitat within a disturbance influence zone by 4 percent in BMU 5 and by 2 percent in all of BMUs 2, 5, and 6 combined.

The combined agencies' alternatives would have lower potential to displace bears from avalanche habitat compared to Alternative 2B. The relocation of the plant site to Libby Creek would reduce long-term displacement effects on avalanche habitat to 53 acres (Table 233). The amount of avalanche habitat within a disturbance influence zone in the agencies' combined alternatives would increase by 2 percent in BMU 5, and by less than 1 percent in all of BMUs 2, 5, and 6 combined.

The combined agencies' alternatives long-term mine-related displacement effects on 453 acres of denning habitat would increase the amount of denning habitat within a disturbance influence zone by 3 percent in BMU 5 and 1 percent in all of BMUs 2, 5, and 6 combined.

Summary of effects to seasonal habitat

Low-elevation spring habitat is thought to be less abundant than other seasonal habitats in the Cabinet-Yaak Ecosystem (USFWS 2014a). A total of about 45,000 acres of spring habitat components are present in the three BMUs directly affected by the combined alternatives (Table 224). Spring habitat is well distributed throughout all directly affected BMUs and is well represented in core areas (secure habitat) when compared to its availability within each BMU (USDA Forest Service 2013b). Approximately 3,843 acres or 8.5 percent of the 45,000 acres are already affected by use on existing roads, especially the existing high use forest roads #278 and #231 (Table 224). Due to the increased traffic volumes and significant human activity along these forest roads and at the mine site, the spring habitat within the influence zones would be under-used by grizzly bears. No seasonal avoidance of important spring habitats can be incorporated into the mine facility activities since the mine would operate full-time and year-round. In BMU 5, approximately 716 acres (agencies combined alternatives) to 1,410 acres (Alternative 2B) would be impacted by long-term displacement effects from the proposed mine sites and associated roads. In addition, Alternative 2B construction of the transmission line in BMU 5 would result in short-term displacement effects on 1,316 acres of spring range where no timing restriction is proposed.

The majority of spring range within the affected BMUs would remain outside of existing and new disturbance influence zones, approximately 84 to 85 percent for Alternative 2B (2B would affect 3,513 acres with no transmission line timing restrictions, and 2,741 acres of spring habitat with restrictions).

Displacement effects of the agencies combined alternatives transmission line are mitigated by implementing a timing restriction. All construction and reclamation activities associated with the transmission line would occur outside the grizzly bear spring and den seasons as discussed previously. Eighty-five to 90 percent of spring range would remain outside of disturbance influence zones in the agencies alternatives (agencies combined alternatives influence zones would include 2,674 to 2,809 acres of spring habitat with no transmission line timing restriction, and only 716 acres of spring habitat would remain due to mine-related displacement with the timing restriction). The agencies combined alternatives transmission line timing restrictions would mitigate for displacement effects more effectively than Alternative 2B as the agencies' mitigation would restrict activity to outside the spring and den use periods along the entire length of the transmission line on National Forest System and State lands within the Recovery Zone and the Cabinet Face BORZ. The agencies' alternatives 3D-R, 3E-R, 4D-R and 4E-R would implement all road access mitigation prior to construction activity effects and would provide greater compensation for increased displacement on spring range prior to construction activity compared to 3C-R and 4C-R which would defer an access change to after construction. All agencies alternatives decrease existing road displacement effects on spring range compared to Alternative 2B. The core created by the agencies' alternatives road access mitigation would decrease the amount of spring range within the influence zone of gated or open roads and would ensure that more acres of spring habitat would be protected from major disturbances throughout the life of the mine, than the amount of spring habitat lost to the mine. The agencies combined alternatives road access changes would secure a total of 2,291 acres of spring habitat within BMUs 2, 5, and 6 combined (USDA Forest Service 2013b), and would reduce the mortality risk and displacement effects to grizzly bears using this habitat.

Although no known grizzly bear dens occur within several miles of the combined alternative facilities, affected potential denning habitat, especially on the slopes above Ramsey Creek (Alternative 2B), on Shaw Mountain above the Libby Adit Site (all alternatives), and near the Libby Plant Site (agencies' alternatives), may be underused. Denning habitat within the mine development influence zones totals 896 acres for Alternative 2B, and 453 acres for the agency combined alternatives. Disturbance levels that would cause a female to prematurely leave the den in spring or move from the den area prior to cub mobility would impair the fitness of the female and safety of the cubs (USFWS 2014a).

Denning habitat in the Cabinet Mountains is readily available and grizzly bears that might avoid habitat affected by mine activities would find ample denning sites in less disturbed locations. Existing denning habitat is well represented in secure (core) habitat across all three directly affected BMUs. The effects of the combined action alternatives on grizzly bear denning are anticipated to be minimal. BMUs 2, 5, and 6 currently provide den habitat in designated roadless areas in high elevation grizzly bear habitat within the Cabinet Mountain Wilderness Area. Core habitat created by the agencies' alternatives road access mitigation would remove gated and open road access and secure more potential denning habitat than what currently occurs within the directly affected BMUs.

For all combined action alternatives during operations, transmission line maintenance needs could arise during the spring or den use period, but disturbance associated with maintenance activities is expected to be very short-term.

As discussed under the agencies' transmission line alternatives, displacement effects on grizzly bear spring range and denning habitat would be minimized through implementation of helicopter construction and decommissioning timing restrictions. Potential to displace grizzly bears from denning and spring habitat from transmission line activity would be very low as the transmission lines would be largely located in spring habitat within the BMUs and the likelihood of displacing a grizzly bear during the summer construction or reclamation phase activity period from June 16 to October 14 is low. Summer habitat is widely available in the BMUs and any grizzly bear potentially displaced would have ample adjacent and secure areas providing similar habitat conditions. Displacement effects on grizzly bear seasonal habitat in the directly affected BMU 5 and BMU 6 by combined mine-transmission line alternative are displayed in Table 233 below. Transmission line effects to seasonal habitat are evaluated within a 1-mile zone of influence either side of the line. Acres displayed in Table 233 are total acres which combine areas with existing displacement effects receiving additional activity and acres receiving new displacement. New displacement is the effect of project activities in grizzly bear habitat not currently disturbed by human activity. Additional displacement is the additional effect of project activities in grizzly bear habitat currently affected by other activities, such as road use or activities on private land. Both new and additional acres displayed for the transmission line effects do not include overlap with mine disturbance footprint.

In all combined action alternatives, impacts from mining activities on seasonal habitat of grizzly bears would also be compensated through MMC's and agencies' land acquisition and conservation easement in perpetuity requirements. Alternative 2B would result in the least amount of spring, avalanche, or denning habitat protected by proposed mitigation because the acres required are far less than the agencies' alternatives. Effects of habitat compensation mitigation on grizzly bears are discussed under "*Effects common to all action alternatives*" and "*Effects common to the agencies' alternatives.*" Depending upon the alternative, acres required are related to habitat loss and the intensity and duration of the disturbance associated with each phase of the mine. Acquired/easement parcels could improve conditions on additional spring, denning, or avalanche habitat if mitigation parcels contained these habitats, were in proximity to these habitats, or had motorized access through these important seasonal habitats that could be reduced.

Road Density and Displacement and Core Areas

These are discussed under Objective 1 and Objective 6.

Objective 3. Manage for an acceptable level of mortality risk

Most human-caused grizzly bear mortality on the KNF have resulted from interactions between bears and big-game hunters (Kasworm and Manley 1988). Grizzly bear vulnerability to human-caused mortality is partially a function of habitat security. Therefore, mortality risk can be assessed to some extent by the use of habitat components that maintain or enhance habitat security. For juxtaposition of foraging habitat and cover see Objective 2, for road density see Objectives 1 and 6, and for displacement see Objectives 1 and 6.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek)

Alternative B would result in the greatest amount of new access roads (9.9 miles) for the construction and maintenance of the transmission line. Although these roads would be closed to public motorized use, the new roads would benefit non-motorized access. All contracts would require contractors or subcontractors or MMC employees to comply with the KNF mandatory food storage order on National Forest System lands.

In Alternative B, food attractants would be minimized through the use of bear-resistant garbage containers, prohibiting the feeding of bears by mine employees, and the prompt removal of roadkill. Although new transmission line access roads would be gated or barriered after transmission line construction to prevent public motorized access, mortality risks could increase due to improved access for forest users. Mortality risks due to improved hunter or poacher access would increase more for Alternative B than for the other transmission line alternatives because more new roads would be built. Clearing of the transmission line corridor in three blocks of core grizzly bear habitat may improve access for forest users on foot or horseback, increasing mortality risk. Some of the Alternative B corridor that crossed core habitat would not be cleared because it would be in a valley, or is currently fairly open habitat due to past regeneration harvest. Clearing of 0.5 mile (9 acres) of corridor would create improved access for forest users to the ridgeline between the Miller Creek and Midas Creek drainages, and could increase mortality risk in this area for the duration of the project. Forest cover would return slowly after the line was decommissioned.

Under MMC's proposed combined Alternative 2B, MMC would fund two new FWP wildlife positions—a bear specialist and a law enforcement officer. Public education about grizzly bears and enforcement of laws protecting grizzly bears would minimize mortality risks.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

In Alternative C-R, additional actions identified in the agencies' mitigation plan would more effectively minimize food attractants within the CYRZ compared to Alternative B. Potential for increase mortality risk due to improved hunter or poacher access would be less for Alternative C-R than Alternative B because fewer new roads would be built. Similar to Alternative B, clearing in 0.5 mile (12 acres) of existing core habitat in the transmission line corridor would provide improved access for forest users to the ridgeline between the Miller Creek and Midas Creek drainages, increasing mortality risk in this area. Throughout the Operations Phase, the transmission line corridor for Alternative C-R, which would total 3 miles through core habitat, would provide for easier recreation or hunter access in the two affected core blocks, resulting in an increased potential for mortality risk for grizzly bears within these core blocks compared to Alternatives D-R and E-R, which are not within core habitat.

The potential increase in risk from human-caused mortality would be minimized by specific actions detailed in the agencies' combined alternatives mitigation plan. These include road access changes and informing and educating mine employees and the public about living in grizzly bear country with the goal to improve public support for recovery of the grizzly bear. Major items included in the mitigation plan include 1) development of a detailed and enhanced information and education program; 2) hiring a grizzly bear specialist to work specifically in the CYE; 3) hiring a law enforcement officer to work specifically in the CYE; 4) ensuring all garbage collection sites and Forest campgrounds in the CYE are bear resistant through fencing and bear-resistant garbage containers; and 5) providing the public with temporary electric fencing kits as needed to deter grizzly bear activity near residences and avoid bears becoming conditioned to attractants such as chickens, pigs, and fruit orchards.

In addition to the bear specialist and law enforcement positions funded by MMC in Alternative B, Alternative C-R would include MMC funding of a habitat conservation specialist if both the Rock Creek and Montanore projects are concurrent. The detailed public education and information program about grizzly bears required in the agencies' alternatives, enforcement of laws protecting grizzly bears, and management of mitigation lands to improve the baseline habitat parameters of OMRD, TMRD, and core and to benefit the grizzly bear would minimize mortality risks.

Alternative D-R – Miller Creek Transmission Line Alternative

In Alternative D-R, food attractants would be minimized within the Recovery Zone, the same as Alternatives B and C-R. Alternative D-R would result in less displacement effects within core habitat as the transmission line would not cross core habitat and would have a smaller potential to increase mortality risk than Alternatives B and C-R. The short-term temporary decrease in 18 acres of core during construction would be mitigated for prior to activity at a 2:1 ratio creation of core. Measures to reduce mortality risk would be the same as Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Under Alternative E-R, mortality risk would be less than Alternatives B and C-R during the Construction, Operations, and Closure Phases because Alternative E-R, like Alternative D-R, would not be within core habitat and no core habitat would be cleared by the corridor. Other effects on mortality risk from Alternative E-R would be similar to Alternatives C-R and D-R.

Combined Mine-Transmission Line Alternatives

The effects are as described for the transmission line alternatives except for the following: Unmitigated, the large influx of mine employees into the county could increase mortality risk. It is assumed in all combined action alternatives that temporary housing facilities would be developed near the project site on private lands, increasing the potential for grizzly bear mortality due to human/grizzly bear interactions. All combined action alternatives would increase recreational use of the analysis area in the long term. Increased recreational activity in bear habitat may increase human/grizzly conflicts and grizzly bear mortality. Traffic-related mortality may also increase due to increased traffic on the access road and US 2. As a result of mine activity at the Ramsey Plant Site (Alternative 2B) and Libby Plant Site (agencies' alternatives), bears may be displaced from important seasonal foraging areas and may need to seek foraging sites in areas closer to human disturbance. Displacement into habitat less secure from humans can cause increased mortality for bears (USFWS 1993a).

All combined action alternatives would restrict public motorized and non-motorized access to mine and agency personnel in all permit areas, which would reduce the amount of area available for hunting and other dispersed recreation activities, which would minimize human/bear interactions. All combined alternatives restrict public motorized access on newly constructed roads and barriered roads opened for transmission line access during and after the Construction Phase.

In all combined action alternatives, food attractants would be minimized through the use of bear-resistant garbage containers, prohibiting the feeding of bears by mine employees, and the prompt removal of roadkill. All combined action alternatives would include the funding by MMC of two new wildlife positions – a bear specialist and a law enforcement officer (see Chapter 2). The new bear specialist would increase public awareness of grizzly bear biology and behavior and help increase acceptance and support of grizzly bear management. Public attitudes are a major part of the success or failure of grizzly bear recovery efforts. It is critical to the recovery effort that people understand reasons for agency actions to have a favorable attitude toward grizzly bears (USFWS 1993). The combined agencies' alternatives would include funding for an additional position, a habitat conservation specialist, if both the Montanore and Rock Creek Projects are active. This habitat conservation specialist would focus on promoting land use decisions that benefit grizzly bears.

The combined action alternatives may increase grizzly bear mortality due to increased traffic volume and speeds. The main Bear Creek Road is currently not maintained for winter travel beyond the 3-mile mark (from US 2) near the private residences. During the Construction and Operations Phases of the mine, NFS road #278 would be easily drivable during the first two weeks of the spring bear hunting season (April 15 to May 1) and during the last two weeks (November 15 to November 30) of the general big game fall hunting season. Currently, the road is closed to conventional vehicles due to snowpack in April, and becomes a challenge to drive toward the end of the fall big game rifle season in November. Increased road access during these periods would allow increased hunter access, which would then increase the potential for human/bear encounters that could result in bear mortality. As described in section 2.5.7.4, *Wildlife*, the agencies' alternatives would include measures to minimize grizzly bear mortality from vehicle collisions, including prohibiting the use of salt on roads during the winter, removing road-killed animals from roads daily, monitoring the frequency of vehicle-killed animals, and reviewing the data to determine if additional mitigation for vehicle collisions is necessary, and developing a transportation plan to reduce mine traffic.

Because roads in the operating permit areas would be closed to the public, the risk of mortality from poaching would be minimized. Although new transmission line access roads would be gated or barriered during transmission line construction to prevent public motorized access, mortality risks could increase due to improved hunter or poacher access. Alternatives 2B, 3C-R, and 4C-R would cross existing core and unroaded habitat in the upper Miller Creek and Midas Creek drainages. In addition, Alternatives 3C-R and 4C-R would result in a total of 3 miles of corridor clearing in two blocks of core during the Operations Phase due to core creation post-construction in the North Fork Miller Creek. Clearing in some segments of the transmission line corridor would provide improved access for forest users to the ridgeline between the Miller Creek, Midas Creek, or the main Libby Creek drainages, increasing mortality risk in this area for the duration of the project. Mortality risks due to improved hunter or poacher access would increase more for Alternative 2B than for the other combined action alternatives because more new roads would be built. The new law enforcement position included in the action alternatives grizzly bear mitigation plan, including Alternative 2B, would help reduce the mortality risk of grizzly bears in the area.

Mitigation designed to offset cumulative effects by changing access conditions to create grizzly bear core habitat would also a) contribute to reducing risk of human-caused bear mortality; b) provide undisturbed habitat area for displaced bears; c) improve habitat conditions in the north-south movement corridor; and d) help meet KFP standards and guidelines for grizzly bear habitat conditions. The agencies' alternatives would create a total of 7,030 acres (includes acres from Trail #935) of new core habitat through road access change. Implementation of the entire mitigation plan would result in an improved condition over the baseline.

All combined action alternatives would result in an influx of human population. The local area of Libby would see the largest number of new households, and the other population increase would be distributed in the Troy and Eureka areas (Table 168). It is likely some new residences would be built on undeveloped private land in or near the CYE, which could result in permanent loss of habitat otherwise available to grizzly bears. Increased number of people would increase potential for conflicts with bears related to sanitation, habituation, or displacement, thus increasing mortality risk.

The agencies' mitigation plan, described in detail in the Wildlife BA (USDA Forest Service 2013a), specifically addresses these concerns to minimize increased potential for mortality risk. In summary, the potential increase in risk from human-caused grizzly bear mortality would be minimized by efforts that inform and educate mine employees and the public about living in grizzly bear country. These efforts would also improve public support for grizzly bear recovery. The major items include: 1) developing a detailed and enhanced information and education program; 2) hiring a grizzly bear specialist to work specifically in the CYE; 3) hiring a law enforcement officer to work specifically in the CYE; 4) making all garbage collection sites and Forest campgrounds in the CYE bear resistant through fencing and new bear-resistant garbage containers; and 5) providing the public with temporary electric fencing kits as needed to deter grizzly bear activity near residences. Details of these measures, along with several other items can be found in the agencies' alternatives mitigation plan. These efforts to curb attractant-related conflicts on public land and private land would become increasingly effective over time, along with the increased levels of information programs in the CYE. These measures would substantively reduce the risk of grizzly bear mortality as a result of habituation and food conditioning on National Forest System and private lands in and adjacent to the entire CYE, not just the directly affected BMUs.

Objective 4. Maintain/improve habitat suitability with respect to bear food production

Agencies' Mitigated Transmission Line Alternatives

As described previously under effects common to the action alternatives or common to the agencies' alternatives, objectives of the mitigation lands and their subsequent management would be to maintain and improve bear habitat, including OMRD, TMRD, and core. The agencies' alternatives would maintain and improve more grizzly bear habitat compared to Alternative B due to the greater amount of habitat compensation required and the adaptive management strategies incorporated into the agencies' mitigation plan.

Combined Mine-Transmission Line Alternatives

The agencies' combined action alternatives would maintain and improve more grizzly bear habitat compared to Alternative 2B due to the greater amount of habitat acquisition and or purchase of conservation easements required for habitat physically lost and long-term displacement effects associated with the mine. The agencies' mitigation plan specifically identifies the importance of the mitigation lands to include protection of seasonally important habitats, with primary emphasis on spring habitat and secondary emphasis on fall habitat, such as huckleberry fields.

Objective 5. Meet the management direction outlined in the Interagency Grizzly Bear Guidelines (51 Federal Register 42863) for Management Situation (MS) 1, 2, and 3.

Meeting Objectives 1-4 has been determined to meet the intent of the IGBC Guidelines (Buterbaugh 1991) and the 2015 KFP. The relevant language from the IGBC Guidelines (IGBC 1986) states: "Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated." The IGBC Guidelines do not provide a specific definition of "compete" or "compatible"; however, the intent of these provisions is made clear by the discussion in the IGBC Guidelines regarding Forest Service grizzly bear management policy: "The Forest Service will manage habitats essential to bear recovery for multiple land use benefits, to the extent these land uses are compatible with the goal of grizzly recovery. Land uses which cannot be made compatible with the goal of grizzly recovery, and are under Forest Service control, will be redirected or discontinued. Management guidelines and objectives, the cumulative effects process, and goals for habitat capability and mortality will be used to guide activities that are compatible with grizzly bear recovery. It is also the policy of the Forest Service to facilitate recreation use in occupied grizzly habitat to the extent such levels or use are compatible with both human safety and grizzly recovery objectives."

Thus, it is apparent that the IGBC Guidelines recognize the multiple use nature of National Forest System management. Furthermore, it is apparent that land uses that are, or can be made, compatible with grizzly bear recovery do not "compete" even if there is an impact on individual bears. The IGBC Guidelines provide a detailed process for determining compatibility between land uses and grizzly bear recovery, which uses the consultation process to assist in determining compatibility between proposed land uses and grizzly bear recovery.

The determination of compatibility is based on the proposed federal action, not on individual components of such action. This is apparent from the IGBC Guidelines that use the consultation process to assist in determining the compatibility of proposed land uses with grizzly bear recovery goals.

Thus, the relevant consideration in the present case is whether the Montanore Project, as consulted on with the USFWS, is compatible with grizzly bear recovery goals and objectives. If it is, or can be made compatible, then the land uses encompassed by this project do not “compete” within the meaning of the IGBC Guidelines. The KNF requested formal consultation on Alternative 3D-R with the USFWS. The final Biological Opinion was released on March 31, 2014 (USFWS 2014a, 2014b). With full implementation of the agencies’ mitigation plan and all terms and conditions as specified in the Montanore Project Biological Opinion, the agencies’ Alternative 3D-R would result in an improved condition over the baseline, would be compatible with grizzly bear recovery goals and objectives, and would meet IGBC Guidelines. The remaining agencies’ combined alternatives are similar in effect to grizzly bears and their habitat and would require the same mitigation plan.

Within the Recovery Zone, with the exception of activities located on private MS-3 lands (Libby Adit, Rock Lake Ventilation Adit, and areas of the impoundment depending upon the alternative), nearly all of the activities associated with the combined action alternatives would be located in grizzly bear MS-1 as designated by the Interagency Guidelines. Unlike Alternative 2B, the agencies’ combined alternatives would ensure that habitat parameters and conditions are maintained or improved post-project (see Objectives 1-4) and would minimize potential impacts or effects of resource competition between bears and humans for the life of the mine (see mitigation plan). In addition, for all action combined alternatives, the mitigation lands would be managed for grizzly bears in perpetuity. The agencies’ alternatives would ensure more lands would be managed for grizzly bears compared to Alternative 2B.

Alternative 2B would result in habitat parameters worse than the existing conditions, which do not meet standards and would only improve OMRD and/or TMRD post-project depending on the BMU (Table 226). The agencies’ combined alternatives would improve habitat parameters prior to activity, or after construction in BMU 6 for Alternatives 3C-R and 4C-R. The agencies’ alternatives would ensure movement corridors between adjacent BMUs would be maintained or improved and overall baseline parameters would improve. The agencies’ combined alternatives mitigation plan would minimize mortality risk to grizzly bears as described under Objective 3.

Large connected areas of core habitat in the directly affected BMUs provide secure habitat for grizzly bears. The agencies’ alternatives mitigation would improve core habitat to better than the standards prior to activity in both BMU 5 and BMU 6 through road access changes. OMRD and TMRD would either be improved or maintained by the agencies’ combined alternatives. Additional improvements to baseline habitat parameters would occur for all action alternatives as a result of habitat compensation, with greater improvements made by the agencies’ combined alternatives due to the detailed mitigation plan and increased habitat compensation acreages required for grizzly bear habitat physically lost and displacement effects. Transmission line construction or reclamation activity on spring habitat would be restricted at some level for all action alternatives, with Alternative 2B providing the least protection.

During transmission line construction, operations, and reclamation, public motorized access on roads behind opened barriers or gates or newly constructed roads would be restricted on National Forest System lands.

Objective 6. Meet the management direction specified in the October 18, 2011 incidental take statement (USFWS 2011c, 2011d).

On October 18, 2011, the USFWS issued a Biological Opinion on the effects of the 2011 Access Amendment that now serves as the first-tier of a tiered consultation framework. Proposed projects in the CYRZ would be tiered to this Biological Opinion in which the 2011 Access Amendment's features and design elements, addressing the habitat parameters of core, OMRD, and TMRD, were analyzed. Projects that fall within the range of activities analyzed would be compliant with the incidental take statement.

Because the effects of land acquisition or conservation easement in perpetuity lands on baseline habitat parameters of core, OMRD, and TMRD are not calculable at this time, the effects of Alternative 2B activities would not adhere to the 2011 Access Amendment features and design elements, would not fall within the range of effects analyzed in the Access Amendment Biological Opinion, and would not be compliant with the 2011 incidental take statement.

The effects of the agencies' combined alternatives adhere to all of the 2011 Access Amendment's features and design elements for OMRD, TMRD, and core and, therefore, fall within the range of effects analyzed in the 2011 Access Amendment Biological Opinion (USFWS 2011c). Effects of the agencies' combined alternatives are described under the Environmental Consequences, Objectives 1.b. Core, 1.c. OMRD, and 1.d. TMRD.

Outside CYRZ – Effects of Transmission Line Alternatives

Cabinet Face BORZ

The Access Amendment (USFWS 2011c, 2011d; USDA Forest Service 2011a, 2011b) established design elements to conserve grizzly bear habitat in BORZ polygons on National Forest System Lands. In summary, the access management design elements (abbreviated) that apply to the BORZ and effects of the transmission line alternatives are as follows:

A&B. The Forest shall ensure no permanent increases in the total linear miles of "open roads" or increases in the total linear miles of "total roads" on National Forest System lands in any individual BORZ area above baseline conditions, except in cases where the Forests lack discretion to prevent road building across national forest land due to legal or other obligation (including ANILCA claims etc). Potential increases in linear miles of open roads must be compensated for with in-kind reductions in linear miles of open road or total road concurrently with, or prior to, project implementation… or new road construction or reconstruction of currently bermed or barriered roads, within the same BORZ…Temporary increases in linear miles of open or total roads are acceptable under……not open for public use, road closed immediately upon completion of activities….

C. Timber harvest activities that would occur within multiple watersheds shall be scheduled such that disturbance of grizzly bears from resulting road use is minimized.

Objectives of the proposed transmission line alternatives are associated with mine development, not vegetation management associated with timber harvest activities.

Other factors falling under Forest Service jurisdiction that can contribute to the risk of grizzly bear mortality, which are also present within the Cabinet Face BORZ, include displacement from human activity, including timber harvest (and associated road use), livestock grazing, and food attractants.

Alternative B – MMC's Transmission Line (North Miller Creek Alternative)
Access Amendment Design Elements: Under Alternative B, a total of about 0.1 mile of new road would be constructed during the Construction Phase within the Cabinet Face BORZ (Table 229). Although the road prism would remain during the Operations Phase, it would be soiled and reseeded after construction, but could be used as necessary for maintenance. New roads would be gated or barriered during construction to prevent public motorized traffic, and would remain restricted to public use until temporarily opened for mine traffic only during reclamation. The road would be temporarily opened during the Closure Phase for removing the transmission line, and then would be bladed, recontoured, and seeded. Public use on the 0.1 mile of road construction on National Forest System land in the BORZ is not proposed. In-kind compensation for the short-term increase in linear open and total road during the Construction Phase as a result of the 0.1 mile of road being constructed is not required as "… *newly constructed roads would be effectively gated and restricted to public use. Roads utilized for administrative purposes (e.g., timber hauling, monitoring, etc.) but are not open to the general public are not considered "open," and do not re-categorize linear total road miles to linear open road miles*." No permanent change to linear miles of total open roads, or linear miles of total roads would occur and Alternative B would comply with these two Access Amendment design elements for the BORZ. Alternative B would begin at Sedlak Park (outside of the BORZ) and would cross the watersheds of the Fisher River, Miller Creek, a tributary to Miller Creek, Midas Creek, Howard Creek, Libby Creek, and Ramsey Creek (Figure 41). Due to the nature of the transmission line construction, activity would not occur along the entire length of the line at any one time and activity is not expected to occur in all watersheds concurrently.

Use of a helicopter is left to the contractor's discretion, and the agencies' assumed helicopters would not be used for logging or installing poles for the Alternative B grizzly bear analysis. Grizzly bear timing restrictions on transmission line construction are proposed within the CYRZ on spring range in the Miller Creek and Midas Creek drainages as previously described and would not occur within the BORZ. Additional timing restrictions for big game preventing construction activity during the winter period could benefit grizzly bears in both the CYRZ and the BORZ.

Livestock Grazing/Attractants: Alternative B would have no impact on livestock grazing. No livestock grazing on National Forest System lands occurs in the Cabinet Face BORZ. In 2011, the KNF issued a mandatory food storage order for all National Forest System lands, which will help mitigate for some of the less favorable conditions (increasing potential for human encounters, private lands, and miles of linear open road) for grizzly bears outside of the CYRZ by minimizing food-associated attractants. The order is automatically included in all permits and contracts issued and administered by the KNF and would be required in MMC's transmission line construction contract.

Disturbance/Displacement: The point source disturbances from construction of the transmission line, including use of helicopters for line stringing, and ground-based timber harvest activities related to clearing the line inside the BORZ may temporarily displace grizzly bears from suitable habitat.

Physical habitat removal in the Cabinet Face BORZ would be negligible, while the clearing area for Alternative B would include 8 acres of grizzly bear habitat (Table 227). Helicopter use during construction may increase disturbance to grizzly bears in the BORZ, potentially displacing them from suitable habitat. Line stringing would take a week or two. Annual inspections may take about a week a year. Increased noise would occur during these times and construction activities would be generally audible for about 2.5 miles, depending on the topography. Based on the 1-mile buffer either side of the transmission line, short-term displacement effects during the Construction Phase in the BORZ as a result of helicopter use would potentially occur on 2,366 acres of grizzly bear habitat, of which 1,636 acres are currently disturbed by existing activities (Table 228). However, only a portion of these acres would likely be unavailable at any given time as activity would not occur simultaneously along the entire line. In the Cabinet Face BORZ, the clearing area for Alternative B would affect 1.2 acres of wetlands/riparian habitat providing potential grizzly bear feeding areas. Direct effects to wetlands are expected to be mostly avoided by locating transmission line facilities and roads outside of wetlands and waters of the U.S. Disturbed areas would be reseeded after transmission line construction, potentially providing additional forage habitat for grizzly bears.

MMC would be governed by the Environmental Specifications for the 230-kV transmission line (MMI 2005b) for transmission line construction, operation, maintenance, and decommissioning activities, but the Vegetation Removal or Disposal Plan, as described in the agencies' Environmental Specifications (Appendix D), does not apply to Alternative B.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative
Effects to grizzly bears in the Cabinet Face BORZ are as described under Alternative B with the exception of the following:

Access Amendment Design Elements: About 0.7 mile of new road would be constructed and 2.8 miles of existing closed road would be opened in the BORZ (Table 229). Road access changes in the BORZ included in the agencies' alternatives (see section 2.5.7, *Mitigation Plans*) prior to the Construction Phase would prevent an increase in the baseline linear miles of open and total roads, and no public use would occur on the newly constructed access roads. After the transmission line was constructed, all new roads in the BORZ would be placed in intermittent stored service, and Alternative C-R would comply with these two design elements. Alternative C-R would traverse an east-facing ridge immediately north-northwest of the Sedlak Park Substation and would cross Hunter Creek 2 miles north-northwest of the substation. After crossing Hunter Creek, the alignment would head west, crossing US 2, the Fisher River, West Fisher Creek, and NFS road #231 (Libby Creek Road). The alignment then would head northwest, up and over the ridge between West Fisher Creek and Miller Creek. The alignment would then follow an unnamed tributary of Miller Creek and then cross into the upper Midas Creek drainage, and then down into the Libby Creek drainage. Mitigation prior to the Evaluation and Construction Phases would implement road access changes to reduce disturbance of grizzly bears. Due to the nature of the transmission line construction, activity would not occur along the entire length of the line at any one time and activity is not expected to occur in all watersheds concurrently. Transmission line construction-related activity would be restricted to outside the denning or spring period, minimizing potential to displace a grizzly bear.

Livestock Grazing/Attractants: In Alternative C-R, the agencies' mitigation plan would require MMC to provide funding for fencing and electrification of garbage transfer stations in grizzly habitat in and adjacent to the CYE, including the Cabinet Face BORZ, reducing the availability of food attractants and reducing mortality risks for the grizzly bears.

Disturbance/Displacement: In Alternative C-R, 2 acres of potential grizzly bear habitat in the BORZ would be removed due to construction of access roads and 51 acres would be cleared (Table 227). The actual clearing area would likely be less, depending on tree height, slope, and line distance above the ground. In Alternative C-R, impacts to wetlands/riparian habitat providing potential grizzly bear feeding areas would be avoided. Disturbed areas would be revegetated after transmission line construction, potentially providing forage habitat for grizzly bears during the Operations Phase.

Helicopter use during construction of Alternative C-R may increase disturbance to grizzly bears in the BORZ, potentially displacing them from suitable habitat. Short-term displacement effects in the BORZ would potentially occur on 2,206 acres of grizzly bear habitat, including 1,336 acres currently disturbed by existing activities (Table 228). Within the Cabinet Face BORZ, displacement effects would be minimized through implementation of transmission line construction and helicopter timing restrictions as described above for CYRZ displacement effects, and also road access changes in the BORZ prior to activity (see section 2.5.7, *Mitigation Plans*). Transmission line construction/decommissioning activities are likely to have minimal impacts on grizzly bears because they would occur outside of the denning or spring use periods. Road access mitigation associated with the agencies' combined alternatives would reduce the linear miles of road in the BORZ and reduce displacement effects on grizzly bear spring range. Risks of increased grizzly bear mortality would be minimized by restricting the construction and decommissioning activities to the summer months when there is low likelihood of a bear occurring because activity would be spread out along the transmission line over 2 years and because of the public education and law enforcement efforts of the bear specialist and law enforcement officer.

Alternative D-R – Miller Creek Transmission Line Alternative

Effects to grizzly bears in the Cabinet Face BORZ are as described under Alternative C-R with exception of the following:

Access Amendment Design Elements: About 0.8 mile of new road would be constructed and 2.8 miles of existing closed road would be opened in the BORZ (Table 229). From the substation, the alignment would follow the same alignment as Alternative C-R until the alignment crossed the ridge between West Fisher Creek and Miller Creek (Figure 44). After departing from the Alternative C-R alignment, this alternative would follow NFS road #4724 (South Fork Miller Creek Road) to a ridge separating Miller Creek from the Standard Creek drainage. The alignment would traverse the ridge into the Howard Creek drainage. The centerline would be about 500 feet east of the northeast corner of a private land parcel about 0.5 mile south of Howard Lake (Figure 44). North of the private land, the alignment would generally parallel Howard Creek and eventually be the same as Alternative C-R.

Disturbance/Displacement: Impacts on grizzly bears in the Cabinet Face BORZ from Alternative D-R would be the same as Alternative C-R, except that the extent of Alternative D-R short-term displacement effects in the BORZ would be less, Alternative D-R would require fewer miles of new access road (Table 229), and Alternative D-R would include less clearing (45 acres) in the Cabinet Face BORZ (Table 227).

Alternative E-R – West Fisher Creek Transmission Line Alternative
Alternative E-R would not be located on National Forest System lands within the Cabinet Face BORZ, but would be located in State section S36, T27N, R30 which the State HCP considers to be located in non-recovery occupied habitat. This section is discussed below under effects to State land. From the substation, the alignment would follow the same alignment as Alternative C-R until just north of Hunter Creek (Figure 44). After departing from the Alternative C-R, this alternative would cross the Fisher River and West Fisher Creek and follow West Fisher Creek until its confluence with Standard Creek. It would follow a small tributary to West Fisher Creek and would eventually follow the same path as Alternative D-R.

Combined Mine-Transmission Line Alternatives
Effects to grizzly bears in the Cabinet Face BORZ are as described under the transmission line alternatives and summarized here.

Access Amendment Design Elements: On National Forest System lands within the Cabinet Face BORZ, none of the combined mine-transmission line alternatives would permanently increase the total linear miles of open or total roads above the baseline conditions. All of the combined action alternatives except for 3E-R and 4E-R would involve the construction of less than 1 mile of new access road in the Cabinet Face BORZ (Table 229), and any existing barriered or gated roads opened for construction would not allow public access. Road access changes in the BORZ included in the agencies' alternatives (see section 2.5.7, *Mitigation Plans*) would offset the impacts of the agencies' alternatives on linear miles of open and total roads prior to activity in the BORZ. Open and total road miles would temporarily increase during the construction period. Temporary increases in total and open linear road miles meet the design elements for BORZ direction in the Access Amendment (USDA Forest Service 2011 a, 2011b). As all newly constructed temporary access roads and barriered roads opened for construction would be barriered after construction and any gated road opened for construction would be gated after construction, no combined action alternative would result in a permanent increase in linear miles of open or total roads. All combined alternatives within the BORZ would comply with the access amendment design elements.

Livestock Grazing/Attractants: For all action alternatives, the KNF grizzly bear food storage requirements would be incorporated into the transmission line construction contract and no livestock grazing occurs or is proposed on National Forest System lands. The combined agencies' alternatives would include MMC funding for fencing and electrification of garbage transfer stations in grizzly bear habitat in and adjacent to the CYE, reducing the availability of attractants and reducing mortality risks for grizzly bears.

Disturbance/Displacement: Physical loss of potential grizzly bear habitat in the Cabinet Face BORZ would be similar for all action alternatives, ranging from 0 acres for Alternatives 3E-R and 4E-R to 2 acres for Alternatives 3C-R, 3D-R, 4C-R, and 4D-R (Table 230). In all combined action alternatives, helicopter use during line stringing, maintenance, and inspections may increase disturbance to grizzly bears, potentially displacing them from suitable habitat. The short-term displacement effects on grizzly bear habitat in the BORZ would range from 986 acres for Alternatives 3E-R and 4E-R to 2,366 acres for Alternative 2B (Table 228). New access road construction, helicopter use, and other construction activities in the BORZ would likely have minimal impacts on grizzly bears because of the agencies' alternatives timing restrictions and low likelihood of a grizzly bear occurring in the area outside of the spring season. Road access changes located in the BORZ included in the agencies' mitigation prior to the Evaluation and

Construction Phases (all or portions of NFS roads #6787B, #4776C, and #6209E) would reduce mortality risk during the spring season within the BORZ by decreasing total linear road densities on spring range. Of the total acres of habitat outside of the CYRZ affected by the transmission line, between 217 acres for Alternatives 3E-R and 4E-R and 1,626 acres for Alternative 2B are currently disturbed by existing activities (Table 228). For the agencies' alternatives, road access changes in the BORZ (see section 2.5.7, *Mitigation Plans*) would also offset displacement effects related to using the Bear Creek Road for access.

The clearing area for the combined action alternatives includes between 0 acres (Alternatives 3E-R and 4E-R) and 51 acres (Alternative 2B) in the Cabinet Face BORZ (Table 227) and (Table 230). In the agencies' alternatives within the BORZ boundary on National Forest System lands, disturbed areas would be revegetated after transmission line construction, potentially returning to forage habitat for grizzly bears. These effects were discussed in detail under the individual effects of the transmission line alternatives.

For all action alternatives, public education and law enforcement efforts of the bear specialist and law enforcement officer would minimize the risk of increased grizzly bear mortality. In addition to these two positions, the combined agencies' alternatives would include funding for a habitat conservation specialist prior to the Evaluation Phase that would focus on promoting land use decisions that would benefit bears if both the Rock Creek and Montanore projects were active concurrently.

Effects on Private and State Land Outside of the CYRZ and Outside the BORZ

No private or State trust land would be directly affected by the transmission line alternatives inside the CYRZ or BORZ boundaries. Assuming that some temporary housing facilities would be developed near the project site on private lands, food attractants may become more available in these areas. All action alternatives would include mitigation requiring funding by MMC of a bear specialist and a law enforcement officer, which would help reduce mortality risk on all ownership. Education of the public on food storage in bear habitat and increased awareness of grizzly bear behavior by the grizzly bear specialist would help prevent human/bear conflicts on private and State trust land.

Within the MFSA Transmission Line Analysis Area

Alternative B

Effects of Alternative B would be as described under the Cabinet Face BORZ except for as follows: No activity would occur on big game winter ranges during the winter and this would apply to winter ranges located on private land within the MFSA analysis area. This big game winter range restriction would not apply to the Sedlak Park Substation construction. The Sedlak Park Substation would be located on winter range on private land within the MFSA analysis area. Alternative B would remove 14 acres and clear 130 acres on private land (Table 227), including the 4 acres of habitat physically removed for construction of the Sedlak Park Substation, access road, and loop line. Actual clearing for the transmission line would likely be less, depending on tree height, slope, and line distance above the ground. Most of these lands have been logged in the past 20 to 30 years. In Alternative B, the new road prism would remain during transmission line operations but roads opened or constructed for transmission line access on private land would be gated after transmission line construction. New access roads on Plum Creek land would be reseeded after transmission line construction and gated at the landowner's discretion. With the exception of new access roads, disturbed areas would be revegetated after transmission line construction, potentially providing forage habitat for grizzly bears. Alternative B would parallel about 4.7 miles of the Fisher River and the existing road corridors of US 2, NFS road #835, and numerous Plum Creek roads would be within 1,000 feet of an open road through most of the MFSA analysis area. Within the transmission line clearing, grassland and shrub communities may remain after construction, but no Vegetation Removal or Disposition Plan was proposed by MMC. The coniferous forest community and riparian forest would take many years to re-establish after decommissioning because many species are relatively slow growing. New access roads on private land would likely be reclaimed during decommissioning, but the decision would be at the landowner's discretion. New access roads, helicopter use, and other construction activities, including construction of the Sedlak Park Substation, would likely have minimal displacement effects on grizzly bears because of the low potential for grizzly bears to occur in the immediate vicinity during construction or decommissioning activities. If a bear occurred and was moving through the area, it may change its movement pattern or avoid the area of concentrated activity. The increased activity associated with helicopter use and other activity related to construction or reclamation would be short-term, as previously described, within the BORZ. Maintenance that could occur during the Operations Phase would be less than 10 days over the entire length of the line, including the portions in the MFSA analysis area, BORZ, and Recovery Zone. Displacement effects already exist within the MFSA analysis area as road densities are currently high on private and State lands. As described previously, the public education and law enforcement efforts of the bear specialist and law enforcement officer would minimize the risk of increased grizzly bear mortality on all ownerships.

Alternatives C-R and D-R

The effects of Alternatives C-R and D-R on private land within the MFSA analysis area would be as described under the Cabinet Face BORZ and under Alternative B above except for as follows: Alternatives C-R and D-R would remove 9 acres and clear 111 acres on State and private land (Table 227). The agencies' Vegetation Removal and Disposition Plan would apply to private lands within the MFSA analysis area. The segments of Alternatives C-R and D-R that would parallel US 2 would be located upslope and out of the Fisher River riparian shrub and forest habitat. The agencies' construction schedule for transmission line construction and reclamation activity would not apply to private land within the MFSA analysis area.

Alternative E-R

Alternative E-R would include removing 8 acres and clearing 133 acres of State and private land (Table 227). The effects are as described for Alternatives C-R and D-R; however, the agencies' mitigation items for grizzly bears within the BORZ would be applied to the State section 36 T27N, R30W. See the discussion below for State trust lands.

Combined Transmission Line and Mine Alternatives

In all action alternatives within the MFSA analysis area, construction of the Sedlak Park Substation and loop line would disturb 4 acres of previously harvested coniferous forest on private land. Roads opened or constructed for transmission line access on private land would be gated after transmission line construction and reclaimed during the final Closure Phase, but the final decision of road status is the landowner's discretion. New access road construction, helicopter use, and other construction on private or State land outside of the CYRZ and the BORZ would likely have minimal impacts on grizzly bears because of the agencies' alternatives timing restrictions for big game winter range and low likelihood of a grizzly bear occurring in the area outside of the spring season. Existing road densities are high on private and State lands within the alternative transmission line corridors, which would also contribute to a lower likelihood of grizzly bears being present during the construction or decommissioning period.

The clearing area for the combined Alternatives 3E-R and 4E-R would affect 133 acres of State and private land (Table 227). On private land outside of the CYRZ and the Cabinet Face BORZ, the clearing area for the combined action alternatives includes between 10 and 27 acres of wetlands/riparian habitat providing potential grizzly bear feeding areas. The substation site and new substation access roads on private land would not be revegetated after transmission line construction.

State Trust Lands

Alternative B would not be located on or near any State trust land.

Transmission Line Alternatives C-R and D-R would cross the northeast quarter of State section 36 T27N, R30W, while Alternative E-R would be located across the section's two southern quarters. The clearing area on State trust land for the combined Alternatives 3C-R, 4C-R, 3D-R, and 4D-R would be 10 acres (Table 227), and less than 1 acre on State trust lands would be physically removed. The clearing area on State trust land for the combined Alternatives 3E-R and 4E-R would be 28 acres (Table 227), and less than 1 acre on State trust lands would be physically removed.

Impacts to grizzly bears and their habitat would be mitigated on State trust land by implementing the agencies' mitigations (Table 36), which would improve conditions for grizzly bears on all lands within and adjacent to the CYE, and by requiring applicable mitigation items to be implemented on State section 36 T27N, R30W. The agencies' mitigation plan is described in detail in the Wildlife BA (USDA Forest Service 2013a). In summary, the agencies' mitigation plan items that would also address DNRC's concern for information and education, firearm use, food storage, and sanitation to reduce mortality risk to grizzly bears on State trust land include 1) MMC would fund, develop, and implement an enhanced public outreach information and education program to build support and understanding of grizzly bear recovery in the CYE and to minimize mortality in adjacent areas (Grizzly Bear Mitigation Plan); 2) implement a wildlife awareness program for employees and contractors and prohibit MMC employees, contractors, and subcontractors when on duty from carrying firearms within the permit area boundary, feeding wildlife, and hunting within the permit area; 3) MMC would agree all mortality reduction measures would be subject to modification based on adaptive management where new information supports changes; and 4) MMC would provide funding to implement a long-term public attitude and input survey so the public Information and Outreach Program could respond to ongoing public perceptions and adapt appropriately. Other items reducing mortality risk to grizzly bears would require MMC to install and maintain fencing around the Libby Adit Site; provide funding for bear-resistant refuse containers for use at the mine and by mine personnel, as well as for the community at large and at developed campgrounds; provide funding for fencing and electrification of garbage transfer stations within grizzly bear habitat within and adjacent throughout the CYRZ; and provide funding for electric fencing kits for use at bear problem sites within and adjacent to the CYRZ. The Vegetation Removal and Disposition Plan (as specified in the Environmental Specifications (Appendix D)) developed for the agencies' alternatives would minimize tree removal and would maintain more shrub and tree cover in the transmission line right-of-way; this plan would also be implemented on State section 36. Impacts to wetland/riparian habitat providing potential grizzly bear feeding areas would be avoided, reducing road construction in riparian habitats and providing for retention of visual screening in riparian and wetland management zones where possible. Direct effects to wetlands are expected to be mostly avoided by locating transmission line facilities and roads outside of wetlands and waters of the U.S. To mitigate for helicopter displacement effects during spring use, as well as during the fall hunting season and denning period, the agencies' transmission line construction schedule for grizzly bears (construction-related activity would occur between June 16 and October 14) would also be required for the State section 36. In addition, the KNF mandatory food storage order for National Forest System lands would be included in the transmission line construction/decommissioning contract and implemented on State land. The agencies' alternatives mitigation items for grizzly bears applied to the State section affected by the transmission line alternatives would reduce potential for displacement and reduce mortality risk to grizzly bears on State lands.

Transmission Line Effects within the US 2 Linkage Zone

Due to construction or decommissioning activity related to the transmission line, grizzly bear movement in the US 2 linkage zone may be temporarily affected. The Barren Peak/Hunter Creek Approach Area (Brundin and Johnson 2008), which is included in the overall US 2 linkage zone, encompasses approximately 17,795 acres. This approach area was delineated on both sides of US 2, extends to or into the CYRZ (BMU 7), and overlaps the Cabinet Face BORZ boundary. Wildlife movement across the US 2 fracture zone occurs within the area.

Alternative B – MMC's Transmission Line (North Miller Creek Alternative)

Effects to grizzly bears within the US 2 linkage zone area are as described for Alternative B within the MFSA analysis area and BORZ except for as follows:

The eastern portion of the Alternative B transmission line alignment would occur within the US 2 linkage zone. The proximity of this alignment within the riparian area adjacent to US 2 would widen the disturbed corridor and may discourage grizzly bear movement within the US 2 linkage zone by decreasing cover. These effects would be short-term and occur twice: when the transmission line was built and when it was decommissioned. Once revegetated, cleared areas could provide forage habitat. Some shrub and tree cover would be maintained in the transmission line right-of-way because only the tallest trees would likely be removed, although vegetation removal is at the contractor's discretion. New access roads, helicopter use, and other construction activities would likely have minimal displacement effects on grizzly bears because of the low potential for grizzly bears to occur in the immediate vicinity during construction or decommissioning activities. If a bear occurred and was moving through the area, it may change its movement pattern or avoid the area of concentrated activity. The increased human activity associated with construction or reclamation would be short-term as previously described. Maintenance activities during operations are expected to last less than 10 days for the entire length of the line. Displacement effects already exist within the US 2 linkage zone as road densities are currently high on private and State lands. National Forest System lands within the linkage zone provide more secure habitat due to the lower amount of total roads.

As described previously, the public education and law enforcement efforts of the bear specialist and law enforcement officer would minimize the risk of increased grizzly bear mortality that could be associated with increased human activity associated with the transmission line construction and reclamation. The KNF food storage order would be required in Alternative B on all National Forest System lands within the linkage area affected by Alternative B. This overlap would only occur on National Forest System land within the BORZ boundary. As described above, Alternative B would have low potential to displace bear movement within the BORZ and MFSA analysis area, and the reasoning would apply to the US 2 linkage zone as well.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Effects to grizzly bears within the US 2 linkage zone area are as described for Alternative C-R within the BORZ and MFSA analysis area except for as follows:

The eastern portion of the Alternative C-R transmission line alignment would occur within the US 2 linkage zone. A relatively small segment of the Alternative C-R transmission line would cross the Fisher River valley, potentially temporarily discouraging grizzly bear movement in a localized area due to transmission line construction activities. These effects would be short-term and occur twice: when the transmission line was built and when it was decommissioned. Once revegetated, cleared areas could provide additional forage habitat. Some shrub and tree cover would be maintained in the transmission line right-of-way because of the Vegetation Removal and Disposition Plan (Appendix D) to minimize vegetation removal. The segment of Alternative C-R that would parallel US 2 would be located upslope and out of the Fisher River valley, and would reduce effects to riparian habitat that bears may use during movement across the US 2 fracture zone. Due to mitigation efforts to minimize the removal of vegetation, greater amounts of cover for movement or forage habitat would likely be retained within the transmission line clearing compared to Alternative B.

New access roads, helicopter use, and other construction activities would likely have minimal displacement effects on grizzly bears because of the timing restricting activities outside of the spring period when use is more likely to occur, and outside of the fall hunting season and denning period, and the low potential for grizzly bears to occur in the immediate vicinity during construction or decommissioning activities. If a bear occurred and was moving through the area, it may change its movement pattern or avoid the area of concentrated activity. The increased human activity associated with construction, maintenance, or reclamation would be short-term as previously described. Displacement effects already exist within the US 2 linkage zone as road densities are currently high on private and State lands. National Forest System lands within the linkage zone provide more secure habitat due to the lower amount of total roads.

Mitigation for displacement consisting of land acquisition that could occur outside of the CYRZ may further reduce the effect of potential displacement and maintain or improve the ability of grizzly bears to move through the US 2 linkage zone.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts of Alternative D-R on grizzly bears in the US 2 linkage zone in the Fisher River valley would be the same as Alternative C-R. Mitigation for impacts of Alternative D-R to grizzly bears would be the same as previously described for Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Impacts of Alternative E-R on grizzly bears in the US 2 linkage zone in the Fisher River valley would be the same as Alternative C-R. Mitigation for impacts of Alternative E-R to grizzly bears would be the same as previously described for Alternative C-R.

Combined Mine-Transmission Line Effects

For all combined action alternatives, the eastern segment of the transmission line corridors would occur within the US 2 linkage zone. The effects and mitigation of the combined mine-transmission lines are as previously described under the individual transmission lines.

Cumulative Effects

The "Affected Environment" section describes relevant past and present factors affecting the existing habitat conditions in BMUs 2, 5, and 6. This "Cumulative Effects" section summarizes past actions as well as further describes ongoing and reasonably foreseeable activities potentially impacting grizzly bear habitat and mortality.

As described under the "Analysis Methods" section for the bounds of analysis, the cumulative effects analysis considers the directly affected BMUs 2, 5, and 6. In addition BMUs 1, 4, 7, 8, and 22 are considered. These BMUs are the appropriate scale for grizzly bear cumulative effects analysis. Detailed description of past, present and reasonably foreseeable management activities found within the Montanore Project analysis area PSUs (Crazy and Silverfish) are found in Appendix E. This list includes actions found within the directly affected BMUs 2, 5, and 6. Actions within BMUs 2, 5, and 6 may affect grizzly bear movement through the north-south corridor. Actions discussed in this cumulative effects analysis for BMUs 1, 4, 7, 8, and 22 extend outside of the Crazy and Silverfish PSUs and are relevant due to their potential effects to grizzly bear habitat parameters within the south Cabinets, which may cumulatively affect grizzly bear movement through the north-south corridor and BMUs 2, 5, and 6.

Limiting the assessment of cumulative effects to the southern half of the CYRZ is appropriate. The Cabinet Mountain portion lies south of the Yaak River drainage and contains about 60 percent of the Recovery Zone. Presently, there has been limited movement of native bears between the Cabinet Mountains and Yaak portions of the CYE. The number of bears in the south Cabinet portion is not considered dense enough to create sufficient pressure to push bears north to the Yaak portion (W. Kasworm, pers. comm. 2010). One sub-adult male has crossed the Kootenai River moving from the Yaak to the Cabinets and then returned to the Yaak (Kasworm *et al.* 2013c). In summary, the Cabinet Mountains south portion of the CYE is the appropriate scale for cumulative effects as 1) the BMUs are biologically meaningful to grizzly bears; 2) provide consistent boundaries for management and monitoring; 3) allows for analysis without minimizing activity effects; 4) considers activities within the directly affected BMUs and the remaining BMUS in the south Cabinets and considers how movement of grizzly bears may be cumulatively affected; and 5) cumulatively determines the conditions of OMRD, TMRD, and core, and if sufficient core would remain available for displacement or dispersal in the south Cabinets. The evaluation of the south Cabinets as a whole, instead of the directly affected BMUs, is necessary to adequately address the potential cumulative effects of two large-scale mining developments (Montanore Project and the Rock Creek Project) and the potential for increased constriction in the north-south corridor and restriction of bear movement within the south Cabinets. Therefore, BMUs 1, 2, 4, 5, 6, 7, 8, and 22 were considered the appropriate scale for cumulative effects in the Recovery Zone. The Cabinet Face BORZ was considered for cumulative effects outside the Recovery Zone. The DEQ MFSA analysis area for private land and cumulative effects to private land outside of the CYRZ and outside of the BORZ remains the 1-mile buffer either side of the transmission line.

Past Actions: The primary measure of habitat availability and quality is related to the density and juxtaposition of open and total roads on the landscape. Table 222 of the grizzly analysis summarizes the existing condition in the directly affected BMUs based on the effects of motorized access management, including past road construction, decommissioning, storage, and gating or barriering of roads, as they relate to grizzly bear habitat parameters of core, OMRD, and TMRD. Roads constructed in association with timber harvest, mining, and other development have cumulatively reduced grizzly bear core areas. Timber harvest has occurred in these BMUs since the 1950s and has provided a variety of successional stages across the area. In some cases, previous post-harvest site treatment provided habitat conditions favorable for huckleberry production and other forage for grizzly bears and big game. Harvest units more than 15 years old generally provide hiding cover for these species. Historically, wildfire resulted in a mosaic of habitats and successional stages providing both forage opportunities and cover to grizzly bears. Fire suppression beginning in the early 1900s has resulted in the encroachment of conifers into foraging habitat and aging of shrub habitat, which in turn reduced huckleberry and other berry production on some sites. The 1910 fires influenced large acreages in the analysis area, resulting in even-aged and dense stands. Numerous small lode mining and placer operations on federal or patented lands have existed since the early 1900s, resulting in small pockets of human activity within the Cabinet Mountain portion of the Recovery Zone. Human activities affecting grizzly bear habitat have changed since the 1980s. Open road densities have decreased as a result of restricting roads to motorized traffic, or reclaiming them, through decisions intended to facilitate grizzly bear recovery. Since implementation of the KNF 1987 KFP and beginning in the 1990s, more intermediate harvest has occurred, which provided for both foraging and cover in closer juxtaposition. Other past activities on federal land include precommercial thinning in harvest units, herbicide spraying, prescribed burning, and road development and maintenance. The Crazy and Silverfish PSUs overlap the directly affected BMUs and have had mineral development since the 1800s, which has resulted in patented land being within the CMW and BMUs and motorized access to these lands. Development of private lands within the analysis area, including commercial timber harvest, land clearing, home construction, and road construction, has contributed to increased disturbance of grizzly bears, loss or reduction in quality of grizzly bear habitat, and increased human/grizzly bear conflicts.

Alternative 1A – No Mine or Transmission Line Combined Alternative

The no mine or transmission line alternative would not directly contribute to any cumulative effects. Without construction of the mine or transmission line, vegetation succession in those areas and across the action area would continue. Both timbered stands and open areas with encroaching tree regeneration or brush buildup would result in a decline in the availability and productivity of forage species over time as well as potential for increased severe fire behavior.

The KNF would be responsible to bring those BMUs not meeting grizzly bear habitat parameter standards under its jurisdiction into compliance within the timeframes specified by the Access Amendment. The Montanore Project was identified as a tentative plan to meet standards in the Access Amendment Compliance Strategy for BMUs 5, 6, and 7. Under the no action alternatives, compliance with the 2011 Access Amendment individual numerical habitat parameter standards in these BMUs would occur under a different management strategy. Current BMUs in the south Cabinets not meeting standards are BMUs 4, 5, 6, 8, and 22.

Ongoing and Reasonably Foreseeable Actions and Combined Mine-Transmission Line Alternatives

For BMUs 1, 4, 7, 8, and 22, also considered for cumulative effects and within the Cabinet Mountain portion of the SCYE, the Access Amendment (USDA Forest Service 2011a, 2011b) provided estimated timelines for KNF compliance for habitat parameter standards. In BMU 4, compliance is by the end of 2019 and in BMU 8, by the end of 2014. BMU 7 is currently in compliance. The Lolo National Forest estimated bringing BMU 22 into compliance by the end of 2019. Of these BMUs, two have lower OMRDs than that reportedly used by grizzly bears in the CYE (Wakkinen and Kasworm 1997). OMRDs in BMU 4 (38 percent) are higher than the average reportedly being used by grizzlies in the CYE (33 percent), in part due to the presence of MT 200 along the unit’s southern boundary and MT 56, which bisects the unit. TMRDs in the action area are likewise near or lower than the average reportedly being used by grizzlies in the CYE (26 percent) (Ibid). BMUs 4 (29 percent) and 22 (37 percent) have higher TMRDs than that reported as used by grizzly bears in the CYE. BMU 4 is higher than the CYE research average (26 percent). The density in BMU 4 is due in part to MT 200 running along its southern boundary and MT 56 bisects the BMU. BMUs not meeting habitat parameter standards would provide lower quality habitat than researchers found being used by female grizzly bears.

Road access changes included in the agencies’ alternatives would serve to mitigate cumulative displacement effects, providing 4,588 acres of grizzly bear core habitat in BMU 5 and 2,144 acres in BMU 6 (Table 232). The proposed agencies’ combined mine-transmission line alternatives create core prior to activity phases, and core areas serve to partially mitigate for the displacement impacts of the proposed activities and cumulative effects of reasonably foreseeable actions. Both the existing and resulting levels of secure core and the seasonal habitats contained within them would provide essential and available habitat for grizzly bears in BMUs 2, 5, and 6. Core areas of substantial sizes are also provided in the surrounding BMUs of 4, 7, 8, and 22 (Table 234).

The effects shown in Table 234 do not reflect potential improvements to grizzly bear baseline habitat parameters that would result from required land acquisitions associated with mitigation for the combined action alternatives, or the Rock Creek Project, a reasonably foreseeable action.

Table 234. Cumulative Effects on Grizzly Bear Habitat Parameters in the South Cabinet-Yaak Ecosystem by Combined Mine-Transmission Line Alternative.

Habitat Parameter and Standard (%)	Existing Conditions	No Action Alternative[1]		[Alt 2] MMC's Proposed Mine TL-B[2]		
		C/O	R	C	O	R
BMU 1						
Core (80%)	83	81	83	81	81	83
OMRD (15%)	14	**18**	14	**18**	**18**	14
TMRD (15%)	8	11	9	11	11	9
BMU 2						
Core (75%)	76	77	77	77	77	77
OMRD (20%)	20	19	19	19	19	19
TMRD (18%)	16	13	13	13	13	13
BMU 4						
Core (63%)	62	**62**	**62**	**62**	**62**	62
OMRD (36%)	37	36	36	36	36	36
TMRD (26%)	**29**	**29**	**29**	**29**	**29**	**29**
BMU 5						
Core (60%)	**58**	60	**58**	**57**	**57**	**58**
OMRD (30%)	28	27	28	**31**	30	27
TMRD (23%)	23	23	23	**26**	**26**	22
BMU 6						
Core (55%)	**54**	**53/53**	55	**52**	**52**	**53**
OMRD (34%)	29	**36/36**	**27**	**37**	**36**	27
TMRD (32%)	**33**	**35/35**	**33**	**36**	**36**	**36**
BMU 7						
Core (63%)	**62**	63/63	63	63	63	63
OMRD (26%)	**32**	25/26	25	25	26	25
TMRD (23%)	23	23/23	23	23	23	23
BMU 8						
Core (55%)	55	55	55	55	55	55
OMRD (32%)	**33**	**33**	**33**	**33**	**33**	**33**
TMRD (21%)	**24**	**22**	**22**	**22**	**22**	**22**
BMU 22						
Core (55%)	**51**	**51**	**54**	**51**	**51**	**54**
OMRD (33%)	**38**	**38**	**38**	**38**	**38**	**38**
TMRD (35%)	**37**	34	34	34	34	34

Bolded values do not meet Access Amendment standards.
BMUs directly affected (physical ground-disturbing activities) by the Montanore combined action alternatives (BMUs 2, 5, and 6) are shaded.
[1]Displays effects of the Miller-West Fisher Project Phase 1/Phase 2 in BMUs 6 and 7, in addition to the other reasonably foreseeable activities in each BMU.
[2]Includes effects of the Miller-West Fisher Project Phase 1 in BMU 6.
[3]Includes effects of the Miller-West Fisher Project Phase 1/Phase 2 in BMU 6.
TL = Transmission Line Alternative.
C = Construction Phase – shown with mitigation in place as mitigation plan requires this before start of Construction Phase.
O = Operations Phase – includes all mitigation in place.
R = Closure Phase (post-project) – includes all mitigation in place. Effects to grizzly bear habitat as reclamation activities are implemented were considered to be the same as the Construction Phase, and are not displayed.
BMU = Bear Management Unit; OMRD = open motorized route density; TMRD = total motorized route density.

Table 234. Cumulative Effects on Grizzly Bear Habitat Parameters in the South Cabinet-Yaak Ecosystem by Combined Mine-Transmission Line Alternative. (continued)

Habitat Parameter and Standard (%)	Existing Condi-tions	[Alt 3] Agency Mitigated Poorman Impoundment Alternative									[Alt 4] Agency Mitigated Little Cherry Creek Impoundment Alternative								
		TL-C-R[2]			TL-D-R[3]			TL-E-R[3]			TL-C-R[2]			TL-D-R[3]			TL-E-R[3]		
		C	O	R	C	O	R	C	O	R	C	O	R	C	O	R	C	O	R
BMU 1																			
Core (80%)	83	81	81	83	81	81	83	81	81	83	81	81	83	81	81	83	81	81	83
OMRD (15%)	14	**18**	**18**	14	**18**	**18**	14	**18**	**18**	14	**18**	**18**	14	**18**	**18**	14	**18**	**18**	14
TMRD (15%)	8	11	11	9	11	11	9	11	11	9	11	11	0	11	11	9	11	11	11
BMU 2																			
Core (75%)	76	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
OMRD (20%)	20	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
TMRD (18%)	16	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
BMU 4																			
Core (63%)	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**	**62**
OMRD (36%)	**37**	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
TMRD (26%)	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
BMU 5																			
Core (60%)	**58**	66	66	65	66	66	65	66	66	65	66	66	66	66	66	65	66	66	65
OMRD (30%)	28	27	28	27	27	27	27	27	27	27	27	27	26	27	27	26	26	27	26
TMRD (23%)	23	19	19	18	20	19	18	20	19	18	19	19	18	19	19	18	19	19	18
BMU 6																			
Core (55%)	**54**	**54**	**54**	56	**54**/55	**54**/55	56	**54**/55	**54**/55	56	**54**	**54**	**54**	**54**/55	**54**/55	56	**54**/55	**54**/55	56
OMRD (34%)	29	**36**	**36**	27	**36/36**	**36/36**	27	**36/36**	**36/36**	29	**36**	**36**	27	**36/36**	**36/36**	26	**36/36**	**36/36**	27
TMRD (32%)	**33**	**34**	**34**	32	**35/35**	**34/35**	32	**34/35**	**34/35**	32	**34**	**34**	32	**35/35**	**34/34**	32	**34/35**	**34/35**	32
BMU 7																			
Core (63%)	**62**	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
OMRD (26%)	32	25	26	25	25	26	25	25	26	25	25	26	25	25	26	25	25	26	25
TMRD (23%)	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
BMU 8																			
Core (55%)	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
OMRD (32%)	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**
TMRD (21%)	**24**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
BMU 22																			
Core (55%)	**51**	**51**	**51**	**54**	**51**	**51**	**54**	**51**	**51**	**54**	**51**	**51**	**54**	**51**	**51**	**54**	**51**	**51**	**54**
OMRD (33%)	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**
TMRD (35%)	**37**	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34

See p. 1315 for footnotes.

Inside Recovery Zone

Combined Mine-Transmission Line Alternatives

Reasonably foreseeable actions include those federal, State, or private activities that are ongoing or scheduled to occur within the next five years, independent of this federal action. Appendix E identified those current and reasonably foreseeable actions in the directly affected BMUs that were determined to be appropriate for inclusion in the cumulative analysis of environmental effects. This cumulative effects analysis also discusses additional actions relative to grizzly bears in the remaining BMUs within the south Cabinet Mountains.

Road use and access information is available for the current and reasonably foreseeable Bear Lakes blasting, Wayup Mine/Fourth of July Road Access Project, Plum Creek activities, the Rock Creek Project, and Phase 1 and Phase 2 of the Miller-West Fisher Vegetation Management Project. The cumulative effects of the mine and transmission line alternatives on percent core habitat, OMRD, and TMRD in BMUs 2, 5, and 6 are shown in the shaded rows in Table 234. Cumulatively, these projects, including the Miller-West Fisher Project, may be completed before the Proposed Action and, as such, the impact on habitat parameters may be less than displayed in Table 234 for the cumulative action alternatives. It should also be noted that habitat parameters that cumulatively exceed or are worse than standards for the agencies’ alternatives during the Construction or Operations Phases would only occur for the time the activities would actually be concurrent with the action alternatives. As the life of the mine would be approximately 30 years, and a timber sale would be likely be completed in 3 to 5 years, actual habitat parameters would be better than shown. In addition, as previously described, the habitat parameters displayed do not reflect improvements in the baseline OMRD, TMRD, and core that are expected due to either the Rock Creek Project or combined action alternatives habitat compensation mitigation.

Federal Actions on National Forest System Lands: Basic road maintenance, precommercial thinning, mushroom picking, prescribed burning, timber hauling, wildlife habitat improvement projects, and various recreational uses have occurred and would continue to occur within the analysis area. These activities are generally not considered to have cumulative adverse impacts on the grizzly bear due to the use being concentrated along existing open roads.

Additional reasonably foreseeable actions would contribute to additional changes to grizzly bear habitat parameters of OMRD, TMRD, and core due to road access changes. Within BMUs 5 and BMU 6, access to reasonably foreseeable projects and private land parcels could open roads within the north-south corridor. Open roads within the north-south corridor pose displacement and mortality risks to bears attempting to move north or south through the ecosystem. These roads also cross spring habitat and early-season huckleberry habitat, and any displacement resulting from these open roads would displace bears during sensitive times (USFWS 2014a).

Within BMU 1, reasonably foreseeable actions include the Flower Creek Vegetation Management Project and the Sparring Bull Project. The Flower Creek Project includes vegetation treatment as well as road storage and temporary trail construction. The Sparring Bull Project includes vegetation treatment and road storage. BMU 1 meets or is better than its OMRD, TMRD, and core standard. Cumulatively, BMU 1 would comply with the Access Amendment design elements and standards, as shown under the Sparring Bull analysis. Analysis for the Flower Creek Project is ongoing.

Within BMU 2, reasonably foreseeable actions include the Paulson Access on Prospect Hill. This project includes storing almost 7 miles of road, gating 1.4 miles, and constructing and reconstructing almost 1 mile of road. The project permits the property owner to construct approximately 1 mile of road on National Forest System land, with permanent year-round vehicle access permitted to the landowner. Road storage implemented prior to road construction would compensate for core lost prior to activity, and would increase core habitat overall, while overall OMRD and TMRD would decrease associated with the No Action Alternative. Cumulative OMRD, TMRD, and core percentages in BMU 2 would not be measurably affected by the action alternatives. The agencies' alternatives mitigation prior to activity would slightly decrease the linear miles of total road and increase the acreage of core, but would not change the percentages. BMU 2 meets or is better than its habitat parameter standards and cumulatively would maintain these levels during all phases of the action alternatives.

Within BMU 4, the Rock Creek Project is reasonably foreseeable. This project is a proposed underground copper and silver mine and mill/concentrator complex near Noxon, Montana, and would occur across the Cabinet Mountains from the proposed Montanore Project mine development in BMU 5. Project mitigation for grizzly bears would include the acquisition of land or perpetual conservation easements of 2,350 acres of replacement grizzly habitat, with 53 acres acquired prior to the Evaluation Phase, 1,721 acres prior to mine construction, 10 acres prior to the air-intake ventilation adit, and 566 acres prior to mine operation. An additional 100 acres would also be secured or protected by Rock Creek Resources. Road access changes associated with the Rock Creek Project include a berm or barrier on portions of NFS road #4784 in BMU 5 prior to the evaluation adit construction, barriers on portions of NFS roads #2285 and 2741X, and gates on portions of NFS roads #2741A and #150. In addition, a grizzly bear specialist and law enforcement officer would be hired and six female grizzlies would be augmented into the south Cabinet Mountains, with augmentation already completed. BMU 4 core and TMRD are worse than the standard, but road access changes associated with the Rock Creek Project will decrease OMRD to meet the standard. The levels of core, OMRD, and TMRD shown in Table 234 do not reflect the habitat compensation required for the Rock Creek Project, which would likely result in the BMU meeting its standards. Cumulatively, the Montanore combined action alternatives may also affect BMU 4, though its mitigation requiring habitat compensation also would result in improvement to the baseline and would provide more secure habitat for grizzly bears.

Within BMU 5, reasonably foreseeable actions include the Rock Creek Project mitigation and the Libby Creek Ventures drilling. Rock Creek Project road access mitigation on the Upper Bear Creek Road #4784 would decrease OMRD and TMRD and increase core to meet the BMU standard, providing more secure habitat for grizzly bears. In the agencies' alternatives, road access changes associated with mitigation would be implemented before project activities affecting core habitat and road densities. Mitigation implemented before the Evaluation and Construction Phases would contribute to the cumulative improvement of OMRD, TMRD and core in BMU 5, where the majority of impacts would occur. Alternative 2B would cumulatively increase OMRD and TMRD and decrease core in BMU 5 to worse than Access Amendment standards during construction and operations, and would cumulatively decrease OMRD and TMRD, and return core to the existing condition which does not meet standard post-reclamation. As a result of road access mitigation, the agencies' alternatives core would be greater than the standard, and OMRDs in BMU 5 would be at or below existing levels during construction and operations. The agencies' alternatives, in combination with other reasonably foreseeable actions, would cumulatively decrease TMRD in BMU 5 during all phases of the proposed projects.

During reclamation OMRD and TMRD would cumulatively decrease due to mitigation of other reasonably foreseeable actions and the action alternatives. Core would also cumulatively decrease due to the end of the Rock Creek Project mitigation on the Upper Bear Creek Road, but cumulatively would remain better than the standard during all phases of the agencies' action alternatives. A reduction in security for grizzly bears could occur within the north-south corridor if human use on the Rock Creek or St Paul trails increased to levels that displace grizzly bears and contribute to fragmentation of the north to -south corridor, or result in a corresponding increase in human food and attractants made available to bears (Rock Creek Biological Opinion 2006, p. A-71, USFWS 2006). Should the Rock Creek Project proceed, the Rock Creek Project mitigation plan specifically incorporated monitoring of the Rock Creek Trail 150A and other trails with potential for high recreation use, such as the St. Paul Lake Trail 646, and requires modification to prevent high use, such as utilizing permits to maintain low levels of recreational access.

Within BMU 6, reasonably foreseeable actions include the Bear Lakes Blasting, Wayup Fourth of July Mine Access (Skranak), Miller-West Fisher Vegetation Management Project Phases 1 and 2, and Plum Creek harvest activities. Within BMU 6, use of existing barriered or closed roads, or construction of temporary roads associated with projects such as the Miller-West Fisher Vegetation Project and Skranak Wayup Mine Access would result in changes to OMRD and TMRD as shown for the No Action Alternative (Table 234). In BMU 6, the Miller-West Fisher Vegetation Project would increase OMRD to 31 percent in Phase 1 and to 32 percent in Phase 2. Post-MWF, OMRD would return to pre-project conditions, and as the BMU standard is no more than 34 percent OMRD, the MWF Project would comply with the BMU standard in all phases. The Miller-West Fisher Project by itself will increase TMRD to 34 percent in Phase 1 and 35 percent in Phase 2. Post-project Miller-West Fisher will drop TMRD to 32 percent to meet Access Amendment standards. The Miller-West Fisher Project maintains the percent core through both Phase 1 and Phase 2. The additional 3-percent increase in OMRD to 36 percent, TMRD increase to 35 percent, and additional decrease in core (all worse than the BMU standard during both phases of the Miller-West Fisher Project as shown in the No Action Alternative) would result from the additional road access and road construction associated with the Skranak Wayup Mine Project (NFS road #6748) as well as Plum Creek harvest activities (only affecting OMRD). In the agencies' alternatives, road access changes associated with mitigation would be implemented before project activities affecting core habitat and road densities. Construction and operations of all action alternatives, in combination with other reasonably foreseeable actions, would increase TMRD in BMU 6 above existing levels, which does not meet the standard and would increase OMRD above the standard. Cumulative core would be maintained at the existing level, which does not meet the standards when concurrent with the Miller-West Fisher Project Phase 1, while core would increase to 55 percent during operations for all agency alternatives except for 3C-R and 4C-R. In the agencies' alternatives, OMRD, TMRD, and core in BMU 6 after reclamation would meet Access Amendment standards due to the combined effects of mitigation measures implemented for the agencies' alternatives and other reasonably foreseeable actions, while Alternative 2B would not meet the standards.

BMUs 2, 5, and 6

Near the proposed combined action alternatives, the ecosystem narrows to approximately 15 miles, its narrowest portion. Human development on the east and west slopes impacts the north-south movement corridor for grizzly bears in BMUs 2, 5, and 6. The Wildlife BA delineated this north-south movement corridor and existing and potential sites that, if developed, may constrict the corridor and impair movement of bears through the area (USDA Forest Service 2013a Figures 9-12). Distances between existing or potential sites of high human use could be less than 2 miles in some cases and when displacement distances are considered, it could be less than 1 mile. This corridor is critical as it links grizzly bear habitat in the southern Cabinet Mountains, specifically BMUs 7, 8, and 22, with habitat in the Cabinet Mountains BMUs to the north.

Unmitigated, the disturbance and displacement of grizzly bears from the proposed combined action alternatives and existing roads on the east side of the Cabinet Mountains could reduce the safe movement and/or inhibit movement of bears traveling north and south along the Cabinet Mountains. The effects of the reasonably foreseeable Rock Creek Project, when added to existing roads occurring on the east side of the divide, would contribute to high levels of human disturbance within BMUs 4, 5, and 6. Although it would not constitute a complete barrier to movement, the disturbance could evoke avoidance behavior by some bears and reduce use of the north-south movement corridor by inhibiting movement west of the divide. Unmitigated, the disturbances associated with the Rock Creek Project and other reasonably foreseeable actions and the combined action alternatives, occurring on both sides of the Cabinet Mountain divide, could impede grizzly bear movement to and from the south, impacting BMUs 6, 7, 8, and 22. Some grizzly bears could move into areas of increased human activity and face increased mortality risk. Grizzly bears using BMUs 2, 5, and 6 may be compelled to change traditional movement patterns and behaviors. However, the effects of the reasonably foreseeable Rock Creek Project are mitigated as are the effects of the combined action alternatives, although the mitigation plan for the agencies' combined alternatives would be more effective.

Surface impacts and complete removal of habitat from reasonably foreseeable actions in BMU 5 would be minimal as the reasonably foreseeable Libby Creek Ventures would disturb about 1 acre due to drilling. Cumulatively, the greatest impact on removal of grizzly bear habitat would result from the action alternatives.

In BMU 6, the combined mine-transmission line alternatives would clear vegetation within the transmission line clearing area but some level of vegetation in the form of low shrubs and low trees is expected to remain. More vegetation in the cleared area would remain under the agencies' combined alternatives due to the Vegetation Removal and Deposition Plan. Movement patterns through BMU 6 may change during the short-term displacement effects caused by construction and reclamation activities, and cumulatively the transmission lines located in BMU 6 would not contribute to cumulative decreases or changes in grizzly bear movement. The combined action alternatives, in combination with reasonably foreseeable actions, would result in cumulative disturbance to grizzly bears during spring. The Miller-West Fisher Project also would occur in grizzly bear spring habitat. Compared to Alternative 2B, more effective timing restrictions for transmission line construction and reclamation would be implemented by the agencies' combined alternatives to minimize displacement effects on denning and spring range.

The combined action alternatives, in combination with reasonably foreseeable actions such as the Rock Creek, Miller-West Fisher, Skranak Wayup Mine, and Libby Creek Ventures projects, could disrupt bear movement in the north-south movement corridor and along riparian corridors. The agencies' combined alternatives mitigation plan would require yearlong closures that would improve grizzly bear habitat. This would include restricting the upper segment of NFS road #150A/Trail 935 with an earthen berm (in conjunction with transfer of MMC's 5-acre parcel at Rock Creek Meadows to the Forest Service included in the habitat compensation requirements). Combined, these two actions would increase the width of secure habitat between disturbances associated with the Montanore Mine Project and the Rock Creek Project and would reduce displacement and fragmentation within the north-south corridor. Additional road closures in Poorman Creek (NFS road #2317) and Ramsey Creek (NFS road #4781) would also contribute to reducing fragmentation in the corridor. The Rock Creek Project mitigation on the Upper Bear Creek Road (NFS road #4784) would close the road with an earthen barrier for the life of the mine. The agencies' action alternatives would only barrier the Upper Bear Creek Road if the Rock Creek Project had not yet done so. All of these road closures would contribute to a significant improvement in grizzly bear habitat within BMU 5 and the larger north-south corridor.

If activities associated with the Miller-West Fisher Project and construction of the combined action alternatives occurred concurrently, grizzly bear movement may be particularly affected in either the Miller Creek or West Fisher Creek corridor, depending on the alternative. Road access changes associated with the agencies' combined alternatives would increase core, provide more secure areas for movement, and further reduce cumulative impacts on grizzly bears in the Miller Creek area by installing an earthen berm on the North Fork Miller Creek Road (NFS road #4725) and in the West Fisher Creek drainage by installing an earthen berm on the Standard Creek Road (NFS road #6745).

Land acquisition associated with mitigation for the combined action alternatives and the reasonably foreseeable Rock Creek Project would be implemented prior to activity of the associated phase of the mine. The amount of land acquisition or conservation easement in perpetuity would vary by combined action alternative for either habitat physically lost or for displacement effects, but all action alternatives and the reasonably foreseeable Rock Creek Project habitat compensation mitigation would reduce displacement and mortality risk by reducing fragmentation and improving the north-south corridor connectivity and mitigate for effects of the mine prior to the Evaluation and Construction Phases. Habitat replacement for displacement effects would offset mine displacement effects on areas affected by increased long-term and high-intensity disturbances associated with mine development (including the impoundment, adits, facilities, conveyer belt system, and access roads). Habitat compensation or replacement mitigation would also result in improved baseline habitat parameters of OMRD, TMRD, and core. Land acquisition included in the combined action alternatives, especially the agencies' alternatives, are designed to offset cumulative impacts on bear movement through additional road access changes, and elimination of sources of grizzly bear disturbance.

The combined action alternatives, in combination with other reasonably foreseeable actions, may increase mortality risk due to the influx of employees and vehicles into the analysis area. The combined agencies' alternatives and the reasonably foreseeable Rock Creek Project would include measures to counteract the increased risk of grizzly bear mortality, such as busing employees to the project site, educating employees about the biology and behavior of grizzly bears, and equipping project sites and surrounding areas with bear-resistant garbage containers. The new law enforcement and bear specialist positions included in the combined action alternatives and the Rock Creek Project would help reduce the risk of illegal killing of grizzly bears in the area, increase public awareness, and help increase acceptance and support of grizzly bear management across the CYE and adjacent BORZ, not just in the directly affected BMUs. The combined agencies' alternatives would include funding for a habitat conservation biologist who would focus on promoting land use decisions that would benefit bears.

Public Actions on Forest Service Land

With population growth and development on private lands independent and related to the combined action alternatives, it is reasonable to assume some level of corresponding increase in human use of National Forest System lands is likely to occur. As a result, bears may experience increased intensity or duration of human-related disturbance in proximity to roads, or increased recreational use. As described previously, any increase in mortality risk and potential cumulative effects to grizzly bears by public actions on Forest Service lands within the Cabinet Yaak Ecosystem and Cabinet Face BORZ would be addressed by the combined action alternatives mitigation plans. These were previously described under *Actions on Forest Service Lands*.

Actions on Private Land

As noted in section 3.18, *Social/Economics*, population growth in the area is converting areas of private land from timber or agricultural production and open space use into residential subdivisions and ranchettes, increasing the potential for additional food attractants and human/grizzly bear conflicts. Anticipated effects could include species displacement, habitat alteration, and or habitat loss. The agencies' action alternatives would include mitigation to reduce attractants and mortality risk on all ownerships within and adjacent to the Cabinet Yaak CYRZ as well as throughout the local communities.

Actions Outside CYRZ and BORZ on Private and State Lands, and all Lands within the US 2 Linkage Area

On National Forest System lands, none of the reasonably foreseeable actions or the combined action alternatives would change the baseline miles of open and total roads as established in the Access Amendment. No livestock grazing occurs or is proposed. The KNF mandatory food storage order in addition to actions included in the agencies' mitigation plans would minimize food attractants and any associated mortality risk on National Forest System land within the Cabinet Face BORZ.

The combined action alternatives, in combination with reasonably foreseeable actions, may increase displacement effects due to increased traffic and human activity along Bear Creek Road. Displacement effects along the access road were accounted for within the 0.5-mile road buffer used in the displacement analysis (ERO Resources Corp. 2015). In addition, cumulative activity may increase temporary housing facilities developed on private lands, potentially resulting in a cumulative increase in the availability of food attractants and human/grizzly bear conflicts, as well as the miles of total and open roads on private land. The combined agencies' alternatives mitigations would include MMC funding for fencing and electrification of garbage transfer stations in grizzly bear habitat in and adjacent to the CYE, reducing the availability of attractants and reducing mortality risks for the grizzly bears. The bear specialist included in the combined action alternatives would help prevent human/bear conflicts by educating the public on food storage in bear habitat and increasing awareness of grizzly bear behavior. In addition to the new positions funded by MMC, the combined agencies' alternatives would include funding for a habitat conservation specialist who would focus on promoting land use decisions that would benefit bears.

As discussed in section 3.18, *Social/Economics*, many areas of private land are being converted from timber or agricultural production and open space use into residential subdivisions and ranchettes. The combined action alternatives, in combination with increased development of private land, could contribute to disturbance of grizzly bears on private land. However, private land outside of the CYRZ and BORZ is infrequently used by grizzly bears, and the area currently has high road densities. The low potential to displace a grizzly bear from disturbance associated with the transmission line construction and decommissioning of the combined action alternatives is also a factor of the short-term and temporary nature of these activities that for the majority of the private land would occur outside of the spring and denning periods due to winter range restrictions in Alternative B. The agencies' alternatives would include a big game winter range restriction with no transmission line construction or decommissioning in big game winter range (December 1 through April 30) unless a waiver was approved by the agencies. This big game winter range activity waiver, however, would not occur on those lands where required grizzly bear transmission line timing mitigation would be implemented (all National Forest System lands in the CYRZ and BORZ, and State trust lands). Construction of the Sedlak Park Substation would be exempt from these timing mitigations. The cumulative impacts of the combined action alternatives on private land outside the CYRZ and outside the Cabinet Face BORZ would likely be minimal.

Other reasonably foreseeable actions, especially increased development on private land, would affect grizzly bear use of the US 2 linkage zone. For all combined action alternatives, the eastern segment of the transmission line corridor would occur within the US 2 linkage zone. Relatively small segments of all alternative transmission line corridors would cross the Fisher River valley, potentially discouraging grizzly bear movement in a localized area due to transmission line construction activities. These effects would be short-term and occur twice: when the transmission line was built and when it was decommissioned. Contributions of the action alternatives to cumulative effects on the US 2 linkage zone would likely be minimal because of the short-term nature of transmission line disturbance and because the US 2 linkage zone potentially affected by the combined action alternatives is generally heavily roaded and has been logged in the past 20 to 30 years.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Mineral Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest System surface resources; comply with applicable state and federal water quality standards including the Clean Water Act; take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations; and construct and maintain all roads so as to assure adequate drainage and to minimize or, where practicable, eliminate damage to soil, water, and other resource values.

Alternative 2B analyzed without the improvements to grizzly bear baseline habitat parameters expected from the land compensation mitigation would not take all practicable measures to maintain and protect grizzly bear or grizzly bear habitat; would not comply with the 2015 KFP; and would not comply with 36 CFR 228.8. The agencies' combined alternatives also analyzed without the improvements to grizzly bear baseline parameters expected from the agencies' land compensation mitigation would comply with 36 CFR 228.8 by taking practicable measures to meet Access Amendment standards prior to activity with road access mitigation and would maintain and protect grizzly habitat that may be affected by the operations.

National Forest Management Act/Kootenai Forest Plan

Alternative 2B would not meet all 2015 KFP direction. During construction and/or operations, Alternative 2B would further reduce percent core habitat to below 2015 KFP standards in BMUs

5 and 6 and would reduce TMRD in BMU 5, where TMRD is worse than the standard. The agencies' combined action alternatives would meet all KFP guidelines and standards as they apply to grizzly bears.

Road access changes associated with the agencies' alternatives provide greater improvements to core, OMRD, and TMRD and the agencies' alternatives would meet 2015 KFP requirements for these habitat parameters prior to activity. The agencies' alternatives would provide a more extensive mitigation plan than Alternative 2B to improve the baseline habitat parameters for bears, offset direct habitat loss and displacement, and reduce the overall risk of mortality throughout and adjacent to the CYRZ.

The purpose and need of the action alternatives is mine development, not timber management. However, as a result of proposed activities, timber harvest would occur and all vegetation would be removed in areas affected by mine development and clearing of trees and tall shrubs would occur for transmission line construction and maintenance. An additional indirect result of the action alternatives would be an influx and increase in human population and an associated increase in traffic and recreational use of the affected BMUs and surrounding area in the long term. Thus, depending on the combined alternative, timber, recreation, and minerals requirements were considered when developing the mitigation plans.

In addition to the access amendment direction, 2015 KFP direction considered in the analysis of grizzly bears is:

FW-DC-WL-01. Nests and den sites and other birthing and rearing areas for terrestrial threatened, endangered, proposed, or sensitive species are relatively free of human disturbance during the period they are active at these sites. Individual animals that establish nests and den sites near areas of pre-existing human use are assumed to be accepting of that existing level of human use at the time the animals establish occupancy.

FW-DC-WL-02. A forestwide system of large remote areas is available to accommodate species requiring large home ranges and low disturbances, such as some wide-ranging carnivores (e.g., grizzly bear).

FW-DC-WL-03. Recovery of the terrestrial threatened and endangered species is the long-term desired condition. Foraging, denning, rearing, and security habitat is available for occupation. Populations trend toward recovery through cooperation and coordination with USFWS, state agencies, other federal agencies, tribes, and interested groups.

FW-DC-WL-04. All grizzly BMUs have low levels of disturbance to facilitate denning activities, spring use, limit displacement, and reduce human/bear conflicts and potential bear mortality. Spring, summer, and fall forage is available for the grizzly bear.

FW-DC-WL-05. Recovery of the grizzly bear is promoted by motorized access management within the KNF portion of the Northern Continental Divide Ecosystem (NCDE) and Cabinet-Yaak recovery zones.

FW-DC-WL-17. Forest management contributes to wildlife movement within and between national forest parcels. Movement between those parcels separated by other ownerships is facilitated by management of the NFS portions of linkage areas identified through interagency coordination. Federal ownership is consolidated at these approach areas to highway and road crossings to facilitate wildlife movement.

FW-DC-WL-19. By trending towards the desired conditions for vegetation, habitat is provided for native fauna adapted to open forests and early seral habitats, or whose life/natural history and ecology are partially provided by those habitats.

FW-STD-WL-02. The Motorized Access Management within the Selkirk and Cabinet Yaak Grizzly Bear Recovery Zone Management Direction and ROD is included in appendix B, and shall be applied.

FW-STD-WL-04. Permits and operating plans (e.g., special use, grazing, and mining) shall specify sanitation measures and adhere to the forestwide food/attractant storage order in order to reduce human/wildlife conflicts and mortality by making wildlife attractants (e.g., garbage, food, livestock carcasses) inaccessible through proper storage or disposal.

FW-GDL-WL-01. Grizzly Bear. Management activities should avoid or minimize disturbance in areas of predicted denning habitat during spring emergence (April 1 through May 1).

FW-GDL-WL-14. Connectivity. In wildlife linkage areas identified through interagency coordination, federal ownership should be maintained.

FW-GDL-WL-15. Grizzly bear. Elements contained in the most recent “Interagency Grizzly Bear Guidelines,” or a conservation strategy once a grizzly bear population is delisted, would be applied to management activities.

GA-DC-WL-LIB-04. Wildlife move between the Cabinet Mountains and the Fisher River, as well as north-south through the Cabinet Mountains.

F*or habitat components and timing constraints (FW-DC-WL-01, 02, 03, and 04, FW-GDL-WL-01 and 14)*: See the effectiveness of mitigation plan discussion and Objective 2. Project mitigation requiring land acquisition to offset direct habitat loss (Alternative 2B and Agency Alternatives) and also displacement (Agency Alternatives) would protect and enhance habitat components as specified in the mitigation plan, with the agencies’ alternatives providing the most protection due to the increased acreage. Project design of the action alternatives includes timing restrictions for transmission line construction and decommissioning activities to reduce potential effects to grizzly bears. The agencies’ alternatives mitigation would restrict these activities to between June 16 and October 14, more effectively minimizing transmission line impacts to both spring range and denning habitat than Alternative 2B. Due to the nature of the construction, operations, and first part of the Closure Phase within the influence zone of the mine development (impoundment, plant site, conveyer belt, and associated facilities and roads), no timing restrictions on spring range are proposed for the facilities and associated roads in BMU 5. In all action alternatives, mine-related activities would occur continuously along the east Cabinet front during the grizzly bear spring use period (April 1 to June 15) throughout the life of the project.

A total of about 45,000 acres of spring habitat components are present in the three BMUs directly affected by the combined action alternatives. Within BMU 5, the agencies’ alternatives would affect 716 acres and Alternative 2B would affect 1,410 acres of spring habitat with long-term displacement caused by the proposed mine sites and associated roads. Of the 45,000-acre total, about 3,843 acres are already affected by use on existing roads, especially NFS roads #278 and

#231. Due to the increased traffic volume and significant human activity along these forest roads and at the mine site, this spring habitat would be underused by grizzly bears. Den habitat in the three affected BMUs totals just more than 44,000 acres, with 1,694 acres already affected by use on existing roads. Only Alternative 2B would physically remove den habitat (17 acres). Alternative 2B would cause long-term displacement effects on 896 acres within BMU 5 due to the mine and associated activities and roads. For the agencies' combined alternatives, den habitat is not expected to be directly impacted, but would result in long-term displacement effects on an estimated 453 acres within the influence zone of the agencies' alternative mine sites and roads**.** With the agencies' alternatives planned road access changes, 2,291 acres of spring habitat would be made secure by creating core habitat. Displacement areas would not result in a net increase in acres of spring habitat, but would ensure that more acres of spring habitat were protected from major disturbances, throughout the life of the mine, than the amount of spring habitat lost to the mine. This measure provides for more than 45,500 acres of spring habitat to be available for use by grizzly bears throughout the life of the agencies' combined alternatives. BMUs 2, 5, and 6 provide den habitat in designated roadless areas in high-elevation grizzly bear habitats within the Cabinet Mountain Wilderness area. Displacement areas created by agencies' alternatives proposed road access changes also secure more potential den habitat than that currently occurring in the active BMUs (USFWS 2014a).

Disturbance impacts within spring, denning, or avalanche habitat in portions of BMUs 2, 5, and 6 would also be alleviated by varying degrees due to habitat compensation required for physical habitat removal (all combined alternatives) and displacement (agencies' combined alternatives). This would be dependent upon the parcel's location, existing habitat, existing access, and development on the properties acquired, potential for reducing motorized access, and proximity to these seasonal habitat components.

Movement Corridors (FW-DC-WL-02 and 17, FW-GDL-WL-14, GA-DC-WL-LIB-04): See effectiveness of mitigation plan discussion and Objective 2A. Acquisition of mitigation lands and road access changes on both National Forest System and the parcels would enhance security in the north-south movement corridor and provide for long-term movement between the north and south Cabinet Mountains. The agencies' mitigation plan for additional habitat compensation for displacement potentially may improve movement corridors outside the Recovery Zone. The agencies alternatives incorporation of a Vegetation Removal and Disposition Plan would provide for more cover retention in the transmission line clearing and the timing restriction would limit potential to disrupt movement patterns during the important spring use period within the affected BMUs.

Provision of Displacement Areas (FW-DC-WL-01 and 04, FW-STD-WL-02, FW-GDL-WL-14): See the effectiveness of mitigation plan discussion and Objective 1A. The agencies' alternatives road access changes on both National Forest System and the parcels would improve core to better than the standards in BMUs 5 and 6, resulting in substantial more improvement in displacement areas than Alternative 2B. For all action alternatives, acquisition of mitigation lands would further improve the level of core, with greater improvement resulting from the agencies' alternatives.

Access Management will be Considered (FW-DC-WL-04 and 05, FW-STD-WL-02): The agencies' grizzly bear mitigation plan describes road access changes and discusses the effectiveness of mitigation plans, Objectives 1A, B, and C, and Objective 2C. The agencies' alternatives would result in more improvement than Alternative 2B. For the agencies' alternatives there would be no increase in the amount of roads open to public motorized use during the active bear year. Restricted, barriered, or impassable and temporary roads opened or constructed for transmission line activity would return to designated status during operations or post-project on National Forest System lands. During construction and operations, road use would result in changes to habitat parameter levels depending on the action alternative. The agencies' mitigation plan ensures no degradation of access management conditions for grizzly bears in BMUs 2, 5, and 6 for the life of the mine.

Attractants –Displacement (FW-STD-WL-04, FW-GDL-WL-15): 2015 KFP

All action alternatives would incorporate the KNF mandatory food storage order into all contracts.

As described in detail in Chapter 2, Alternative 2 grizzly bear mitigation plan, Alternative 2B would fund two new full-time wildlife positions, a law enforcement officer and an information and education specialist with duties aimed directly at minimizing effects on grizzly bears. The law enforcement officer duties would include deterring illegal killing, minimizing/eliminating mortality due to mistaken identity, enforcing applicable regulations, enforcing road access changes, while the information and education specialist would focus on educating school-age children regarding grizzly bear conservation, developing educational materials for mine employees and the public, and integrating the actions and programs of the Interagency Grizzly Bear Committees. In addition to these two positions, the agencies alternatives mitigation plan would provide for an additional habitat conservation specialist if both the Rock Creek Project and Montanore Project are active, and the mitigation plan has specific items to address attractants such as bear-resistant refuse containers for the mine facility and personal and community at large under the direction of grizzly bear management specialists, funding for fencing and electrification of garbage transfer stations, electric fence kits for bear problem sites, and a detailed wildlife grizzly bear awareness program for both MMC employees and the communities. Potential for increased recreation trail use within the north-south corridor and mitigation for those effects if the Rock Creek Mine Project is concurrent with the Montanore combined action alternatives has been addressed by the Rock Creek Project.

IGBC Guidelines FW-GDL-WL-15 (and including FW-DC-WL-02, 03, 04, 17, and 19):

The agencies' mitigation plan specifically requires that proposed mitigation properties meet one or more criteria, including protection of seasonally important habitats, with a primary emphasis on spring and secondary emphasis on fall habitats.

The agencies' combined action alternatives would provide grizzly bears an adequate quantity and quality of secure habitat at the home range scale because in these situations, grizzly bears can sustain disturbance within their home range without injury or death (USFWS 2011, p. A-77). The agencies' grizzly bear mitigation plan summarizes the design features based on the grizzly bear standards and guidelines, as well as additional mitigation for the projected direct, indirect, and cumulative effects. Effects to spring range would be alleviated due to road access changes and land acquisition (see Objective 2b). The agencies' alternatives would maintain or improve core, OMRD, and TMRD due to required mitigation. The mitigation plan would require the KNF to manage at a level better than baseline conditions for the life of the mine once mitigation properties are acquired and additional access management opportunities arise on National Forest System lands. This level of access management would contribute to reducing or mitigating for displacement and fragmentation effects of the agencies' combined alternatives on grizzly bears.

The mitigation plan requires funding to conduct a long-term monitoring study of grizzly bears throughout the life of the mine, and this information would be used to ensure the mitigation measures, including road closures, habitat acquisition, and easements were in fact alleviating fragmentation of habitat. Information gained through monitoring would inform the adaptive management process provided for in the mitigation plan.

The agencies' mitigation plan would require an Oversight Committee to establish a MOU that would define roles and responsibilities of members and the committee, whose primary function would be to oversee the 30-year grizzly bear management plan. The combination of the Oversight Committee and detailed management plan would coordinate and monitor the complex mitigations, habitat acquisition and easements, monitoring and reporting, use of new information, and other requirements to ensure conservation needs of grizzly bears are met. This would ensure full implementation of the mitigation plan, with adaptive management where needed, which would alleviate potential for fragmentation of the southern Cabinet Mountains as a result of the agencies' combined alternatives. The USFWS (2014a) concluded for Alternative 3D-R the combination of the actions required in Alternative 3D-R and mitigation plan would eliminate the likelihood that the alternative would appreciably diminish survival and recovery of grizzly bears and would improve conditions over the long term over the existing conditions, ultimately promoting the recovery of the CYE grizzly bear population. As all of the agencies' combined action alternatives require the same actions and incorporate the same mitigation plan, with only slight differences in acreages of habitat compensation required, all of the agencies' mitigated action alternatives would have a similar effect. However, Alternative 3C-R and 4C-R would result in an increased potential for displacement and mortality risk to grizzly bears within core habitat. Transmission lines would not be built in core habitat in the other combined agency alternatives.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53.

Endangered Species Act. For all combined action alternatives, ESA compliance would be ensured through Section 7 consultation. The agencies' combined Alternative 3D-R is in compliance with the ESA. This statement is based on: 1) consultation with the USFWS is completed and a Biological Opinion has been issued (USFWS 2014a, 2014b) for Alternative 3D-R; and 2) Implementation of Alternative 3D-R would meet all terms and conditions established by the USFWS (2014a, 2014b). If the agencies selected any other combined action alternative, the KNF would request an opinion from the USFWS on whether formal consultation would need to be re-initiated regarding the selected alternative.

Statement of Findings

The No Action Alternatives (Alternative 1 and Alternative A) may affect, are not likely to adversely affect, the grizzly bear for the following reasons: 1) all existing habitat parameters would be maintained in the short term, including those that do not meet the individual BMU standard; 2) however, in the long term and in the time-frame specified by the Access Amendment, habitat parameters in the CYE BMUs would meet their individual BMU standards for OMRD, TMRD, and core.

Alternative 2B may affect, is likely to adversely affect, the grizzly bear for the following reasons:

- Alternative 2B would result in the physical removal of 2,598 acres of grizzly bear habitat for at least 35 years. Although the mitigation plan requires acquisition or purchase of conservation easement in perpetuity of mitigation lands for habitat physically lost due to mine development, no habitat compensation for long-term mine-associated displacement effects is proposed.
- Alternative 2B would not comply with the 2015 KFP for the following reasons:
  - During construction and operations, Alternative 2B would cause additional decreases in core habitat in BMUs 5 and 6, where existing percent core habitat is worse than the standard. MMC road access mitigation would not offset effects to core prior to or concurrent with loss of core. Core would remain lower than the standard in both BMUs 5 and 6 for the life of the mine, and post-project core would return to existing conditions, with no trend toward meeting the standards. Implementation of habitat compensation mitigation would result in an improvement to the baseline parameters, including core, but this could not be calculated at this time, as previously described.
  - During construction, operations, and decommissioning, Alternative 2B would increase TMRD in BMU 6, where it is currently worse than the standard, and would not improve or trend TMRD toward meeting the standard after reclamation.
- In Alternative 2B, mine-related activities would occur continuously along the east Cabinet front during the grizzly bear spring use period (April 1 to June 15) throughout the life of the project. Alternative 2B would cause long-term disturbance in the upper Ramsey Creek and Libby Creek drainages, which are adjacent to or in proximity of the CMW and core grizzly bear habitat, and in the north-south movement corridor.

In its BA (KNF 2013b), the KNF determined that Alternative 3D-R may affect, is likely to adversely affect, the grizzly bear. The BA provides detailed information for this determination and is incorporated by reference. The KNF's determination for Alternative 3D-R, and the reasons supporting it, are applicable to the other agency alternatives, although the effects would differ. The KNF's basis for a determination of may affect, is likely to adversely affect, the grizzly bear for the agencies' mitigated combined alternatives is summarized as follows:

- If the agencies select any combined action alternative other than Alternative 3D-R, the KNF would request an opinion from the USFWS on whether formal consultation would need to be re-initiated regarding the selected alternative.
- In all agency combined alternatives, between 1,560 and 1,926 acres of grizzly bear habitat would be physically removed for at least 32 years.
- Currently, the CYRZ grizzly bear population is estimated to have a minimum population of 42 bears with a 64-percent probability of a downward population trend from 2006-2011 (Kasworm *et al.* 2013c). However, data from the previous 5 years indicates an improving trend (Ibid).
- Use of a helicopter could have displacement effects to any grizzly bears that may be in the zone of influence (USDA Forest Service and USFWS 2009).

- In all combined agencies' alternatives, mine-related activities would occur continuously along the east Cabinet front during the grizzly bear spring use period (April 1 to June 15) throughout the life of the project. Mine-related activities in Libby Creek would occur in proximity of the CMW and core grizzly bear habitat and would result in displacement effects in the north-south movement corridor. Habitat near the mine site, facilities, and roads, including spring habitat, may be underused by grizzly bears for the life of the mine.
- Increased traffic on the Bear Creek Road #278 access road could inhibit movement to lower elevation spring range to the east or toward linkage areas across US 2.
- The increased level of activity associated with the agencies combined action alternatives would result in a substantial increase in human activity over the existing conditions and could increase the risk of grizzly bear mortality within and adjacent to the Cabinet Yaak Ecosystem.

3.25.5.3 Canada Lynx

3.25.5.3.1 Summary of Conclusions

Implementation of Montanore Alternative 2B *may affect is likely to adversely affect*, the Canada lynx. Alternative 2B 1) would clear less than 1 percent of lynx habitat from the West Fisher Lynx Analysis Unit (LAU), but would remove 2 percent of lynx habitat within the Crazy 14504 LAU for the life of the mine (about 30 years, plus an additional 15 years or more until the stands became suitable for summer foraging habitat (early stand initiation) if reclamation was successful; and 2) would not comply or meet the intent of three applicable Northern Rocky Lynx Management Direction (NRLMD) Guidelines. Implementation of the agencies' mitigated combined action alternatives *may affect are not likely to adversely affect*, the Canada lynx. The agencies combined action alternatives would 1) remove less than 1 percent of lynx habitat from either the Crazy or West Fisher LAU; and 2) would meet all applicable NRLMD Objectives, Standards, and Guidelines. No effect to lynx critical habitat would occur with implementation of any of the action alternatives as the affected LAUs are not within critical habitat.

3.25.5.3.2 Introduction

Canada lynx occupy northern boreal forests, which are primarily composed of cool, moist subalpine fir and Engelmann spruce and moist lodgepole pine forest that receive abundant snowfall. Snowshoe hares are the primary prey of lynx and habitat use by lynx is associated with those conditions that support hare populations. Therefore, young regenerating and mature multistory forest that provide habitat for snowshoe hares is important to lynx conservation. Especially important is winter habitat that continues to provide snowshoe hare forage and cover (twigs and stems that protrude above the snow or limbs that drop to the snow surface) during high snow periods. Denning habitat is found in forests with abundant dead and down trees, especially in areas near foraging habitat. Both natural (*e.g.*, fire) and human disturbances such as timber harvest and prescribed fires can affect lynx habitat (USDA Forest Service 2007a).

Although a variety of habitat and forest types may be found within a lynx's home range and used to some level (*e.g.*, matrix habitat for travelling between patches of boreal forest), in northwestern Montana lynx select forest stands with high horizontal cover primarily consisting of Engelmann spruce and subalpine fir. Both mature multistory and early successional forest habitats provide for snowshoe hares, but use by lynx varies seasonally in response to snowshoe hare availability. Mature multistory stands provide the greatest foraging opportunities for both hares and lynx during winter and management that maintains and promotes a mosaic of mature multistory spruce-fir forests is most beneficial to the species (Squires *et al.* 2010).

Canada lynx population ecology, biology, habitat description, and relationships are described in Ruggiero *et al.* (2000), Ruediger *et al.* (2000), and Interagency Lynx Biology Team (2013). Population and habitat status on a national scale is provided in the final lynx listing rule (USFWS 2000) and the most recent lynx distinct population segment is found in the Biological Opinion on the effects of the Northern Rocky Mountains Lynx Amendment (NRLMD) (USFWS 2007d). National population and habitat status descriptions in these documents are incorporated by reference.

3.25.5.3.1 Data Sources, Methods, Assumptions, Bounds of Analysis

National Forest System Lands

The USFWS listed the contiguous U.S. distinct population segment of the Canada lynx as threatened in 2000 (USFWS 2000). The Final EIS for the NRLMD was completed in 2007 with the ROD signed in 2007 (USDA Forest Service 2007a, 2007f). The decision replaces the interim consideration of the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger *et al.* 2000). The NRLMD is incorporated into the 2015 KFP: it contains direction related to vegetation, grazing, human uses, and linkage areas and applies to lynx habitat in LAUs in occupied habitat. There is direction on linkage areas in the NRLMD that may also contain areas outside of LAUs. This direction is used during project development to maintain lynx habitat across the KNF. The USFWS reviewed new information regarding Canada lynx that was published or made available since the NRLMD was completed and determined that it did not reveal effects that were not previously considered in the 2007 Biological Opinion on the NRLMD (USFWS 2013a) (Figure 95). The direction provided in the NRLMD is applied to lynx habitat at the LAU scale. The KNF has delineated 47 LAUs, which approximate a lynx home range size.

Lynx habitat was mapped for the KNF based on elevation, forest type and stand age data available in 2010. Based on knowledge of the area and lack of harvest and fire occurrences in the previous four years, designation of mapped habitat would not have changed for this analysis. This data source was used for the existing condition and analysis of effects to lynx habitat. In addition to lodgepole pine, Engelmann spruce, and subalpine fir forest types, mapping includes cedar-hemlock and other cool, moist forest types as they may provide lynx habitat (USDA Forest Service 2007a, 2007b). Successional or structural stage is based on year of origin and assumptions about the length of time it takes for a stand to move from one stage to the next. However, age does not account for environmental conditions or disturbance processes that affect development of the successional stage. For example, cold temperatures and short growing seasons at high-elevation sites may maintain a more early seral stage despite an old age and multiple years of origin. Also, natural disturbances such as fire and wind play an important role in the development of multistoried stands and, without disturbance stands may remain in a stem exclusion stage for a longer period than expected. Therefore, mapping of lynx habitat based on stand data provides a broad estimation of lynx habitat within a LAU and may be fine-tuned based on field review.

The direct and indirect effects analysis for Canada lynx on federal land follows the Objectives, Standards, and Guidelines established in the NRLMD and only those relevant to the proposed activities are analyzed in detail. Objectives, Standards, and Guidelines considered, but found “not applicable” are summarized under the “Effects Common to All Action Alternatives” section. Lynx habitat connectivity is provided by an adequate amount of vegetation cover arranged in a way that allows lynx movement. Connectivity was evaluated by visually examining mapped lynx habitat and past management activities to determine possible movement areas and potential areas where lynx travel may be hindered. Ridgelines and draws were considered high-value movement areas.

Based on the NRLMD, the analysis area for analyzing and monitoring project effects (direct, indirect, and cumulative) to lynx habitat is the affected LAUs. As described in the LCAS (Ruediger *et al.* 2000), the LAU is an appropriate scale for analysis because: 1) the LAU approximates the size of a home range of a female lynx, 2) maintaining habitat conditions at the scale of a lynx home range will allow for good distribution of lynx habitat components, and 3) expanding the analysis area could dilute the effects of the proposed activities. In addition, the boundaries of a LAU remain constant and therefore provide for monitoring of and compliance with the Objectives, Standards, and Guidelines of the NRLMD. The action area (as defined under the ESA), or analysis area considered for the lynx analysis are within the West Fisher (14503), Crazy (14504), and Rock (14702) LAUs (Figure 95). The directly affected Crazy LAU (mine-related facilities and transmission line), Silverfish LAU (transmission line), and Rock LAU (Rock Lake Ventilation Adit only) have records of lynx occurrence, and have ample lynx habitat remaining for lynx use during and post-project implementation. The action alternatives' mine-related facilities are largely concentrated in or adjacent to low-elevation non-habitat areas that are roaded in the existing condition; however, lynx habitat (early stand initiation, stand initiation, and multistory forage) (Table 235) would be removed by the mine plant site and related facilities, the tailings impoundment, associated new road construction or road reconstruction, and certain components of the transmission line (*e.g.,* pole footprints). The remaining components of the transmission line and associated temporary road construction in the Crazy and Silverfish LAUs would affect lynx habitat, but some vegetation would remain or recover during the Operations Phase and movement across the landscape would not be adversely affected. A wide variety of lynx habitat occurring across the landscape would remain available within all three LAUs for lynx to use during project implementation and post-project based on current conditions. Therefore, the Crazy, Silverfish, and Rock LAUs have been chosen as the appropriate scale of analysis for determining direct, indirect, and cumulative effects for the Montanore Project. Indirect and cumulative effects not only consider the directly affected LAUs, but also consider adjacent LAUs (for effects on habitat connectivity) and potential movement corridors or linkage areas outside of the LAUs. As required in 36 CFR 220.4.(f) the analysis considers the present effects of past activities. These effects are reflected in the existing condition provided for each LAU and include the effects of past road building and vegetation changes due to either natural or management activities. In addition, the analysis considers the temporal effects of the activities, that is how long would the effects of the action last. For the lynx analysis, temporal effects were considered to be short-term (2 to 5 years) or long-term (lasting for life of the mine (30 years) or longer (see descriptions provided in section 3.25.1, *Introduction* (p 1063. These descriptions of short-term and long-term effects are not consistent with the definitions provided in section 3.1.1, Direct, Indirect, and Cumulative Effects (p. 273), but they are appropriate for analysis of most wildlife species, including the threatened lynx. Most female lynx reach reproductive maturity at 22 months, with reproductive rates and survival of kittens tied to prey availability (Ruggiero *et al*. 1994). At southern latitudes, where hare densities are typically low (Dolbeer and Clark 1975), older age individuals appear to predominate in lynx populations. Harvest records from Washington from 1976-1981 showed an average age of 4.5 years for 14 lynx harvested (Ruggiero *et al*. 1994). A 16-year old lynx killed by a mountain lion was the longest-lived wild lynx every identified (Foresman 2012). Temporal effects also were used to determine what, if any, reasonably foreseeable activities overlap the activities, the project (geographic) area that could cause cumulative effects. Lynx occurrence data comes from KNF historical records (NRIS Wildlife), and other agencies (MNHP, FWP, and USFWS). The effects analysis also includes an evaluation of the effectiveness of the mitigation plans applicable to each action alternative.

Analysis Methods on Private and State Lands

The NRLMD management direction only applies to federal lands within a LAU; however, for LAUs that include non-federal lands (private or State), the acreage of non-federal land in a stand initiation structural stage is considered when the LAU is evaluated for compliance with the NRLMD standard VEG S1 (see “Affected Environment” section below). This was considered in the evaluation of existing conditions for the affected LAUs.

Outside of the LAU, to evaluate potential direct, indirect, and cumulative impacts of the transmission line and Sedlak Park Substation on lynx on private and State lands as required by the DEQ for MMC’s MFSA and MEPA evaluation, the MFSA analysis area includes all additional non-National Forest System land within a corridor 1 mile on each side of the alternative transmission line alignments. The 1-mile buffer around the transmission line (in which the Sedlak Park Substation would be located), was guided by Circular MFSA-2 (DEQ 2004), Section 3.7 Baseline Data and Impact Assessment Requirements for Electric Transmission Lines, item 12(a). To determine the adequate size of an analysis area to measure potential displacement effects from the transmission line on private lands, the 1-mile zone of influence for aircraft as determined by the Cumulative Effects Analysis Process for the Selkirk/Cabinet-Yaak grizzly bear ecosystems (USDA Forest Service *et al.* 1988; USDA Forest Service *et al.* 1990) was considered sufficient to measure potential disturbance to other wildlife species less sensitive to human activity than the grizzly bear.

Impacts to lynx on private lands from the transmission line alternatives were evaluated qualitatively, based on KNF lynx habitat mapping for potentially affected LAUs; mapping of broad vegetation types within the vegetation analysis area, which includes all lands, including private lands outside a LAU, that would be disturbed by facility construction under any alternative; tracking surveys; hair sample analyses conducted by Western Resource Development (1989f) and FWP; and predicted changes in habitat and disturbance resulting from the proposed mine and transmission line alternatives.

The DNRC developed a voluntary State HCP for forest management activities with technical assistance from the USFWS. The State HCP identified two lynx habitat areas: 1) lynx habitat within the HCP project area and 2) Lynx Management Areas (LMAs), which are specific subsets of lands encompassing select portions of the HCP project area where resident lynx populations are known to occur or where there is a high probability of periodic lynx occupancy over time. No LMAs were identified in the Cabinet Mountains or near the DNRC Libby Unit. The State HCP identified the Libby Unit, which includes the two State trust sections within the Crazy and Silverfish PSUs as within the general distribution area for lynx (DNRC 2011, Appendix C, Figure C-17). Not all State trust land within this overall distribution area are included within the HCP or are managed for lynx habitat (DNRC 2011, Appendix C, Figure C-26). The two State trust sections located in the Montanore analysis area of the Crazy and Silverfish PSUs are included in the HCP, and the DNRC mapped lynx habitat according to protocol established in the HCP. DNRC provided the KNF with ArcGIS layers identifying lynx habitat on State trust lands within the Libby Unit and this data source was used in the analysis of effects to lynx. The State HCP covers forest management activities including timber harvest and associated activities, road construction and maintenance, and forest grazing. Construction and operations of the proposed mine and transmission line action alternatives are not covered activities under the State HCP. For this analysis, which will fulfill both the MEPA and NEPA requirements of the agencies, proposed activities on State trust land will be evaluated on the effects to lynx and lynx habitat and mitigations will be applied consistent with those for affected federal land. Measurement criteria will be the potential for disturbance to lynx and effects to lynx habitat, including coarse woody debris, winter and summer foraging habitat, and habitat suitability and connectivity.

Differences in lynx habitat mapping occur between the KNF and DNRC. For DNRC units west of the Continental Divide, preferred habitat types, as defined by the HCP, were used as the primary indicators of potential lynx habitat regardless of elevation or average snow depth. The KNF considered both elevation and average snow depth in addition to preferred habitat types in delineating lynx LAUs and in mapping lynx habitat components.

General Analysis Methods

Disturbance area boundaries for mine facilities and impoundment areas are specific to each alternative. To assess direct effects on surface resources, including lynx habitat, the disturbance area boundaries were based on the maximum “worst-case-scenario” amount of actual ground disturbance, even if no proposed activities were currently planned, and were determined by the lead agencies (see section 2.4.1.1, *Permit and Disturbance Areas*). This would allow MMC to construct additional temporary and seasonal roads and other facilities within these disturbance boundaries as needed. Roads associated with the mines and facilities were buffered at a 100-foot width total for new roads, or 67-foot width for existing road reconstruction.

For the analysis, the agencies assumed the clearing or disturbance widths for the transmission line analysis direct effects on vegetation, including lynx habitat, were 150 feet for Alternative B and 200 feet for Alternatives C-R, D-R, and E-R. However, actual on the ground effects to lynx are discussed. Within the rights-of-way where vegetation would be cleared, the right-of-way width for Alternative B would be 100 feet, and the right-of-way width for the agencies’ alternatives would be 150 feet. Outside of the right of way right-of-way width, only danger trees would be removed as necessary, which would retain low-growing trees and shrubs therefore providing more cover. For roads associated with the transmission line, a 25-foot width was used for temporary access roads or upgraded existing roads.

3.25.5.3.2 Affected Environment

Crazy, West Fisher, and Rock LAUs

Current conditions in the West Fisher (14511), Crazy (14504), and Rock (14702) LAUs meet the NRLMD standards based on 2010 data for the LAUs (Table 235 and Project record). Effects of natural vegetation succession and of more recent vegetation management and other activities between 2010 and 2012 were also considered. On federal land, little to no activity has occurred on the ground in these LAUs since 2010. Private property, including corporate timberland, within all three LAUs is considered with respect to connectivity and movement concerns both inside and outside the LAUs. Adjacent LAUs are also considered with respect to connectivity and movement of lynx, including the Treasure 14505 LAU to the north, Bull 14701 LAU to the west of the Crazy LAU, and the Silver Butte 14502 LAU to the south of both the West Fisher and Rock LAUs.

The higher elevations within the Crazy, West Fisher, and Rock LAUs are within the CMW where steep topography dominates. Approximately 10,084 acres of the Crazy LAU, 4,712 acres of the

West Fisher LAU, and 13,413 acres of the Rock LAU are within the CMW. Using information from the timber stand database, lynx habitat within the wilderness boundary is largely comprised of travel habitat (also known as matrix habitat) widely interspersed with stands of multistory forage. Based on aerial photo interpretation, some areas identified as part of multistory lynx habitat have large inclusions of sparse herb to shrub-dominated communities unsuitable for lynx winter foraging habitat. Vegetation within the CMW was influenced by the large-scale 1910 fires, and provides natural vegetative conditions and connectivity within and between LAUs that straddle the Cabinet Mountains. Wildfire in the CMW was the primary disturbance factor to result in structural changes within lynx habitat by reducing timber overstory and resulting in a variety of age classes and species diversity. The most recent large-scale fires occurred between 1885 and 1939, with the 1910 fires affecting the largest area. Within the last 15 years, fires occurred on the south-facing slopes in Leigh Creek and Big Cherry Creek in the Crazy LAU. Forested habitats that experienced stand-replacing fire would be in the stand initiation structural stage and would soon become snowshoe hare winter foraging habitat. In areas where fire severity was low to mixed-severity, smaller patches of early successional vegetative stages would result. In contrast, fire suppression since the early 1900s has altered stand structure, resulting in more homogenous stands with greater canopy closure and poorly developed understories in some areas, which in turn reduced snowshoe hare habitat and lynx foraging opportunities.

Outside of the wilderness boundary, vegetation management has occurred within the LAUs on both federal and private lands. At lower elevations on roaded lands, timber production has occurred, utilizing a number of silvicultural treatments including regeneration harvest, commercial thinning, and salvage harvest. Harvest activities within the database indicate that timber harvest began in the 1950s and has continued to present. Within the West Fisher LAU, regeneration harvest has occurred on 2,617 acres of National Forest System land while 1,641 acres of private land has been harvested. Within the Crazy LAU, regeneration harvest has occurred on 2,011 acres of National Forest System land and on about 51 acres of private land. Not all of this activity occurred within lynx habitat. Within the Rock LAU, about 190 acres of regeneration harvest has occurred on National Forest System land (with 48 acres now multistory forage, 49 acres in stand initiation stage with 79 acres occurring in non-habitat matrix, and 14 acres in non-habitat low-elevation habitat).

Past harvest has provided a variety of age classes and successional stages in areas of the LAUs outside of the wilderness boundary. The majority of the harvest has occurred at lower elevations due to access and topographical limitations. Regeneration harvest in lynx habitat resulted in vegetation structural changes that influenced lynx, lynx habitat, and travel habitat. Immediately following regeneration for about 15 years, stands would have become temporarily unsuitable for lynx as the vegetative structural composition of the stand would not have provided winter forage habitat for snowshoe hares. Conditions on the KNF indicate that winter snowshoe hare foraging opportunities are met after about 15 years and occur within age classes of 16 to 50 years old.

Boreal forest landscapes are naturally in a state of change, through disturbance and succession processes, and result in a changing environment of habitat types, distribution, and juxtaposition (USFWS 2013b). As such, not all potential lynx habitat acres provide suitable habitat all of the time and there may naturally be periods with low levels of suitable habitat. This variability of habitat suitability and distribution is reflected in habitat mapping done on lynx habitat to estimate historical range of lynx habitat levels, current levels on the KNF, and projected future levels under different management scenarios (Ecosystem Research Group 2012). Historically, the KNF provided 69,681 acres to 278,725 acres of multistoried suitable lynx habitat (Ibid). Currently the

KNF has 149,781 acres of suitable lynx habitat, which falls within the historic range of variation (Ibid).

The NRLMD requires that no additional regeneration harvest is allowed if more than 30 percent of lynx habitat in a LAU is in a stand initiation structural stage that does not provide winter snowshoe hare habitat, except for fuel treatments in the wildland urban interface. Although the management direction would apply only to federal lands, the 30 percent takes any private land into account if that private land is within a LAU. No LAU on the KNF, including the directly affected West Fisher, Crazy, and Rock LAUs, exceed the 30-percent stand initiation structural stage (Table 235).

Under the NRLMD, no more than 15 percent of lynx habitat on National Forest System lands in a LAU may be changed by regeneration harvest in a 10-year period. Percent is the percent of total LAU acres that provide lynx habitat. The KNF has regenerated less than 15 percent of any LAU over the past 10 years. No LAU should have more than two adjacent LAUs that exceed 30 percent. No LAUs on the KNF, including the directly affected West Fisher, Crazy, and Rock LAUs, have any adjacent LAUs that exceed 30 percent.

Lynx habitat and travel (or matrix) habitat in the directly affected West Fisher, Crazy, and Rock LAUs were assessed for all ownerships in terms consistent with the NRLMD; both private and National Forest System lands are found within the affected LAUs. All lynx habitat components are represented and dispersed throughout the LAUs (Figure 95), and all three LAUs are consistent with the NRLMD.

Table 235. Existing Lynx Habitat in Analysis Area.

Lynx Habitat Component	14503-West Fisher LAU				14504-Crazy LAU				14702-Rock LAU			
	NFS Lands		Private/ State		NFS Lands		Private/ State		NFS Lands		Private/State	
	(ac.)	%	(ac.)	%	(ac.)	%	(ac.)	%	(ac.)	%	(ac.)	%
Early stand initiation structural stage – all lands unsuitable for SSH[3] VEG S1	0	0	0	0	81	<1	0	0	0	0	1	<1
Number of adjacent LAUs that exceed 30% lynx habitat in an early stand initiation structural stage[3] VEG S1	0	0	0	0	0	0	0	0	0	0	0	0
Stand initiation structural stage suitable for SSH[4]	337	3	0	0	3,009	13	0	0	364	2	0	0
Habitat changed to early stand initiation structural stage on National Forest System lands over the past 10 years by timber management with regeneration harvest[5] VEGS2	0	0	0	0	0	0	0	0	0	0	0	0
Multistory mature - late successional forest[6] VEG S6	10,940	89	354	100	18,434	82	140	82	20,893	93	46	100
Other (non-forage stem exclusion)[7]	970	8	0	0	1,033	5	31	<1	1,254	5	0	0
Total Lynx Habitat Acres[2]	**12,247**	**41**	**354**	**11**	**22,557**	**44**	**171**	**1**	**22,511**	**54**	**47**	**<1**
Non-habitat low elevation	6,234	21	2,163	65	7,824	15	805	67	1,845	4	7	<1
Travel (matrix) habitat[1]	11,215	38	806	24	21,076	41	219	18	17,597	42	40	4
No data	0	0	0	0	0	0	0	0	0	0	877	0
Total	**29,696**	**90**	**3,323**	**10**	**51,457**	**98**	**1,195**	**2**	**41,972**	**98**	**971**	**2**
Total LAU	33,019				52,652				42,943			

Snowshoe Hare – SSH, NFS – National Forest System.

[1] Travel (or matrix) habitat (*e.g.*, hardwood forest, dry forest, non-forest, or other habitat types that do not support SSH) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

[2] Lynx habitat: Acres do not include "travel\matrix" or low-elevation stands (considered unsuitable SSH habitat, but suitable for lynx habitat connectivity); travel and low-elevation habitat comprises the remaining suitable plus unsuitable habitat. Unsuitable habitat is habitat that currently does not provide sufficient vegetation quantity or quality to be used by SSH.

[3] Early stand initiation stage: These acres are lynx habitat that currently do not provide sufficient vegetation quantity or quality (height) to be used by SSH and lynx in winter. The NRLMD standard VEG S1 states no additional regeneration harvest is allowed if more than 30 percent of lynx habitat in a LAU is in a stand initiation structural stage (*i.e.*, early stand initiation stage) that does not provide winter SSH habitat, except for limited fuel treatments in the wildland urban interface.

[4] Stand initiation structural stage currently suitable SSH winter habitat.

[5] Portion of total LAU acres that provide lynx habitat (suitable + unsuitable acres). The NRLMD standard VEG S2 states no more than 15 percent of lynx habitat on National Forest System lands in a LAU may be changed by regeneration harvest in a 10-year period.

[6] Multistory mature late successional stages with multiple age classes and structural components that provide winter SSH habitat. Standard VEG S6 states no vegetation management projects that reduce SSH habitat in multistory mature or late successional forests, with exceptions for infrastructure, research, and incidental removal.

[7] Other, including stem exclusion, currently unsuitable structural stages that currently do not provide SSH winter habitat NRLMD (USFWS 2007d).

In addition to lynx habitat mapped by the KNF within the Crazy and Silverfish LAUs, the State mapped lynx on State land included in the State HCP (Table 236). As described in the analysis methods, the DNRC State sections affected by proposed activities and within the Crazy and Silverfish Planning Subunits were considered.

Table 236. Lynx Habitat on State Lands within the Crazy and Silverfish Planning Subunits.

State HCP Mapped Lynx Habitat	Section 16 T28N, R30W	Section 36 T27N, R30W	
Size (acres)	600	640	
Elevation (feet)	<4,000	<4,000	>4,000
Not Mapped as Lynx Habitat (acres)	104	322	138 [1]
Winter Forage (acres)	364	94 [2]	0
Summer Forage (acres)	14	18	0
Temporary Non-suitable (acres)	17	69	0
Other Suitable (acres)	101	0	0

[1] These 138 acres are also within the West Fisher LAU and mapped at a landscape scale by the KNF as either low-elevation non-habitat or travel habitat.
[2] 45 acres of this 94-acre total is mapped by the KNF within the West Fisher LAU as travel habitat (44 acres) or low-elevation non-habitat (1 acre), with the remaining located <4,000 feet in elevation and outside of the LAU.

Studies in Montana indicated that lynx depended almost exclusively on snowshoe hares during winter (Squires and Ruggiero 2007). Other prey species include red squirrel, northern flying squirrel, grouse, marten, voles, and occasionally small birds. Red squirrels were the second most common prey, but they only provided 2 percent biomass to the winter diet (Ibid). Data indicate red squirrel abundance was not a factor in lynx habitat selection, lynx foraging and habitat selection was strongly driven by the abundance of snowshoe hares, and red squirrels were only killed opportunistically (Squires and Ruggiero 2007).

In western Montana, the red squirrel is most common in montane (yellow or ponderosa pine and Douglas fir) and subalpine (subalpine fir and Engelmann spruce). Red squirrels den in old woodpecker holes, tree hollows, and other small crevices (MNHP and FWP 2014). Red squirrels are often associated with large live and dead trees, down woody debris, and overstory and understory diversity (Holloway and Malcolm 2006; Russell *et al.* 2010). As described in section 3.25.2.2, *Snags and Woody Debris*, existing levels of down wood in surveyed stands are sufficient and meet 2015 KFP desired conditions and guidelines. Levels of down wood in untreated stands would be at levels appropriate or higher, due to fire suppression, for the specific vegetation type. Red squirrel habitat could occur within old growth or recruitment potential old growth forest. As described in section 3.22.2, *Old Growth Ecosystems*, old growth in the Crazy and Silverfish PSUs, which overlap to a great extent the West Fisher and Crazy LAUs, would remain well distributed throughout both areas.

Summer foraging habitat (also good summer hare habitat) consists of early successional stages of dense, young (about 15- to 30-year-old) forests. Because of this short time frame (about 15 years), it is not long before the forest grows into a structure that does not provide good foraging for lynx. A regular influx of early successional vegetation is important to maintain a level of summer foraging habitat through time. This can be created by any disturbance process, such as fire, windthrow, or vegetation management activities. Generally, maintaining no more than 30 percent of a lynx ho9me range in early succession habitat is considered good for lynx management.

Denning habitat generally consists of mature stands of spruce, subalpine fir, lodgepole pine, cedar, or hemlock forest with a complex structure of large down trees to provide cover for lynx kittens. In Montana, abundant woody debris from piled logs was the dominant habitat feature at den sites. Lynx generally denned in mature spruce-fir forests with high horizontal cover and abundant coarse woody debris (Squires *et al*. 2008). Eighty percent of dens was in mature forest stands and 13 percent was in mid-seral regenerating stands, while young regenerating (5 percent) and thinned (either naturally sparse or mechanically thinned) stands with discontinuous canopies (2 percent) were seldom used (Ibid). Lynx with kittens need well-distributed patches of denning habitat throughout their home range. Denning habitat is abundant on the KNF and is not limiting (Squires, pers. comm. September 6, 2012).

Landscape-scale connectivity, which allows animals to move within ecosystems and provides for genetic exchange with outside populations, is a crucial component of carnivore recovery and conservation. The primary causes of wildlife habitat fragmentation are human activities such as road building, and residential, recreational, and commercial developments. When these developments reach a certain concentration, they become impermeable and are termed “habitat fracture zones” (Servheen *et al.* 2003). Transportation corridors characterized by high road densities and substantial vehicle traffic can result in “fracture zones” that increase risk of mortality and impede natural patterns of animal movement (Long *et al.* 2010). There is direction on linkage areas in the NRLMD that may also contain areas outside of LAUs. This direction is used during project development to maintain lynx habitat across the KNF. Broad-scale lynx linkage areas have been identified (Claar *et al.* 2004; USDA Forest Service 2007a) and are intended to assist in land use planning to maintain connectivity and allow for movement of animals between blocks of habitat that are otherwise separated by intervening non-habitat areas such as basins, valleys, and agricultural lands, or where habitat naturally narrows due to topographic features. Seven identified linkage areas (Claar *et al.* 2003; USDA Forest Service 2007a; KNF Lynx Taskforce 1997) for lynx on the KNF. Four of these seven linkage areas cross private lands between parcels of KNF lands, while two cross the Kootenai River or Lake Koocanusa. The remaining linkage area lies within the KNF along the Cabinet Mountains. Six of the seven linkage areas cross non-lynx habitat at lower elevations between LAUs, while the linkage area in the Cabinet Mountains is within LAUs (including Silver Butte, West Fisher, and Rock) at higher elevations (including Silver Butte, West Fisher, and Rock) (see map of linkage areas in NRLMD, USDA Forest Service 2007a, Figure 1-1). Maintaining connectivity or “linkage” between wildlife populations across the landscape could reduce or prevent the negative consequences of habitat fragmentation (Servheen *et al.* 2003). For lynx in Montana at the southern periphery of the species’ range, maintaining connectivity with source populations to the north in Canada is especially important (Squires *et al.* 2013). Squires *et al.* (2013) found that connectivity between lynx habitat in Canada and that in the conterminous U.S. is facilitated by only a few presumed corridors that extend south from the international border, and maintaining the integrity of these connectivity corridors is of primary importance to lynx conservation in the Northern Rockies. These corridors identified by Squires *et al.* (2013) are not located near or within the south Cabinet Mountains.

Connectivity between more extensive areas of lynx habitat may be provided by narrow forested mountain ridges, shrub-steppe plateaus, wooded riparian communities, or lower elevation ponderosa pine woodlands between high-elevation spruce-fir forests (Ruediger *et al.* 2000). Within the West Fisher and Crazy LAUs, and within the adjacent LAUs, a large tract of lynx habitat occurs along the CMW. The CMW (94,272 acres) is about 34 miles long and varies in width from 7 miles to about 0.5 mile near the upper headwaters of Libby Creek in the Crazy LAU. The CMW forms the central section of a potential north-south movement corridor for large carnivores. Lynx habitat and travel habitat providing movement corridors and habitat connectivity (juxtaposed between rock and talus cliffs at high elevations in the CMW) within and adjacent to this corridor appear more than adequate to support movement and dispersal of lynx.

Additional general wildlife linkage areas or approach zones, collectively described below as the US 2 linkage zone, have been identified, which overlap and are adjacent to the directly affected LAUs. Specifically these approach areas include the US 2 – Horse Mountain/Teepee Lake approach zone, which overlaps the south end of the Crazy LAU along the eastern edge, and the US 2 – Barren Peak/Hunter Creek approach zone, which overlaps portions of the eastern edge of the West Fisher LAU. These approach zones within the US 2 linkage area are described in detail below under the *Affected Environment, Private, State, and National Forest System Land Outside of the LAU*.

Lynx are generally tolerant of human activity (Ruediger *et al*. 2000), although it cannot be completely ruled out that in a few instances human activity could create a large enough disturbance that individual lynx may be temporarily displaced away from the activity. The effects of human activities on lynx activity patterns and energetics are unknown (Ruediger *et al.* 2000). Research on the effects of roads and trails on lynx is inconclusive, although limited information suggests that lynx do not avoid roads (McKelvey *et al.* 2000) except at high traffic volume (Apps 2000). Research by Alexander *et al*. (2005) evaluated whether traffic volume significantly reduced wildlife movement rates (or habitat permeability or road crossings). Alexander *et al*. (2005) identified winter average daily traffic on four highways (three paved two-lane highways and a graveled road) and recorded movement of ungulates and carnivores across the roads utilizing winter track surveys. Carnivores monitored included coyote, wolf, cougar, lynx, marten, and wolverine, and data indicated average daily traffic volume between 300 and 500 vehicles per day may be the threshold above which successful crossings by these carnivores are impeded (Ibid).

Plowing roads or using over-snow motorized vehicles that compacts snow can allow competing predators (*e.g.*, coyotes) into lynx habitat during the winter and was once thought to have an effect on lynx (Ruediger *et al.* 2000). However, Kolbe *et al.* (2007) found that compacted trails from over-snow motorized vehicles in their study area (western Montana) had only minimal impacts on coyote movements and foraging success. The results of the Kolbe *et al.* (2007) study and the effects of snow compaction on lynx were discussed in the NRLMD Biological Opinion (p. 53-55 in USFWS 2007d). On p. 55 in the Biological Opinion for the NRLMD it states, "The best information available has not indicated that compacted snow routes increase competition from other species to levels that adversely impact lynx populations, and under the [NRLMD], the amount of areas affected by snow compacted routes within the NRLMD would not substantially increase." Open roads occur throughout the West Fisher and Crazy LAUs; existing roads most relevant to the Montanore Project include those in major drainages such as Poorman Creek, Ramsey Creek, Libby Creek, as well as the Bear Creek Road (NFS road #278) and Libby Creek Road (NFS road #231). Roads in the Ramsey Creek, Poorman Creek, and uppermost Libby Creek drainages are currently closed to motorized traffic except winter snowmobile traffic. The current status of roads potentially affected by the Montanore Project is described in Chapter 2.

As of 2008, the KNF authorized MMC for snowplowing on NFS roads #231 and #2316 for access to the Libby Adit for maintenance. As part of this authorization, the KNF implemented seasonal restrictions on these two roads from April 1 to May 15 when only mine traffic is allowed access behind the gate. This restriction was implemented to reduce displacement and mortality risk to grizzly bears on spring range, but it may provide some benefit to lynx. Most of this activity occurs in low-elevation non-habitat within the Crazy (14504) LAU.

Snowmobile activity and the related snow compaction also occur within the Crazy (14504) and West Fisher (14503) LAUs. With the advancement in snowmobiles and increase in winter recreation on the KNF, snowmobile use has increased throughout lynx habitat. Most winter use occurs on roads open to snowmobile use and free of vegetation protruding above the snow. Popular snowmobile routes include the main access roads for Libby Creek – Howard Lake – Miller Creek and the West Fisher Creek. No trails are groomed in the Crazy and West Fisher LAUs.

A large portion of the KNF LAUs are also within the recovery zones for grizzly bear on the KNF (62 percent of the total KNF LAU acreage is within a BMU, with 87 percent of the total KNF LAU acreage within a BMU or a BORZ polygon. Of the directly affected LAUs, about 30,772 or 93 percent of 14503 West Fisher LAU, 43,160 acres or 82 percent of 14504 Crazy LAU, and 29,200 acres or 68 percent of 14702 Rock LAU are within the CYRZ. In addition, about 1,980 acres (6 percent) of LAU 14503 and 9,420 acres (19 percent) of LAU 14504 are within the Cabinet Face BORZ. Canada lynx are afforded the security provided for bears in these areas. Security for bears is maintained by controlling and managing access and this maintains or improves Canada lynx use by reducing the risk of displacement and poaching. Currently wheeled motorized vehicle access management strategies for grizzly bear have been analyzed (USDA 2011a, 2011b). With implementation of the Access Amendment, there will be lower levels of wheeled motorized vehicle access and an increase in the amount of core (secure) habitat, which in turn would potentially provide higher levels of security for lynx. Many roads restricted to create core, however, allow snowmobile access during the winter.

Exact lynx population numbers are unknown for the KNF, although the population seems to be doing well in the Purcell Mountains (*e.g.*, small home ranges, higher survival rate, and more kittens compared to the rest of the continental U.S.) (Squires, pers. comm. September 6, 2012). From 1999 through 2006, lynx reproduction was documented at 57 dens of 19 female lynx in Seeley Lake, the Garnet Range, and the Purcell Mountains (Squires *et al*. 2008). Lynx are known to occur throughout the KNF, based on historical and recent trapping records. Research has been conducted throughout the region, including the KNF (Squires *et al*. 2013) to capture and radio collar lynx in the Purcell Mountains. From 2003 to 2005, 25 individual lynx were captured and collared. Stands with abundant horizontal cover are common in the area of the KNF where lynx and snowshoe hare are most abundant (north of the town of Libby and west of Koocanusa Reservoir and east of Pete Creek in the Yaak) in the Purcell Mountains (Squires, pers. comm. 2012).

Lynx rarely use, or are considered absent from the Cabinets Mountains (south of Libby) and West Cabinets (Squires, pers. comm. 2012; Squires 2010). The reason is unknown, but limiting factors for lynx habitat present (*e.g.*, spruce-fir forests and high horizontal cover) in the Cabinet Mountains may be the steep topographical roughness and/or unfavorable Pacific Maritime climatic conditions resulting in unsuitable snow characteristics (Squires, pers. comm. 2012). Squires *et al*. 2013 specifically described the distribution of lynx in Montana based on 81,523 telemetry points from resident lynx from 1998-2007. Lynx are primarily restricted to northwestern Montana from the Purcell Mountains (on the KNF this area is described previously) as north of the town of Libby, west of Koocanusa Reservoir, and east of Pete Creek in the Yaak east to Glacier Park, then south through the Bob Marshall Wilderness Complex to MT 200 (Squires, pers. comm. 2012; Squires 2010). The southernmost lynx population in Montana is currently in the Garnet Range, except for a few individuals in the Greater Yellowstone Area (Ibid).

Most historical (before 1997) observations of lynx or their signs in the West Fisher LAU were in the Lake Creek or West Fisher Creek drainages, although three observations were recorded near Miller Creek. At least 20 lynx observations have been recorded in the Crazy LAU, near Howard Lake, and in most of the major drainages including Libby, Ramsey, and Poorman creeks, with many of the records in the low-elevation non-habitat (where more gentle rolling topography exists). Most records of lynx in the West Fisher and Crazy LAUs are from 1985 through 1995, and none have been recorded since 1997. In the West Cabinet Mountains in Idaho, in January 2014, a female lynx was caught by trappers, and subsequently collared by Idaho Fish and Game. Table 235 displays the current lynx habitat conditions in the directly affected LAUs.

Private Land

Private lands within or near the alternative transmission line corridors and located in the West Fisher LAU or Crazy LAU are mapped by the KNF as either low-elevation non-habitat or travel habitat. This includes a parcel of Plum Creek land along West Fisher Creek, a parcel of private land at the confluence of Libby and Howard creeks mapped as non-habitat, and a narrow parcel of private land southeast of Howard Lake as travel habitat. This narrow parcel, consisting of a lodgepole forest type, has been subdivided, logged, and has three developed home sites.

Other private land within the West Fisher and Crazy LAUs, mapped by the KNF using the best vegetation data available, are a mixture of low-elevation non-habitat, travel habitat, or multistory mature late successional habitat.

Outside of the LAUs, private land is not mapped as lynx habitat under the NRLMD. Although lynx may travel outside LAU boundaries, private and National Forest System land outside of the West Fisher and Crazy LAUs have low potential for lynx due to elevation range (below 4,000 feet) and subsequent poor snow conditions, previous timber harvest and commercial thinning practices, and high road densities.

State Land

The two State parcels and the HCP mapped habitat within these sections are displayed in Table 236. One parcel (section 36 T27N, R30W) is partially within the KNF West Fisher LAU. The DNRC mapped the portion of section 36 within the West Fisher LAU as either winter forage or non-habitat, and mapped the portion of section 36 outside the West Fisher LAU as temporary unsuitable habitat, winter foraging habitat, summer foraging, or non-habitat. The state parcel (section 16 T28N, R30W) is adjacent to the lower elevational limit of the Crazy LAU, with approximately 7 acres overlapping the LAU. These 7 acres were mapped as winter forage by the HCP.

Private, State, and National Forest System Land Outside of the LAU

The KNF has identified three approach areas for crossing the US 2 fracture zone in the general vicinity of the Montanore Project analysis area (Brundin and Johnson 2008). Servheen *et al.* (2003), using a Linkage Zone Prediction model, found linkage areas were scattered but allowed numerous crossing opportunities west of Marion along the US 2 fracture zone. As development again became more concentrated approaching the community of Libby, small scattered crossing opportunities existed until just north of Poker Hill. Four miles south of Poker Hill the US 2 – Horse Mountain/Teepee Lake approach area (Brundin and Johnson 2008) is adjacent to and overlaps the eastern edge of the Crazy 14504 LAU in the Horse Mountain area. The most southern approach area identified, the US 2 – Barren Peak/Hunter Creek (Ibid), extends from the Miller Creek area southward toward the Jumbo Peak and Fosseum Mountain Area, and overlaps the eastern edge of the West Fisher 14503 LAU. The Barren Peak/Hunter Creek and most of the Horse Mountain/Teepee Lake approach areas are within the larger landscape scale Lost Trail – Kenelty linkage area identified by American Wildlands (2008), a regional non-profit organization. The Lost Trail – Kenelty linkage area was identified as an important movement area connecting lynx habitat across the KNF (Ibid). This general area is considered an important wildlife corridor for many species, including grizzly bear, black bear, lynx, wolverine, white-tailed deer, mule deer, elk, moose, gray wolf, coyote, mountain lion, and a variety of smaller animals (KNF Lynx Taskforce 1997; Ruediger *et al.* 2001; American Wildlands 2008; Brundin and Johnson 2008). Servheen *et al*. (2003) examined grizzly bear habitat linkage between the Cabinet-Yaak and the Northern Continental Divide ecosystems and identified more site-specific linkage areas consisting of small scattered crossings between Libby and Sedlak Park. These areas would likely also serve as areas of movement suitable for lynx. Lynx are highly mobile, have relatively large average home ranges, and are capable of moving long distances to find abundant prey (68 FR 40076-40101, July 3, 2003, p. 40083). For the FEIS analysis, the linkage areas described by Servheen *et al.* (2003), Brunden and Johnson (2008), and American Wildlands (2008) are referred to collectively as the US 2 linkage zone. The eastern part of the MFSA transmission line analysis area, which includes the Sedlak Park Substation, is comprised mainly of private land, especially in the vicinity of US 2, and is situated within the US 2 linkage zone.

3.25.5.3.3 Environmental Consequences

Alternative 1 (No Mine), Alternative A (No Transmission Line), Alternative 1A (No Mine or Transmission Line)

Direct and Indirect Effects of No Action Alternatives on Canada Lynx and Lynx Habitat on National Forest System Lands

No direct effects from federal actions would occur under the No Action Alternatives. NRLMD standards would continue to be met, as described in the “Affected Environment” section. The No Action Alternatives would maintain the existing vegetative conditions within the West Fisher 14503 LAU, Crazy 14504 LAU, and Rock 14702 LAU. The existing vegetation conditions providing lynx habitat would continue to provide a mosaic of structural stages providing for lynx foraging and denning. Currently lynx habitat in the early successional stages is limited within all three LAUs.

Direct and Indirect Effects of No Action Alternatives on Canada Lynx and Lynx Habitat on Private and State Land

No direct effects from federal actions would occur and any lynx habitat present on private or State land would not be affected under the No Action Alternatives. NRLMD management direction does not apply to private or State land.

Direct and Indirect Effects of No Action Alternatives on Canada Lynx and Lynx Habitat on All Lands

Climate change over time may change lynx habits and habitat. At this time, however, the scope and scale of such changes are unknown, and the effects (negative or positive) on lynx would likely be variable across the landscape. Snowfall was the strongest predictor of lynx occurrence at a regional scale (Hoving *et al.* 2005). In addition to snow depth, other snow properties, including surface hardness or sinking depth, are important factors in the spatial, ecological, and genetic structuring of the species (Stenseth *et al.* 2004). An important consideration is that the topography strongly influences local snow conditions.

Climate change may result in lynx prey becoming more vulnerable to predation (Ruggiero *et al.* 2008). Coupled with past fire suppression, climate change can increase the impact of insects and disease and change the amount of habitat available for lynx. In some areas, changes in the fire regime associated with climate change may increase the availability of suitable habitat by increasing fire frequency, and in some areas potentially leading to increased acreage of brushy, early successional foraging habitat (McKenzie *et al.* 2004).

One of the primary constituent elements of lynx critical habitat is light deep snow. The Cabinet Mountains and the affected Crazy, West Fisher, and Rock LAUs are located south of US 2 and are not within critical habitat and, therefore, would have no effect on critical habitat or primary constituent elements. Climate change may influence the availability of deep fluffy snow in the future, and this is outside the control of the KNF to dictate the location of deep fluffy snow on the landscape. Deep fluffy snow may be located in higher elevations and patches separated by greater distances in the future if the climate becomes warmer. Lynx and snowshoe hare are adapted to life in the deep snow. The snowshoe hare has adapted to deep, fluffy, and persistent snow in winter (large feet and a pelage that turns white in winter), and changes in snow patterns and conditions as a result of a warming climate would put the species at a disadvantage (Ruggiero *et al.* 2008). Based on food habits and logistic modeling, lynx foraging and habitat selection is strongly driven by the abundance of snowshoe hares (Squires and Ruggiero 2007), especially in winter. As each species responds differently to climate change, the predator/prey relationship between snowshoe hares and lynx may dissolve (Ruggiero *et al.* 2008).

Lynx habitat may shift upward in elevation and north in latitude as the climate warms, and peninsular extensions of habitat may become fragmented (p. 8617 in USFWS 2009; Ruggiero *et al.* 2008; Carroll 2007). If a warming climate leads to less snowfall and warmer temperatures, snowshoe hare populations may decline as lynx predation efficiency increases. As described by Griffin *et al.* (2005), predator avoidance is a critical aspect of snowshoe hare behavior. When coloration of hares does not match the background (*e.g.*, white hare and brown background), hares may be more vulnerable to predators (McKelvey *et al.* 2013). Gonzales *et al.* (2007) modeled the potential shift in boreal forest and areas that have continuous winter snow coverage for at least four months each winter. Gonzales *et al.* (2007) predicted a potential decline of up to two-thirds of potential habitat in the lower 48 states by the year 2100. Lynx habitat may shift northward as much as 125 miles. Areas that could lose potential lynx habitat in the long term (about the year 2100) include the KNF (Gonzales *et al.* 2007). A lack of adequate snow in the long term may render at least some lynx habitat on the KNF less than optimal for lynx.

Mine Alternatives 2, 3, and 4; Transmission Line Alternatives B, C-R, D-R, and E-R; and Combined Action Alternatives Direct and Indirect Effects to Canada Lynx

Effects Common to the Mine Alternatives and Combined Action Alternatives

The location of the impoundment sites would slightly differ between the three mine alternatives but the chemical makeup of the tailings water is not likely to pose a risk to wildlife, including lynx. The impoundments would affect habitat along the lower elevational edge of the Crazy LAU. Lynx have been previously documented in the impoundment areas, likely due to the location with more gentle and rolling topography suitable for travel through the LAU. The metals in the water would be similar to what is found at the Troy Mine decant ponds (Table 122 in the *Water Quality* section), and where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). For Alternative 2, concentrations of metals in mine and adit water, which would be stored in the mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (Table 122 in the *Water Quality* section). The Ramsey Plant Site would be fenced, restricting wildlife access.

Lynx would be at less risk of contaminant uptake from storage of mine, adit, and tailings water in Alternatives 3 and 4. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in the *Water Quality* section, p. 712.

Northern Rocky Mountain Lynx Management Direction Compliance Analysis

Effects Common to All Action Alternatives

A. Objectives, Standards, and Guidelines Applicable to ALL Management Projects in Lynx Habitat in LAUs in Occupied Habitat and in Linkage Areas, Subject to Valid Existing Rights.

Objective All 01: *Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.*

Standard All S1*: New or expanded permanent development and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.*

Although the amount of mitigation lands required for habitat compensation would vary (Table 28 and Table 29 in Chapter 2) by combined mine-transmission line alternatives (Alternative 2B or any of the agencies' combined action alternatives), the acquisition of mitigation lands for grizzly bears could improve connectivity for lynx habitat, and provide additional habitat for both lynx and their prey. Some of the parcels identified for potential acquisition occur within the directly affected LAUs or in areas identified as important for linkage outside of LAUs. Land acquired for grizzly bear mitigation that might otherwise be developed in a manner inconsistent with bear needs would be managed for grizzly bear use in perpetuity. The objective of the grizzly bear habitat compensation would be to improve the baseline habitat conditions for grizzly bears, which would include decreasing open and total miles of road. Dependent upon the actual location of the acquired mitigation lands, any additional reductions in wheeled motorized vehicle access, and increase in amount of secure (core) habitat for grizzly bears in turn, could provide higher levels of security for lynx and potentially reduce risk of displacement and potential poaching.

Standard LAU S1: *Changes in LAU boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.*

No changes in LAU boundaries are proposed; therefore, this standard does not apply.

B. Objectives, Standards, and Guidelines Applicable to Vegetation Management Activities and Practices in Lynx Habitat within LAUs in Occupied Habitat. "With the exception of Objective VEG 03 that specifically concerns wildland fire use, the Objectives, Standards, and Guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, roads and the like. None of the objectives, standards, or guidelines apply to linkage areas."

The objective of all action alternatives is mineral development and the Vegetation Objectives, Standards, and Guidelines (Standard VEG S1, VEG S2, and VEG S6; Objectives VEG O1, O2, O3, and O4; Guidelines VEG G1, G4, G5, and G11) do not apply.

C. Objectives and Guidelines Applicable to Livestock Management in Lynx Habitat within LAUs. [Applies to Grazing Projects. Does Not Apply to Linkage Areas.]

The objective of all action alternatives is mineral development and not livestock management. No grazing allotments are found on public lands in the Crazy, West Fisher, or Rock LAU. Objectives GRAZ 01 and Guidelines GRAZ G1, G2, G3, and G4 do not apply

D. Objectives and Guidelines Applicable to Human Use Projects in Lynx Habitat within LAUs.

Objective HU O2: *Manage recreational activities to maintain lynx habitat and connectivity.*

The objective of the action alternatives is mineral development. No recreational activities are proposed. Winter recreational (snowmobile) access is discussed under each action alternative under Objective HU O1. The action alternatives would manage public access in the mine area during the Construction and Operations Phases and would not create new recreation routes affecting lynx habitat or connectivity. The potential increase in use on plowed roads is discussed under each action alternative. The intent of **Objective HU O2** would be met.

Objective HU O4: *Provide for lynx habitat needs and connectivity when developing new or expanding existing developed recreation sites or ski areas.*

No development or expansion of recreation or ski sites is proposed. No new snowmobile trails or play areas are proposed or would be created. Objective HU 04 does not apply.

Guideline HU G1: *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.*

No development or expansion of ski areas is proposed and Guideline HU G1 does not apply.

Guideline HU G2: *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.*

No development or expansion of ski areas is proposed and Guideline HU G2 does not apply.

Guideline HU G3: *Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat*

No recreational developments or operations are proposed and Guideline HU G3 does not apply. Lynx movement through the project area is addressed under Objective All 01 and Standard All S1 for each action alternative.

Guideline HU G10: *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.*

No development or expansion of ski areas is proposed and Guideline HU G10 does not apply.

Guideline HU G11: *Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat.*

Designated new over-the-snow routes or play areas are not proposed and Guideline HU G11 does not apply.

E. Objectives, Standards, and Guidelines Applicable to ALL Projects in Linkage Areas in Occupied Habitat, Subject to Valid Existing Rights.

Standard LINK S1: *When highway or forest highway construction or reconstruction is proposed in linkage areas, identify potential highway crossings.*

No proposed highway or forest highway construction is proposed. Potential crossings on US 2 have been identified. See the *Affected Environment* section and ***Objective All 01 and Standard All S1*** discussion above. Standard Link S1 does not apply.

Guideline LINK G1: *National Forest System lands should be retained in public ownership.*

The sale or exchange of National Forest System lands is not proposed and this guideline is not applicable.

Guideline LINK G2: *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.*

No livestock grazing in shrub-steppe habitat is proposed and Guideline Link G2 does not apply.

Alternative 2 – MMC's Proposed Mine

A. *Objectives, Standards, and Guidelines Applicable to ALL Management Projects in Lynx Habitat in LAUs in Occupied Habitat and in Linkage Areas, Subject to Valid Existing Rights.*

Objective ALL O1: *Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.*

Standard All S1*: New or expanded permanent development and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.*

Activities that alter vegetative cover over large areas or wide bands of cover, especially in travel corridors (*e.g.*, saddles and ridges) or linkage areas, could reduce connectivity within or between LAUs. Alternative 2 would not affect any designated linkage areas. None of the Alternative 2 activities would occur along ridgelines that might serve as lynx movement areas. In Alternative 2, construction of mine facilities, including the plant site and tailings impoundment, could affect lynx movement within LAU 14504 by removing forest cover in potential movement areas such as the Little Cherry Creek, Ramsey Creek, and upper Libby Creek riparian corridors. New disturbance would be primarily concentrated within specific areas of these drainages, such as for the plant, adit, and impoundment sites, while direct habitat loss or alteration along most of the length of these riparian corridors would be minimal. During the Construction Phase, the plant site and the tailings impoundment disturbance areas within the Crazy LAU (the proposed impoundment site straddles the LAU boundary) would result in large openings.

Most mine access roads within the Crazy LAU would not be in lynx habitat and displacement effects from human activity, including low-traffic roads, do not appear to be a major concern for lynx (Ruediger *et al.* 2000). There is no evidence that lynx avoid or are displaced by unpaved roads; therefore, unpaved roads are not considered a threat to lynx movement (USFWS 2003a).

MMC's proposed Alternatives 2 and B include an access change in NFS road #4724 from April 1 to June 30 and the yearlong access change in a segment of NFS road #4784 to mitigate for impacts to grizzly bears. NFS road #4784 is proposed for an access change by the Rock Creek Project and is no longer available for Montanore Mine mitigation. However, if Alternative 2B were selected, and the Rock Creek Project had not yet implemented the closure on the Upper Bear Creek Road #4784, then MMC would decommission or place into intermittent stored service and barrier NFS road #4784 prior to Forest Service authorization to initiate the Montanore Project Evaluation Phase. Core created as a result of the closure would also result in benefits to lynx by providing more secure habitat and improving habitat connectivity within the LAU.

The extent to which fragmentation from roads and urbanization can impact connectivity of mesocarnivore populations such as lynx likely depends on the physical design of highway improvements, the surrounding environmental features, the density of increased urbanization, and the increased traffic volume (Clevenger and Waltho 2005; Grilo *et al*. 2009). High traffic volume roads probably affect lynx through increased mortality, habitat fragmentation, and reduced ability of lynx to successfully disperse. Along a highway in Banff National Park, Alberta that had a traffic volume of 4,000 vehicles per day, 7 of 15 crossing attempts by lynx were aborted (Ruediger *et al.* 2000). In the central Cascades, Interstate 90 averages more than 24,000 vehicles per day (Singleton and Lehmkuhl 2000) and may affect the chance that lynx will re-colonize potential habitat in the southern Cascades, and would affect movements between subpopulations. Squires *et al.* (2013) documented 44 radio-collared lynx with home ranges within an 8-km buffer of two-lane highways; only 12 of these individuals crossed the highway (Squires, unpublished data).

The Bear Creek Road (NFS road #278) is considered a high-use road based on the grizzly bear CEM model (greater than 10 vehicles per day) in the existing condition. Calculations of projected traffic volume are described previously (p. 1266). In summary, estimates of increased traffic range from 187 percent to 234 percent (Table 177 in section 3.21, *Transportation*) about three times existing levels throughout the life of the mine. The KNF revised Johnson (2013) calculations which replace Johnson (2013) used in the Wildlife BA (USDA Forest Service 2013b) and Grizzly Bear Biological Opinion (USFWS 2014a, 2014b), result in an estimated increased traffic volume range over a 7-month period from 109 percent to 132 percent and an estimated 232 to 253 vehicles per day over that same period. Although the *Transportation* section 3.21, Johnson (2013) and KNF revised Johnson (2013) calculations differ, all reflect a substantial increase in traffic volume. Widening, improvement, and yearlong use of the Bear Creek Road would lead to increased vehicle volumes and speeds. Overall, improved road conditions that allow higher vehicle speeds and increased traffic could increase the risk for lynx mortality due to vehicle collisions.

The mine would generate an estimated additional 132 vehicles per day (an additional 66 trips) on the Bear Creek Road. At peak production, about 420 tons of concentrate, or 21 trucks per day, would be trucked daily via Bear Creek Road and US 2 to the loading site in Libby. The speeds on the Bear Creek Road would increase from the existing 15 to 25 mph to 35 to 45 mph, equating to a 40-percent to 80-percent increase in potential traffic speeds over the existing conditions. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1600), which would minimize traffic and the potential for vehicle-lynx collisions outside of these times. Mitigation to reduce mortality risk to grizzly bears, which would also benefit lynx, include: MMC would provide transportation to employees using buses, vans, and pick-up trucks, thereby limiting the use of personal vehicles; MMC would report road-killed animals to the FWP as soon as road-killed animals were observed; and FWP would either remove road-killed animals or direct MMC on how to dispose of them.

Estimated projected traffic volume with both mine and estimated existing use increase up to 253 vehicles per day in 2029 and decrease to an estimated projected existing 123 vehicles a day post-closure (revised KNF Johnson (2013) calculations). It should be noted that the estimated projected traffic levels may be substantially less based on the assumption that logging traffic would remain at a substantial decrease compared to the 1986-1991 timeframe used to develop the estimated baseline traffic volume. Significant decreases in logging traffic have occurred since the baseline data were collected. Based on this, throughout the Construction and Operations Phases, projected daily traffic volume with both mine and existing traffic is expected to be much lower than the 300 to 500 vehicles per day identified by Alexander *et al.* (2005) as the potential threshold above which successful crossings by carnivores such as lynx may be impeded. In general, lynx are considered a highly mobile species (Aubry *et al.* 2000) and are known to cross highways (Squires and Oakleaf 2005).

Mine traffic would be substantially less in the Closure Phase. Future traffic volume on the Bear Creek Road when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and the loss of the Little Cherry Loop Road beneath the impoundment. In the Post-Closure Phase, mortality risk to lynx would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (*e.g.*, increased road width, improved sight distance, and paving) and higher traffic speeds would result in an increased mortality risk compared to pre-mine conditions. Even with the projected traffic volume increases and road improvements, increased risk in mortality to lynx is considered small because collisions are unlikely to occur due to the low potential for lynx to be present, restriction of concentrate hauling to daylight hours, overall expected lower traffic volume than projected, presence of cover adjacent to the road, and the low–elevation non-habitat nature of the area where the Bear Creek Road is located (see *Effects to Lynx Habitat Components* section, p. 1376).

Increased traffic levels can contribute to fracturing of habitat connectivity. The Bear Creek Road is situated in low-elevation non-habitat where it passes through the Crazy LAU; however, it does lie between habitat in the main LAU and the Big Hoodoo Mountain portion of the LAU. Approximately 3,000 acres of the Crazy LAU are located in the Big Hoodoo Mountain area, consisting of about 1,367 acres of multistory mature late successional, 65 acres of stem exclusion, 50 acres of early stand initiation, 35 acres of stand initiation, 530 acres of travel habitat, with the remainder identified as low-elevation non-habitat. This is about 6.7 percent of the total lynx habitat available within the Crazy LAU. The surrounding low-elevation non-habitat environmental features adjacent to the portion of the Bear Creek Road located near the Hoodoo Mountain area would remain and continue to provide opportunity for movement across the Bear Creek Road.

The mine facilities consisting of the adit, conveyor belt system, mill site, pipes, and impoundment would likely cause a change in movement patterns in the immediate area. A lynx may find it difficult to cross under the ore conveyor belt system between the adit and the mill site. The configuration of the conveyor may allow passage of smaller animals through the framework supporting the conveyor, whereas larger animals the size of a bear or deer would have difficulty passing under the conveyor (Klepfer, pers. comm. 2014). The noise associated with the conveyor, coupled with the framework that a lynx would have to negotiate, may deter a lynx from passing under the conveyor. However, lynx are highly mobile, as described previously, and with the 1,200-foot length of the conveyor system, a lynx would be able to bypass this site. North and south connectivity in the main Crazy LAU would remain undisturbed. Explosive use during construction at the Libby Adits or the Rock Lake Ventilation Adit would be a short duration ‘pulse’ event of less than 24 hours, and potential for disturbance effects would occur only when the last section of blasting broke through the surface. Otherwise, noise would be muffled underground and would not be expected to create a noticeable amount of disturbance. During the Operations Phase, any potential disturbance would be minimized by specially designed low-noise fan blades or active noise-suppression equipment estimated to reduce fan noise so that it would not be audible over ambient noise levels (Big Sky Acoustics 2006). No measurable effect to lynx movement or connectivity would occur along this high-elevation area identified by the NRLMD as important for linkage as a result of the Rock Lake Ventilation Adit.

None of Alternative 2 mitigation plans are specific to lynx. The effects to wetlands and riparian areas that may provide potential lynx movement corridors would be minimized through implementation of MMC’s proposed Wetland Mitigation Plan. Alternative 2 would mitigate affected forested and herbaceous wetlands at a 2:1 ratio and herbaceous/shrub wetlands and waters of the U.S. at a 1:1 ratio (as described under section 2.4.6.1, *Wetlands and Other Waters of the U.S.*). The feasibility of MMC’s proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC’s plan is conceptual and would be refined during the 404 permitting process. All potential wetland mitigation sites identified for Alternative 2 (Figure 20) are either located in low-elevation non-habitat within the Crazy LAU or outside or adjacent to the LAU and are expected to have little benefit to lynx.

Identified broad-scale linkage areas identified for lynx would not be affected. The additional movement and linkage areas, or approach zones previously described in detail under the *Affected Environment* section and important for many wildlife species, including lynx, and collectively called the US 2 linkage area would remain suitable for lynx. Connectivity toward the east through the Crazy LAU and West Fisher LAU across US 2 would remain. The main access route on the Bear Creek Road, and the Libby Creek Road used during the Evaluation Phase, is largely situated outside or along the edge of the lower elevation boundary of the LAUs or are located in low-elevation non-habitat when inside the LAU. Lynx movement within the affected LAUs and to adjacent LAUs would remain, and the intent of ***Objective ALL O1*** and ***Standard ALL S1*** would be met.

Guideline ALL G1: *Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses*.

Forest roads rarely receive motorized use at levels that create barriers or impediments to lynx movements (USFWS 2007d). The primary concern with highways is the risk of lynx mortality due to collisions with high-speed vehicles on paved highways or straight gravel roads on flatter terrain. The best information available suggests that the types of roads in the analysis area that are managed by the Forest Service do not provide surface conditions conducive to fast speeds and do not adversely affect lynx (USFWS 2007d). Lynx mortality from vehicle strikes has not been documented on National Forest System lands on the KNF and, although possible, is not likely to occur.

In the existing condition, the first 9.5 miles of the Bear Creek Road (NFS road #278) has a chip-seal paved surface that is in poor condition, and after the first 0.75 mile from the intersection with US 2, the remainder of the road is a two-way single lane with a total width of about 14 feet. The current design speed for the Bear Creek Road ranges from 15 to 25 mph.

Alternative 2 would not include underpasses/overpasses or fencing for any mine access road, including NFS road #278. In Alternative 2, MMC would upgrade 11 miles of the Bear Creek Road and build 1.7 miles of new road between the Little Cherry Creek Tailings Impoundment Site and the Ramsey Plant Site. The 11 miles of the Bear Creek Road (NFS road #278), from US 2 to the Bear Creek bridge, would be chip-and-seal paved and upgraded to applicable NFS road standards. The road would be widened to 20 to 29 feet and designed to handle speeds of 35 to 45 mph. Between the plant site and the impoundment area where both mine haul and public traffic would occur, for about 2.5 miles, the road width could be up to 56 feet to accommodate joint use safely (section 3.21.4.22, *Transportation*). About 4.3 miles are within the Crazy LAU but are below the elevation of lynx habitat. Of the 7.5 miles of realigned and new road needed from the Bear Creek bridge to the Ramsey Plant Site, only 0.8 mile would be in lynx habitat. A single-lane bridge over Poorman Creek would be constructed to accommodate mine traffic. Public access to any portion of Bear Creek Road would not be restricted. Public access to the new mine access road would be restricted to mine-related traffic.

When the Bear Creek Road would be reconstructed during the Construction Phase, mine-related traffic (and public traffic) would use Libby Creek Road (NFS road #231) as the primary access to the mine facilities and the area of the KNF surrounding the mine facilities. The Libby Creek Road enters the Crazy LAU along its eastern boundary just to the southeast of the proposed LAD Area location and about 0.7 mile after the existing intersection with the Bear Creek Road. The existing Libby Creek Road design speed reduces from 25 mph to 20 mph where it enters the LAU, and the road is located in low-elevation non-habitat. Roads improved for Alternative 2 would allow higher vehicle speeds (and increased traffic and could increase the potential risk of lynx mortality due to vehicle collision. Reconstructed and new roads associated with Alternative 2 would not incorporate specific measures to avoid or reduce effects on lynx, although some grizzly bear mitigation would also benefit lynx. With the mine and road improvements on the Bear Creek

Road, the speeds would increase to 35 to 45 mph. Other roads associated with the project may experience higher volumes of traffic, but would not likely cause or increase lynx mortality given the relatively slow speeds at which vehicles on these roads travel (USFWS 2007d).

Most mine access roads would not be in lynx habitat, which would lower mortality risk to lynx, but the increased traffic speeds and volume on the Bear Creek Road could result in increased fracture of connectivity between the Big Hoodoo Mountain Area and the remainder of the Crazy LAU. See *Objective ALL O1 and Standard All S1* above for a discussion of how connectivity would remain within the LAU and the effects of roads on lynx. Alternative 2 would not include monitoring of roads to document lynx mortalities due to vehicle collisions in permit areas and along access roads. Alternative 2 would not meet the intent of ***Guideline ALL G1.***

Objectives and Guidelines Applicable to Human Use Projects in Lynx Habitat in LAUs.

Objective HU O1: *Maintain the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat.*

The USFWS concluded in their initial final rule that snow compaction created by human activities was not found to be a threat to the lynx distinct population segment (USFWS 2000). The USFWS also concluded that there was no evidence that any competition existed between lynx and other species that exerted a population-level impact on lynx, and that there was no evidence that packed snow routes facilitated competition to a level that negatively affected lynx or lynx populations (USFWS 2003b). The USFWS does acknowledge that there is evidence that competing predators do use packed trails, suggesting a potential effect on individual lynx. Because there could be possible adverse effects at the site-specific scale and because of the possibility that unregulated expansion could further impair conservation efforts over time, the NRLMD included provisions to discourage the expansion of snow-compacting activities in lynx habitat above the existing conditions (USFWS 2007d). No particular threshold of allowable increases is provided in the NRLMD.

The main Bear Creek Road is currently not maintained for winter travel beyond the 3-mile mark (from US 2) near the private residences. During the Construction and Operations Phases of the mine, NFS road #278 would be easily drivable during the winter due to snowplowing. Currently, the road becomes a challenge to drive toward the end of the fall big game rifle season in November, and the road is closed to conventional vehicles due to snowpack in April. The Ramsey Creek Road would be open yearlong to mine traffic only, but this road is currently open for administrative use and winter snowmobile use.

Alternative 2 would result in changes in motorized access by conventional motorized vehicles during the winter and early spring season (December 1 to April 30) within the Crazy LAU. The main Bear Creek Road #278 would be maintained for winter travel during the Evaluation, Construction, and Operations Phases of the mine. When the Bear Creek Road was being reconstructed during the Construction Phase, mine-related traffic and public traffic would use Libby Creek Road as the primary access route to the mine facilities and surrounding area. NFS road #231 would be plowed while Bear Creek Road was being reconstructed. The Upper Libby Creek Road would be plowed during the Evaluation Phase through the Operations Phase. Overall, about 25 miles of roads normally not accessed by conventional motorized vehicles during the winter would be plowed for winter motorized travel within lynx habitat. Currently, these roads are open for winter snowmobile travel. There would be no expansion of areas accessible to snowmobiles beyond the existing road system. There may be a slight increase in the ability of predators and competitors (coyotes and mountain lions) to move into and/or through the area during the winter period. Based on local research by Kolbe *et al.* (2007), this potential increase is not likely to create enough competition with coyotes for snowshoe hares that lynx at the site-specific scale would be adversely affected.

The main Bear Creek Road #278, through the impoundment area and the road from the facility site up to the Libby Adit Site is largely located in low-elevation non-habitat, or in lynx travel habitat. Both trapping records and observations of lynx have occurred in this low-elevation non-habitat. Reasons for this may include the more gentle topography that occurs at these lower elevations. Although the Cabinet Mountains appear to have lynx habitat, for some reason the habitat does not appear to be occupied by lynx and this could be a combination of topographic roughness (steep bisected slopes), aspect, and snow conditions (*e.g.*, Cabinet Mountains has a more maritime climate – wetter and associated vegetation) (personal observation by J. Squires, pers. comm. 2011; Regional Silviculturist meeting Yaak 2011; Squires pers. comm. to Carly Walker 2009; and Squires and DeCesare, pers. comm. KNF field trip 2006).

Mountain lions are known predators of lynx in northwest Montana (Squires *et al.* 2006), and increased cougar access could potentially result in lynx mortality. Regular mine traffic on the area roads would tend to discourage mountain lion use of roads, particularly after the Evaluation Phase when traffic would increase and continue for 24 hours a day. Squires *et al.* (2006) found that lions were the major predator of lynx in Montana with most kills occurring in the non-snow season. The risk of increased mountain lion use of the area due to compacted snow on road surfaces would be considered low. The intent of ***Objective HU O1*** would be met.

Objective HU O3: *Concentrate activities in existing developed areas rather than developing new areas in lynx habitat.*

Activities associated with Alternative 2 were designed to avoid lynx habitat and use existing roads and facilities (*i.e.*, the Libby Adit). However, the existing facilities are not adequate to contain the magnitude of the project, and additional facilities (ventilation adits, plant site, tailings impoundment, and transmission line corridor) are required. These activities would impact lynx habitat, although the majority of the disturbance areas would not affect lynx habitat (see *Effects to Lynx Habitat Components* section, p. 1376). The intent of ***Objective HU O3*** would be met.

Objective HU O5: *Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.*

Activities associated with Alternative 2 were designed to avoid lynx habitat and use existing roads and facilities (*i.e.*, the Libby Adit). However, the use of the Libby Adit up Libby Creek and the adit, plant site, and conveyer belt system in Ramsey Creek affects two adjacent drainages in the Crazy LAU. Activity and human use associated with the Alternative 2 mine would become predictable once construction-related activity was over. Most indications are that lynx do not significantly alter their behavior to avoid human activities (summarized in USFWS NRLMD Biological Opinion 2007, p. 68). The majority of impacted acres in the Crazy LAU from the mineral development and facilities would occur in low-elevation non-habitat; however, 2 percent of lynx habitat within the Crazy LAU would be removed for mine development for the life of the mine. The USFWS found no evidence that mineral development was a factor threatening lynx

(USFWS 2007d) and concluded that the NRLMD contained guidelines to minimize the impacts of mineral-related activities on individual lynx and lynx habitat, including Objective HU 05. The intent of ***Objective HU 05*** would be met.

The remaining NRLMD guidelines that would minimize the impacts of mineral-related activities (USFWS 2007d), Guideline HU G4, Guideline HU G6, Guideline HU G9, and Guideline HU G12 are described below.

Objective HU O6: *Reduce adverse highway effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity, and to reduce the potential of lynx mortality.*

The effects of highways on lynx have previously been discussed for Guideline ALL G1. The primary concern with highways is the risk of lynx mortality due to collisions with high-speed vehicles on paved highways or straight gravel roads on flatter terrain. Managing habitat beneficial to lynx movement and cover across linkage areas where lynx tend to cross highways could help reduce mortality. US 2, on the east side of the analysis area, is the only highway associated with this project. The highway corridor is below 4,000 feet in elevation and does not include lynx habitat; however, it is partially located in the linkage area that was also previously discussed (see discussion under Standard All S1). Alternative 2 would not include mitigation for lynx; however, as discussed under *Effects Common to All Action Alternatives*, mitigation for grizzly bears may benefit lynx by improving connectivity in the US 2 fracture zone. The intent of ***Objective HU 06*** would be met.

Guideline HU G4: *For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.*

Alternative 2 would include several operational and post-operational monitoring plans (see section 2.4.5, *Monitoring Plans*), which include hydrology, aquatic life, tailings dam stability, and revegetation, but none monitor snow compaction. No monitoring for lynx, lynx habitat, or snow compaction was proposed in Alternative 2. The potential effect of snow compaction was previously addressed for **Objective HU O1,** and the intent of Objective HU 01 would be met by Alternative 2. Because about 25 miles of the access roads (Bear Creek #278 and Libby Creek #231) would be snowplowed from the Evaluation Phase through to at least the end of the Operations Phase, public snowmobile access to new areas could increase; however, these roads are currently open for winter over-snow vehicles. Plowing of the Bear Creek Road would increase public wheeled-vehicle motorized access where currently it does not occur during the winter. Although remote monitoring for snow compaction is not feasible, Alternative 2 also would not include on-the-ground monitoring for increases in snow compaction off of the access roads by public snowmobiles, and Alternative 2 would not meet the intent of ***Guideline HU G4***.

Guideline HU G5: *For mineral and energy development sites and facilities that are closed, a reclamation plan that restores lynx habitat should be developed.*

Alternative 2 would include a reclamation plan that over the long term would likely restore affected lynx habitat (see section 2.4.3, *Closure and Post-Closure Phases*). The reclamation plan for Alternative 2 was developed with the goal of establishing a post-mining environment compatible with existing and proposed land uses, and consistent with the 2015 KFP. Disturbed areas would be re-contoured where appropriate and revegetated with mostly native species. Tree and shrub seedlings would be planted in selected areas of the Ramsey Plant Site, the Libby Adit

Site, and the Little Cherry Creek Tailings Impoundment Site. If reclamation were successful, sites with lynx habitat potential would return to suitable lynx habitat in the long term. The analysis for lynx considered long-term effects as lasting for the life of the mine, or longer. Those sites impacted by mine-related development and having lynx habitat potential would not provide habitat for the life of the mine, and if reclamation was successful would then require additional time for plant establishment and succession. Alternative 2 would meet the intent of ***Guideline HU G5***.

Guideline HU G6: *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.*

Maintenance levels define the level of service provided by and maintenance required for a road ((USDA Forest Service 2009b). Maintenance level 4 is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double-lane and aggregate surfaced. Some may be single-lane and some may be paved or have dust abated. Maintenance level 5 is assigned to roads that provide a high degree of user comfort and convenience. Normally roads are double-lane and paved, but some may be aggregate surfaced with the dust abated.

The existing Bear Creek Road #278 is currently a level 3 maintenance road. A road maintenance level 3 is defined (USDA Forest Service 2009b) as a road opened and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this level are typically low speed with single lanes and turnouts, have low to moderate traffic volume, and typically have potholes or a washboard surface. The Bear Creek Road primarily functions as a recreation road. The first 0.75 mile of the road is a two-way two-lane road with a total width ranging from 18 to 20 feet, while the remainder is a two-way single-lane road with a total width of about 14 feet. The first 9.5 miles has chip-seal paved surface that is in poor condition. After the Bear Creek bridge, the remainder of the road is a native dirt surface. The proposed upgrades, as described under Standard All S1 and Guideline All G1, would result in the road being upgraded to a level 4 maintenance road.

The USFWS (2003a) concluded the overall threat to lynx populations from high traffic volume on roads that bisect suitable lynx habitat and associated suburban developments is low, especially for resident lynx. High-volume highways reported as hazards to dispersing lynx have high average daily traffic volume, with ranges reported from 14,940 vehicles (Clevenger and Waltho 2005) to more than 24,000 vehicles (Stinson 2001; Singleton and Lehmkuhl 2000). Please see Alternative 2, *Objective All 01*, and *Standard All S1* for a discussion of effects to lynx due to the increases in projected traffic volume and traffic speeds.

As described for *Guideline ALL G1* above, reconstructed and new roads associated with Alternative 2 do not incorporate specific methods to avoid or reduce effects on lynx.

Most mine access roads would not be in lynx habitat, but portions of the road used do occur within the LAU. In all mine alternatives, MMC would continue to snowplow the Libby Creek Road during the Evaluation Phase and early in the Construction Phase. Snowplowing of the Libby Creek Road would cease after the Bear Creek Road was reconstructed. Throughout the Evaluation, Construction, and Operations Phases, the Upper Libby Creek Road #2316 would be plowed for access to the Libby Adit. Traffic would be limited to mine traffic during the KNF seasonal closure period of April 1 to May 15, but otherwise would be open to the public. Plowing where public access could occur would make access to lynx habitat easier for trappers and increase the risk of incidental lynx mortality. No monitoring of access roads or permit areas to document lynx mortality due to vehicle collisions was proposed for Alternative 2. Alternative 2 would not include mitigation to avoid or reduce effects of the road upgrades to lynx and would not meet the intent of ***Guideline HU G6.***

Guideline HU G7: *New permanent roads should not be built on ridgetops, saddles, or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers (i.e., narrow bands of forest habitat).*

The majority of Alternative 2 activity would be within the Crazy LAU in low-elevation non-habitat and travel habitat, with some stand initiation and multistory forage habitat affected. New permanent roads would not be built on ridgetops or saddles. Alternative 2 would require three new road crossings across major streams and one new road crossing across a minor stream. During construction, disturbances within the riparian and floodplain would be minimized. The existing Bear Creek bridge would likely remain at the existing 14-foot width. New bridges are proposed over Ramsey (single-lane) and Poorman creeks and a culvert would likely be installed in Little Cherry Creek above the Diversion Dam. Although construction would occur in riparian areas suitable as potential travel corridors, the extent of development would not be expected to disrupt normal lynx movement patterns in the long term. The intent of ***Guideline HU G7*** would be met by Alternative 2.

Guideline HU G8: *Cutting brush along low-speed, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.*

Low-speed, low-traffic forest roads would generally refer to single-lane roads where roadside brush would be likely to intrude into the vehicle-width corridor (about 14 feet wide). The clearing width for most of the constructed or reconstructed roads associated with Alternative 2 would be upgraded to 20 to 29 feet wide, with a total disturbed area of 100 feet including ditches and cutbanks to facilitate safe passage for mine-related and public traffic. Road maintenance, which is likely to include roadside brushing at times, would occur throughout the life of Alternative 2. The minimum level necessary to provide for public safety would most likely be more extensive than what would be needed for low-speed, low-traffic-volume roads. These roads would not be considered low-volume roads in terms of forest road use until well into the Closure Phase. Overall, ***Guideline HU G8*** is generally not applicable to the wider, higher traffic volume roads associated with the mine-related roads.

Guideline HU G9: *On new roads built for projects, public motorized use should be restricted. Effective closures should be provided in road designs. When the project is completed, these roads should be reclaimed or decommissioned, if not needed for other management objectives.*

All new roads associated with Alternative 2, except for the reconstructed segments of the Bear Creek Road to provide for safety of public and mining road use, would be gated and restricted to public access. All newly constructed roads would be decommissioned following mine closure. Alternative 2 would meet the intent of ***Guideline HU G9***.

Guideline HU G12: *Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes or designated over-the-snow routes.*

Winter road access for activities associated with Alternative 2 would be limited to designated routes. Alternative 2 would plow the Libby Creek Road #231 and the Upper Libby Creek Road #2316 during the Evaluation Phase, and would plow the Libby Creek Road #231 while the Bear Creek Road was being reconstructed. During the Operations Phase, the Bear Creek Road and the Upper Libby Creek Road #2316 would be plowed. For Alternative 2, all motorized winter access for mine-related activities would be confined to the existing road network and new roads proposed to access mine facilities, and winter access associated with Alternative 2 would meet the intent of ***Guideline HU G12***.

E. *Objectives, Standards, and Guidelines Applicable to ALL Projects in Linkage Areas in Occupied Habitat, Subject to Valid Existing Rights.*

Objective LINK O1: *In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.*

Please see the discussion above under *"Effects Common to All Combined Action Alternatives."* In summary, Alternative 2, as part of MMC's Grizzly Bear Mitigation Plan, would acquire lands or conservation easements as mitigation for habitat physically lost, and all lands would be managed in perpetuity for grizzly bears. If these lands were located in lynx habitat, management for grizzly bears would also benefit lynx in terms of offsetting direct loss of habitat, precluding private parcels within lynx habitat from being developed, improve connectivity for lynx, and by reducing motorized access could provide higher levels of security for lynx and potentially reduce risk of displacement and potential poaching. Due to the required habitat compensation for grizzly bear mitigation for combined action alternatives, potential to reduce impacts on lynx and habitat may occur, and Alternative 2 would meet the intent of ***Objective LINK 01***.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

In respect to NRLMD applicable Objectives, Standards, and Guidelines, impacts on lynx in Crazy LAU 14504 from Alternative 3 would be the same as described in *Effects Common to All Action Alternatives* or under Alternative 2, with the exception of the following.

A. *Objectives, Standards, and Guidelines Applicable to ALL Management Projects in Lynx Habitat.*

Objective ALL O1: *Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.*

Standard ALL S1: *New or expanded permanent development and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.*

Alternative 3 potential impacts on lynx movement within the Crazy LAU would be minimized by concentrating disturbance from plant facilities and adits in the Libby Creek drainage. The mine facilities consisting of the adit, conveyor belt system, mill site, pipes, and impoundment would likely cause a change in movement patterns in the immediate area. A lynx may find it difficult to cross under the ore conveyor belt system between the adit and the mill site. The configuration of the conveyor (10 feet high by 10 feet wide or 8 feet high by 16 feet wide) may allow passage of smaller animals through the framework supporting the conveyor, whereas larger animals the size of a bear or deer would have difficulty passing under the conveyor (Klepfer, pers. comm. 2014). The noise associated with the conveyor, coupled with the framework that a lynx would have to negotiate, may deter a lynx from passing under the conveyor. The conveyor would be 6,000 to 7,500 feet long. Lynx would be able to bypass the conveyor. In respect to the effectiveness of Alternative 3 mitigation plan, the agencies' Terrestrial Threatened and Endangered Mitigation Plan requires yearlong closures that would improve grizzly bear habitat by reducing fragmentation in the north-south movement corridor (see the *Grizzly Bear* section). These closures would also serve to provide additional secure habitat for lynx where those closures occurred in LAUs. In addition to the agencies' proposed road closures (Table 28 and Table 29 in Chapter 2), an additional closure may be implemented by Alternative 3. If the Rock Creek Project has not yet implemented the closure on the Upper Bear Creek Road #4784, then MMC would decommission or place into intermittent stored service and barrier NFS road #4784 prior to Forest Service authorization to initiate the Evaluation Phase), as discussed under Alternative 2. This additional closure would not only improve grizzly bear habitat but would improve connectivity for lynx in the Crazy LAU.

The effects to wetlands and riparian areas that may provide potential lynx movement corridors would be minimized through avoiding RHCAs to the extent feasible (Table 75 in the *Aquatic Life and Fisheries* section) and implementing the agencies' Vegetation Removal and Disposition Plan. As part of the final design, MMC would submit a Vegetation Removal and Disposition Plan that would minimize vegetation clearing, particularly in RHCAs. However, wetland mitigation sites that may be used would be located either at lower elevations outside of the Crazy LAU or adjacent to the LAU boundary and would have little beneficial effect for lynx.

Guideline ALL G1: *Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses.*

In Alternative 3, MMC would use the same roads as Alternative 2 for main access during operations, but the amount of miles used would differ. About 13 miles of Bear Creek Road (NFS road #278), from US 2 to the Poorman Tailings Impoundment Site, would be paved and upgraded to a road width of 26 feet. Actual disturbance for new and upgraded mine access roads was considered at 100-foot total width, including cutbanks. South of Little Cherry Creek, MMC would build 3.2 miles of new road west of Bear Creek Road that would connect Bear Creek Road with Ramsey Creek Road (NFS road #4781). The new road would be designated NFS road #278 (the new Bear Creek Road) and would generally follow the 3,800-foot contour to north of the Poorman Creek bridge. To maintain a public access connection between the Bear Creek Road and the Libby Creek Road (NFS road #231), the public would use the new Bear Creek Road, a segment of the Poorman Creek Road (NFS road #2317), and a segment of the Bear Creek Road south of Poorman Creek. Overall road use and traffic volume increases expected for Alternative 3 are as described for Alternative 2 in ***Standard All S1*** and ***Guideline HU G6***.

Alternative 3 would not include fencing, underpasses, or overpasses to avoid or reduce effects on lynx due to the low volume of traffic expected relative to the volume of traffic known to cause lynx mortality (see the ***Standard All S1*** and ***Guideline HU G 6*** discussion for Alternatives 2 and 3). The USFWS (2003a) concluded the overall threat to lynx populations from high traffic volume on roads that bisect suitable habitat is low, especially for resident lynx, and low potential for lynx to occur in the Cabinet Mountains. However, the agencies' alternatives, including Alternative 3, would incorporate adaptive mitigation measures that would reduce effects to lynx from changes to forest roads. Prior to the Evaluation Phase, to reduce mortality risk to grizzly bears, the agencies' Terrestrial Threatened and Endangered Species Mitigation Plan would 1) require the development of a transportation plan designed to minimize mine-related vehicular traffic (Part A, item A.1.b); 2) monitor frequency of vehicle-killed animals and review with the KNF and FWP to determine if additional mitigation measures are necessary (Part A, item A.1.f); and 3) report all grizzly bear, lynx, wolf, and black bear mortalities within 24 hours (Part A, item A.1.f). The transportation plan would reduce disturbance from increased motorized activity along roads in forested corridors between mine components by reducing traffic levels and would require busing employees to the mine facilities and limiting private vehicles. These measures would also reduce mortality risk to lynx. Alternative 3 would meet the intent of ***Guideline ALL G1***.

D. Objectives and Guidelines Applicable to Human Use Projects in Lynx Habitat in LAUs.

Objective HU O1: *Maintain the lynx's natural competitive advantage over other predators in deep snow by discouraging the expansion of snow-compacting activities in lynx habitat.*

Objective HU O2: *Manage recreational activities to maintain lynx habitat and connectivity.*

Objective HU O3: *Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.*

Objective HU O5: *Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.*

Activities associated with Alternative 3 were designed to avoid lynx habitat and use existing roads and facilities (*i.e.*, the Libby Adits and Upper Libby Adit) and to avoid new expansion of snow-compacting activities in lynx habitat. Potential impacts on lynx movement within the LAU also would be minimized by concentrating disturbance from plant facilities and adits in the Libby Creek drainage. Public access would be managed in the mine area during the Construction and Operations Phases, and no new recreation routes would be created that affect lynx habitat or connectivity.

Activity and human use associated with the Alternative 3 mine would become predictable once construction-related activity was complete. Grizzly bears have been documented to forage and use areas close to high levels of human use, including mines, where activities were temporally and spatially predictable and people associated with the work were carefully regulated against carrying firearms and providing human-associated attractants (USFWS 2014a). Most indications are that lynx do not significantly alter their behavior to avoid human activities (summarized in USFWS NRLMD Biological Opinion 2007, p. 68). The USFWS found no evidence that mineral development was a factor threatening lynx (USFWS 2007d) and concluded that the NRLMD contained guidelines to minimize the impacts of mineral-related activities on individual lynx and lynx habitat, including Objective HU 05, Guideline HU G4, Guideline HU G6, Guideline HU G9, and Guideline HU G12. Guidelines HU G4, HU G6, HU G9, and HU G12 are described below.

Less than 1 percent of lynx habitat within the Crazy LAU would be removed for mine development for the life of the mine (for effects to lynx habitat, see the *Effects to Lynx Habitat* section). Remaining effects are as described for Alternative 2. Alternative 3 would meet the intent of ***Objectives HU 01, HU 02, HU 03,*** and ***HU 05***.

Guideline HU G4: *For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction****.***

As described in sections 2.5.6, *Monitoring* and 2.5.7, *Mitigation Plans*, the KNF would monitor new snow compaction activities (such as snowmobiling) in the analysis area and take appropriate action if compaction monitoring identified increased predator access to new areas (agencies' Terrestrial Threatened and Endangered Species Mitigation Plan, Lynx, Item B). Remote monitoring is difficult and impractical, and new off-road use can easily be monitored from the access roads. Alternative 3 would meet ***Guideline HU G4***.

Guideline HU G5: *For mineral and energy development sites and facilities that are closed, a reclamation plan that restores lynx habitat should be developed.*

For Alternative 3, during reclamation, disturbed areas would be reseeded with native species only, except in specific situations as approved by the lead agencies. Also, reclamation success criteria and planting/seeding conditions would be more rigorous, and tree planting densities would be greater in Alternative 3 than Alternative 2. Alternative 3 modifications in the reclamation plan are expected to result in more rapid revegetation of lynx habitat than Alternative 2. Alternative 3 would meet ***Guideline HU G5***.

Guideline HU G6: *Methods to avoid or reduce effects on lynx should be used in lynx habitat when upgrading unpaved roads to maintenance level 4 or 5, if the result would be increased traffic speeds and volumes, or a foreseeable contribution to increases in human activity or development.*

The agencies' alternatives would incorporate adaptive mitigation measures that would reduce effects to lynx from changes to forest roads. Prior to the Evaluation Phase, to reduce mortality risk to grizzly bears, the agencies' Terrestrial Threatened and Endangered Species Mitigation Plan would 1) require the development of a transportation plan designed to minimize mine-related vehicular traffic (Part A, item A.1.b); 2) monitor the frequency of vehicle-killed animals and review with the KNF and FWP to determine if additional mitigation measures are necessary (Part A, item A.1.f); and 3) report all grizzly bear, lynx, wolf, and black bear mortalities within 24 hours (Part A, item A.1.f). The transportation plan would reduce disturbance from increased motorized activity along roads in forested corridors between mine components by reducing traffic levels and would require busing employees to the mine facilities and limiting private vehicles. These measures would also reduce mortality risk to lynx. Alternative 3 would meet the intent of ***Guideline HU G6***.

Guideline HU G7: *New permanent roads should not be built on ridgetops and saddles, or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers.*

Alternative 3 associated activities (evaluation adit, plant site, impoundment, and associated roads) are largely within the Crazy LAU, mainly affecting low-elevation non-habitat, travel habitat, and affecting less stand initiation and multistory mature late successional habitat than Alternative 2. Alternative 3 would not include building new permanent roads on ridgetops or saddles. Alternative 3 would require one major stream crossing and one minor stream crossing. During construction, disturbances within the riparian and floodplain would be minimized. The existing 14-foot-wide Bear Creek bridge would be replaced and widened to a width compatible with a 26-foot-wide Bear Creek Road. Although construction would occur in riparian areas suitable as potential travel corridors, the extent of development would not be expected to disrupt normal lynx movement patterns in the long term. Cover for movement is retained in the remaining undisturbed areas, and no designated lynx linkage area would be measurably affected (Claar *et al.* 2003; USDA Forest Service 2007a). The intent of ***Guideline HU G7*** would be met by Alternative 3.

E. *Objectives, Standards, and Guidelines Applicable to ALL Projects in Linkage Areas in Occupied Habitat, Subject to Valid Existing Rights.*

Objective LINK O1: *In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.*

Please see discussion above under *"Effects Common to All Combined Action Alternatives."* In summary, the agencies' Threatened and Endangered Species Mitigation Plan for grizzly bear would acquire lands or conservation easements (acreages depend upon the combination) as mitigation for habitat physically lost and for habitat displacement. The acreages required for the agencies' combined action alternatives are greater than the habitat mitigation acreage for Alternative 2B and, as a result, the potential benefit to grizzly bears, and consequently lynx, is greater. These lands would be managed in perpetuity for grizzly bears. If these lands were located in lynx habitat, management for grizzly bears would also benefit lynx in terms of offsetting direct loss of habitat, precluding private parcels within lynx habitat from being developed, improving connectivity for lynx, and by reducing motorized access could provide higher levels of security for lynx and potentially reduce risk of displacement and potential poaching. Due to the required habitat compensation for grizzly bear mitigation for the agencies' combined action alternatives, potential to reduce impacts on lynx and their habitat may occur, and Alternative 3 would meet the intent of ***Objective LINK 01***.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

With respect to NRLMD applicable Objectives, Standards, and Guidelines, impacts on lynx in LAU 14504 from Alternative 4 would be the same as discussed under *Effects Common to All Action Alternatives*, and Alternative 2 as modified by Alternative 3.

Direct and Indirect Effects of Transmission Line Alternatives

With respect to NRLMD applicable Objectives, Standards, and Guidelines, where general effects to lynx or lynx habitat from management activities as described under "*Effects Common to All Combined Action Alternatives*," or as described under the mine alternatives, would apply to similar activities in the transmission line alternatives, and there are no substantial differences in the reasoning, those conclusions will not be repeated here.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Effects on Lynx on National Forest System Lands

A. Objectives, Standards, and Guidelines Applicable to ALL Management Projects in Lynx Habitat in LAUs in Occupied Habitat and in Linkage Areas, Subject to Valid Existing Rights.

Objective ALL O1: *Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.*

Standard ALL S1: *New or expanded permanent development and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.*

Alternative B would not affect any NRLMD designated linkage areas within the LAUs. North and south connectivity and identified linkages in the main Crazy and West Fisher LAUs would remain undisturbed. Existing movement areas and connectivity toward the east in the Crazy LAU through the Horse Mountain to the Poker Hill area would remain, as well as toward the eastern edge of the West Fisher LAU. Movement through the US 2 linkage zone area, which partially overlaps the Crazy and West Fisher LAUs, may be temporarily disrupted while construction activity is occurring but this would be of short duration and would not occur along the entire line, allowing for movement areas without construction-related activity. Alternative B could affect movement by removing forest cover in potential movement areas such as the Miller, Howard, Libby, and Ramsey creek corridors. Vegetation would be cleared in areas of ground disturbance, such as access roads and pulling and tensioning sites. In some portions of transmission line clearing areas, only the tallest trees would be removed, leaving some shrub and tree cover in the transmission line right of way (100 feet). However Alternative B has no plan for minimizing vegetation removal in the 100-foot right of way. For Alternative B, the analysis assumed a 150-foot clearing width due to potential hazard tree removal outside of the right of way.

Clearing of timber through harvest would occur on up to 6 acres of lynx habitat in LAU 14503, and up to 79 acres of lynx habitat in LAU 14504, with the habitat affected being scattered along the entire transmission line. The Alternative B transmission line right of way of 100 feet, and the clearing area (150 feet) would be relatively narrow and the removal of vegetation would have a minimal long-term effect on lynx behavior or movement patterns due to the amount of shrubs and low trees expected to remain in the clearing area or that would grow back during operations. Displacement effects from human activity, including low-traffic roads, do not appear to be a major concern for lynx (Ruediger *et al.* 2000). Construction activities associated with the transmission line and access roads could temporarily disturb a lynx or movement patterns within LAUs 14503 and 14504. However, activities would be spread along the transmission line alignment over a 2-year period, hiding cover would remain throughout most of the clearing area outside of roads, plant succession would occur on temporary roads throughout the Operations Phase, and actual potential to affect movement patterns is considered low.

Outside of the West Fisher LAU and within the MFSA analysis area, about 6.5 miles of road under Alternative B, originating at the Sedlak Park Substation, would be within the US 2 linkage zone, which includes the US 2 – Barren Peak/Hunter Creek Approach area. Discussion of this portion of the transmission line and Sedlak Park Substation is in the *Effects on Lynx on Private and State Land Analysis* section following the federal lands discussion for Alternative B.

No mitigation plans associated with Alternative B are specific for lynx. MMC would be governed by its proposed Environmental Specifications (MMI 2005b) for transmission line construction, operation, maintenance, and decommissioning activities, but the specifications did not include a Vegetation Removal and Disposition Plan. Alternative B would incorporate mitigation for other resources that would benefit lynx. Alternative B would include a timing restriction for short-term displacement effects for grizzly bears, which would restrict motorized activity associated with the transmission line construction from April 1 to June 15 within bear habitat in the Miller Creek and

Midas Creek drainages. This area within the Cabinet Yaak CYRZ for grizzly bears also overlaps lynx habitat in the West Fisher and Crazy LAUs and would minimize disturbance to potential movement between the drainages and decrease the risk of mortality in the spring. Alternative B construction would also not occur during the winter (December 1 to April 30) in big game winter range areas as identified by FWP. This would eliminate winter disturbance caused by Alternative B construction in the West Fisher LAU, while partially restricting it in the Crazy LAU. Between the grizzly and big game timing restrictions, winter disturbance in the West Fisher LAU and spring disturbance in the West Fisher LAU, Miller Creek Area, and the Crazy LAU in Midas Creek associated with Alternative B would not occur. This would maintain the existing security levels and connectivity for lynx between the drainages during the winter and spring.

In summary, Alternative B construction and associated road reconstruction or temporary road construction would affect travel and lynx habitat within both LAUs. The transmission line narrow clearing area would not be expected to impede movement within the Crazy or West Fisher LAU or outside of the LAU in the approach/linkage area due to the short-term construction period of 2 years, the amount of vegetative cover that is expected to remain in the clearing area, and low potential for lynx. The intent of ***Objective ALL 01*** and ***Standard ALL S1*** would be met.

Guideline ALL G1: *Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses.*

Reconstructed and new roads associated with Alternative B are not considered forest highways and do not incorporate specific measures to avoid or reduce effects on lynx. Alternative B would include the construction of new roads and reconstruction of existing roads for transmission line access, which were analyzed as affecting a 25-foot road width. Use of most of these roads would be limited to construction equipment during the construction period, and traffic volume would be low. Specific measures that would minimize potential impacts on lynx would not be necessary due to the short duration of use, low traffic volume and speeds, low potential to affect lynx, and a low potential for lynx to occur. Alternative B would meet the intent of ***Guideline ALL G1***.

B. Objectives and Guidelines Applicable to Human Use Projects in Lynx Habitat within LAUs.

Objective HU O1: *Maintain the lynx's natural competitive advantage over other predators in deep snow by discouraging the expansion of snow-compacting activities in lynx habitat.*

Snow compaction created by human activities was not found to be a threat to lynx (USFWS 2000). Alternative B transmission line construction could occur during the winter, but the USFWS also concluded there is no evidence that packed snow routes facilitated competition to a level that negatively affected lynx or lynx populations (USFWS 2003b). Alternative B transmission line construction would not occur during the winter in big game winter ranges (December1 to April 30). Thus, no late winter activity associated with Alternative B construction would occur within the West Fisher LAU as it is located entirely on winter range. In the Crazy LAU, Alternative B activities would be partially located on winter range. A timing restriction for grizzly bear restricts motorized activity associated with construction from April 1 to June 15 within bear habitat in the Miller Creek and Midas Creek drainages, which also overlap both LAUs. Activities related to construction of Alternative B and associated road use would occur outside of the big game and grizzly bear timing restriction, which would reduce potential for snow compaction along portions of the transmission line. Activities associated with Alternative B construction could occur in late October and November and snow compaction is possible. The short-term nature of the activities occurring in 2 months where snow is likely would not be expected to measurably change the lynx's natural competitive advantage. Based on local research by Kolbe *et al.* 2007, any potential increase in the ability of predators and competitors to move into lynx habitat on snow-compacted roads or trails is not likely to create enough competition with coyotes for snowshoe hare that lynx on the site-specific scale would be adversely affected. The intent of ***Objective HU 01*** would be met by Alternative B.

Objective HU O3: *Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.*

Objective HU O5: *Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.*

The components of Alternative B were designed, to the extent possible, to avoid lynx habitat and use existing roads and facilities. However, due to the objective of the project, to construct a transmission line from the substation located on US 2 to the plant site up Ramsey Creek, some construction would occur in undeveloped areas, mainly over the ridge from Miller Creek into Midas Creek. Where possible, roads currently open year-round would be used for construction access. Although some new access roads would be built and some currently closed roads would be opened for transmission line access, these roads would be used temporarily during transmission line construction and would not likely be used during winter. Helicopter use is at the discretion of the contractor and may be used for four activities – structure placement, line stringing, timber harvest, and annual inspection and maintenance. Logging may take 1 to 2 months over the 2-year period. Structure placement and line stringing would take 1 to 2 weeks each. Annual inspections may take about a week a year. Increased noise would occur during these times and construction activities would be generally audible for about 2.5 miles, depending on the topography. Noise associated with the transmission line activity would not be expected to measurably change lynx use patterns. Most indications are that lynx do not significantly alter their behavior to avoid human activities (summarized in USFWS NRLMD Biological Opinion, 2007, p. 68).

No mitigation plans are associated with Alternative B specifically for lynx. However, Alternative B incorporates mitigation for other resources that would reduce impacts on lynx. Alternative B would require a timing restriction for short-term displacement effects for grizzly bears, which would restrict motorized activity associated with the transmission line construction from April 1 to June 15 within bear habitat in the Miller Creek and Midas Creek drainages. This area within the Cabinet Yaak CYRZ for grizzly bears also overlaps lynx habitat in the West Fisher and Crazy LAUs and would minimize disturbance to potential movement and provide for a decreased risk of mortality during this time. See Objective HU 01 for a description of the big game winter range timing that would also reduce impacts to lynx. The intent of ***Objective HU 03*** and ***HU 05*** would be met by Alternative B.

Guideline HU G4: *For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.*

Alternative B includes several operational and post-operational monitoring plans (see section 2.4.5, *Monitoring Plans*), which include hydrology, aquatic life, tailings dam stability, and revegetation, but none monitor snow compaction. No monitoring for lynx, lynx habitat, or snow compaction was proposed in Alternative B. The potential effect of snow compaction was previously addressed for ***Objective HU O1,*** and the intent of ***Objective HU 01*** would be met by Alternative B. Although remote monitoring for snow compaction is not feasible, Alternative B also would not include on-the-ground monitoring for increases in snow compaction off of the access roads by public snowmobiles. However, due to mitigation incorporated for big game and grizzly bears (described under ***Objectives HU 01***, ***HU 03***, and ***HU 05***), which would restrict Alternative B construction during the winter (December 1 to April 30) on big game winter ranges (as mapped by FWP) and in early spring (April 1 to June 15) for grizzly bears in the Miller Creek and Midas Creek drainages, the potential for snow compaction resulting from Alternative B during these times on about 3 miles in the West Fisher LAU and about 3 miles in the Crazy LAU would not occur. Alternative B, due to non-related lynx mitigation, would meet the intent of ***Guideline HU G4***.

Guideline HU G5: *For mineral and energy development sites and facilities that are closed, a reclamation plan that restores lynx habitat should be developed.*

Alternative B includes a reclamation plan that over the long term would likely restore affected lynx habitat. The reclamation plan for Alternative B was developed with the goal of establishing a post-mining environment compatible with existing and proposed land uses and consistent with the 2015 KFP. Following construction, land within the clearing area that has been rutted, compacted, or disturbed would be reclaimed. Access roads opened or constructed for transmission line access would be gated or barriered, regraded, scarified, and reseeded after transmission line construction. At mine closure, the transmission line would be removed and all new roads would be reclaimed and graded to match the adjacent topography and obliterate the road prism. Interim and permanent seed mixes with both native and introduced species would be used. Native shrubs, such as alder or willow, would be planted on streambanks to reduce bank erosion. Alternative B would meet ***Guideline HU G5***.

Guideline HU G6: *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.*

As described for ***Guideline ALL G1*** above, reconstructed and new roads associated with Alternative B do not incorporate specific methods to avoid or reduce effects on lynx. Roads that would be built or reconstructed would have a disturbance area no more than 25 feet wide. Use of most of these roads would be limited to construction equipment during the construction period, and traffic volume would be low. Specific measures that would minimize potential road reconstruction impacts on lynx for Alternative B are probably not necessary due to the short duration of use and low potential to affect lynx. Alternative B would meet ***Guideline HU G6***.

Guideline HU G7: *New permanent roads should not be built on ridgetops and saddles, or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers.*

Alternative B would cross over the ridge between the Miller Creek and Upper Midas drainage where currently no road exists. Temporary roads would be constructed. Alternative B construction activity would be of short duration (about 2 years) and would not occur on the entire line at one time. In addition, due to mitigation incorporated for grizzly bears (see ***Objectives HU 01***, ***HU 03***, and ***HU 05***), construction-related activity would not occur in the Miller Creek and Midas Creek drainages from April 1 to June 15. Known lynx locations are to the west and lynx appear to use the divide below Midas Peak, south of Howard Lake, where the Libby Creek Road and NFS road #4724 cross. Lynx habitat connectivity would remain with implementation of Alternative B as shrubs and other low vegetation is expected to remain in the transmission line clearing area. Alternative B would meet ***Guideline HU G7***.

Guideline HU G8: *Cutting brush along low-speed, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.*

Roads opened or temporary access roads constructed for the transmission line access would be closed after the transmission line was built. On new roads, all trees and shrubs would be cleared for a 12-foot width, with a total road width assumed to be 25 feet. After construction, temporary access roads would be closed and surfaces reseeded for the Operations Phase. Roads could be used for maintenance as needed, and brushing for safety may be needed during the Operations Phase. On open roads and gated administrative roads opened for construction, brushing would likely occur for public or administrative use safety. Alternative B would comply with ***Guideline HU G8*** as roads used for Alternative B construction/maintenance access are low-speed, low-traffic-volume roads and brushing would only occur where required for safety.

Guideline HU G9: *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.*

Access roads opened or constructed for transmission line access would be used only during the Construction Phase or for maintenance, which is expected to be required infrequently. Where seasonally closed roads were used for construction, efforts would be made to minimize their use during the restricted period. Restricted roads used or built for constructing the transmission line would restrict public use. Yearly inspection and repair of the line would be conducted by helicopter. Monitoring at monthly intervals during the growing season would be conducted along the clearing area and access roads to detect the invasion of weeds. Herbicide would be carried in tanks mounted on vehicles or in backpack tanks. Routine maintenance would identify and remove targeted trees and tall shrubs through manual or mechanical means. Clearing of hazard trees and tall shrubs in the clearing area would continue until decommissioning of the line. Roads opened or constructed for access would be closed and reseeded as an interim reclamation activity to stabilize the surface during the Operations Phase. MMC expects the transmission line facilities would be the last facilities reclaimed following mine closure. After the transmission line was removed, all newly constructed roads on National Forest System lands would be bladed and re-contoured, obliterating the road prism. Alternative B would comply with ***Guideline HU G9***.

Guideline HU G12: *Winter access for non-recreation special uses and mineral and energy exploration and development should be limited to designated routes or designated over-the-snow routes.*

If road access occurred during the October and November activities associated with Alternative B, access would be limited to designated routes. Due to mitigation restricting construction during winter on winter ranges for big game (December 1 to April 30) and restricting motorized activity associated with construction from April 1 to June 15 within bear habitat in the Miller and Midas

Creek drainages, motorized access for Alternative B construction during winter is limited. Alternative B would meet ***Guideline HU G12***.

Effects on Lynx on Private and State Land

The NRLMD management direction does not apply to private land or State land within a LAU. Alternative B would not be located on any private or State land in the West Fisher 14503 or Crazy 14504 LAUs. Effects to lynx habitat inside the LAUs, and outside of the LAUs within the MFSA analysis area, are discussed in the *Effects to Lynx Habitat Components* section, p. 1376. Although an individual lynx may alter its route to avoid the increased activity associated with construction of the transmission line and Sedlak Park Substation, effects within the US 2 linkage zone would be short-term due to the short duration (over a 2-year period) of construction, transmission line construction activity would not occur all the time on any one section of the line during that time frame, some level of low shrubs providing cover would likely remain within the transmission line clearing or would recover during the Operations Phase, and the low potential for lynx to occur.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Effects on Lynx on National Forest System Lands

With respect to NRLMD applicable Objectives, Standards, and Guidelines, general effects to lynx in the Crazy LAU 14504 and the West Fisher LAU 14503 from Alternative C-R are as described for Alternative B, with the exception of the following:

A. Objectives, Standards, and Guidelines Applicable to ALL Management Projects in Lynx Habitat in LAUs in Occupied Habitat and in Linkage Areas, Subject to Valid Existing Rights.

Objective ALL O1: *Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.*

Standard ALL S1: *New or expanded permanent development and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.*

More clearing area and tree clearing, but fewer structures and access roads, would be required for Alternative C-R than Alternative B. In Alternative C-R, construction of the transmission line and access roads could affect lynx movement within LAUs 14503 and 14504 by removing forest cover in potential movement areas such as the Miller Creek and Howard Creek riparian corridors (see the *Effects to Lynx Habitat Components* section, p. 1376 for a discussion of effects to lynx habitat). Existing movement areas and connectivity toward the east side of the Crazy LAU through the Horse Mountain to the Poker Hill area would remain, as well as toward the eastern edge of the West Fisher LAU, but cover would be modified in the 150-foot transmission line right of way. Within this right of way area trees and shrubs would likely be removed, which may affect lynx movement across the opening. The analysis used a 200-foot clearing width because outside of the 150-foot right of way, danger trees may be removed as necessary. Removing danger trees in this additional 50-foot width would not be expected to affect the availability of low shrubs and trees providing cover for movement. It is expected however that low-growing shrubs would also persist in portions of the right of way clearing area, providing some level of cover, and not all areas would be cleared due to the height of the line as a result of mitigation.

Outside and to the east of the West Fisher LAU about 4.5 miles of Alternative C-R, beginning at the Sedlak Park Substation, would be within the US 2 linkage zone area. Discussion of this portion of the transmission line is in the *Effects on Lynx on Private and State Land a*nalysis sections following the federal lands discussion for Alternative C-R.

Slash would be left in the clearing area, providing down wood, but the clearing area would not be expected to provide habitat suitable for lynx denning. Most documented den sites in Montana have been in mature spruce-fir forests with high horizontal cover and abundant coarse woody debris, while younger stands and stands with discontinuous canopies were seldom used (Squires *et al*. 2008). Areas of surface disturbance in lynx habitat, such as access roads and pulling and tensioning sites, would return to suitable lynx habitat in the long term once vegetation is re-established. For access roads constructed, this return to suitable lynx habitat could be after reclamation if the road was used for maintenance and bladed for safety during the Operations Phase. Vegetation succession would continue on pulling and tensioning sites during the Operations Phase, but would be re-disturbed during reclamation.

The acreages of lynx habitat affected are probably an overestimate of the actual effects because a Vegetation Removal and Disposition Plan (as specified in Environmental Specifications, Appendix D) developed for Alternative C-R would minimize tree removal, thereby maintaining more shrub and tree cover in the transmission line clearing area than Alternative B. This would serve to maintain connectivity within the LAUs by minimizing vegetation removal in the clearing area. MMC would develop this plan and submit it for agency approval before the Construction Phase (see section 2.5.3.3.1, *Vegetation Removal and Disposition* in the Alternative 3 discussion). For more detailed discussion of the effects to lynx habitat, see the *Effects to Lynx Habitat Components* section, p. 1376.

Construction activities associated with the transmission line and access roads would not be expected to measurably affect lynx movement within LAUs 14503 and 14504 due to the activities that would be spread along the transmission line route over a 2-year period, hiding cover would remain throughout most of the clearing area outside of roads, and plant succession would likely continue on most temporary roads throughout the Operations Phase. Alternative C-R would meet the intent of ***Objective ALL 01*** and ***Standard ALL S1***.

B. *Objectives and Guidelines Applicable to Human Use Projects in Lynx Habitat within LAUs.*

Objective HU O3: *Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.*

Due to the objective of Alternative C-R, to construct a transmission line from the substation at Sedlak Park on US 2 to the Libby Plant Site, construction activities would occur in undeveloped areas, mainly over the ridge from Miller Creek into Midas Creek. Fewer structures and access roads would be required for Alternative C-R than Alternative B. For Alternative C-R, helicopters would be used to construct structures at 26 locations in the Miller Creek, Midas Creek, and Howard Creek drainages, thereby eliminating the need for access roads in these locations. Alternative C-R would meet ***Objective HU 03***.

Objective HU O5: *Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.*

Required grizzly bear timing mitigation for Alternative C-R construction, which would restrict all activities on National Forest System lands for both construction seasons of the transmission line between June 16 and October 14, would remove transmission line construction disturbance during the important winter period and early spring in both the West Fisher 14503 and Crazy 14504 LAUs. Due to grizzly bear mitigation, Alternative C-R would meet the intent of ***Objective HU 05***.

Guideline HU G4: *For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.*

In northwest Montana, Kolbe *et al.* (2007) found that coyotes remained in lynx habitat with deep snow throughout the winter months, and although readily available, selected compacted surfaces for only a small portion of their travel time. Kolbe *et al.* (2007) concluded that the overall influence of compacted snowmobile trails on coyote movements and hunting success was minimal, and that compacted routes would not significantly affect competition with lynx for snowshoe hare. However, the agencies' Threatened and Endangered Species Mitigation Plan for lynx incorporates measures to monitor snow compaction off designated mine access routes. Remote monitoring is difficult and impractical, and new off-road use can easily be monitored from the access roads. To address Northern Rockies Lynx Management ***Guideline HU G4***, Forest Service personnel would monitor new snow compaction activities (such as snowmobiling) in the analysis area and take appropriate action if compaction monitoring identified increased predator access to new areas. Alternative C-R would meet ***Guideline HU G4***.

Guideline HU G5: *For mineral and energy development sites and facilities that are closed, a reclamation plan that restores lynx habitat should be developed.*

See the Alternative 3 and Alternative B ***Guideline HU G5*** discussion. Alternative C-R would include permanent seed mix with native species only, if commercially available. Snags would also be left in clearing areas, unless required to be removed for safety reasons, and up to 30 tons per acre of coarse woody debris would be left within the clearing area providing for more down woody potential. Alternative C-R would meet ***Guideline HU G5***.

Guideline HU G7: *New permanent roads should not be built on ridgetops and saddles, or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers.*

Alternative C-R would differ in route location compared to Alternative B, but would also meet ***Guideline HU G7***.

Guideline HU G12: *Winter access for non-recreation special uses and mineral and energy exploration and development should be limited to designated routes or designated over-the-snow routes.*

Alternative C-R incorporates the grizzly bear transmission line construction timing mitigation, and activity associated with the transmission line construction would occur between June 16 and October 14 within the Cabinet-Yaak Grizzly Bear CYRZ and Cabinet Face BORZ on federal lands. This would include all federal lands within with West Fisher and Crazy LAUs, and winter access for the transmission line construction would not occur. Alternative C-R would comply with ***Guideline HU G12***.

C. *Objectives, Standards, and Guidelines Applicable to ALL Projects in Linkage Areas in Occupied Habitat, Subject to Valid Existing Rights.*

Objective LINK O1: *In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.*

Alternative C-R does not meet ***Objective LINK 01*** by itself. Grizzly bear habitat compensation mitigation associated with the agencies' combined action alternatives, which include combinations with Alternative C-R, would meet the intent of ***Objective LINK 01***. Please see the discussion under "*Effects Common to all Combined Action Alternatives*" and also under Alternatives 3 and 4, ***Objective LINK 01***.

Effects on Lynx on Private and State Land

The NRLMD management direction does not apply to private or State land. Alternative C-R would not affect lynx habitat on private land in LAUs 14504 and 14503. See the *Effects to Lynx Habitat Components* section, p. 1376 for discussion of effects to habitat on private land outside the LAUs.

Alternative C-R would affect lynx habitat on DNRC section 36 T27N, R30W. For effects to lynx habitat mapped on State lands, see the Alternative C-R discussion under the *Effects to Lynx Habitat Components* section, p. 1376. As described under Alternative B, potential movement through the US 2 linkage zone area would not be impeded. More shrubs and low trees would remain in the Alternative C-R transmission line clearing area due to the mitigation requirement for a Vegetation Removal and Disposition Plan. This plan would minimize vegetation removal, allowing for more remaining cover for lynx movement. This mitigation would also be applied to State land. To mitigate for helicopter displacement on spring bear range on State land, the agencies' transmission line construction schedule for grizzly bears (construction-related activity would occur between June 16 and October 14) would be applied to the State section 36, partially within the West Fisher LAU. As a result, this would remove transmission line construction-related activity on State lynx habitat during the important winter period for lynx and early spring and reduce potential displacement and mortality risk to lynx during this time frame.

Alternative D-R – Miller Creek Transmission Line Alternative

With respect to NRLMD applicable Objectives, Standards, and Guidelines, impacts on lynx in the Crazy LAU 14504 and the West Fisher LAU 14503 from Alternative D-R would as described for Alternative B modified by Alternative C-R, with the exception of the following:

Effects on Lynx on National Forest System Lands

Objective ALL 01: In Alternative D-R, construction of the transmission line and access roads could affect lynx movement within LAUs 14503 and 14504 by removing forest cover in potential movement areas such as the Miller Creek and Howard Creek corridors.

Objectives HU 01, HU 03, and HU 05: For Alternative D-R, helicopters would be used to construct structures at 16 locations in the Miller Creek and Howard Creek drainages, thereby eliminating the need for access roads in these locations.

Effects on Lynx on Private and State Land

The NRLMD management direction does not apply to private or State land within the LAUs. Alternative D-R would not affect lynx habitat on private land in LAUs 14504 and 14503. See the

Effects to Lynx Habitat Components section, p. 1376 for a discussion of the effects on private land outside the LAUs.

Alternative D-R would affect lynx habitat on State section 36 T27N, R30W. For effects to lynx habitat on State lands, see the Alternative D-R discussion under the *Effects to Lynx Habitat Components* section, p. 1376.

Alternative D-R vegetation removal mitigation and timing mitigation and effects to lynx on State section 36 T27N, R30W are as described for Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Effects on Lynx on National Forest System Lands

With respect to NRLMD applicable Objectives, Standards, and Guidelines, impacts on lynx in the Crazy LAU 14504 and the West Fisher LAU 14503 from Alternative E-R would be the same as Alternative B, as modified by Alternatives C-R and D-R, with the exception of the following:

Objectives HU 01, HU 03, and HU 05:

For Alternative E-R, helicopters would be used to construct structures at 31 locations along West Fisher Creek and Howard Creek, thereby eliminating the need for access roads in these locations.

Effects on Lynx on Private and State Land

The NRLMD management direction does not apply to private or State land within the LAUs. Alternative E-R would not affect lynx habitat on private land in LAUs 14504 and 14503. Please see the *Effects to Lynx Habitat Components* section, p. 1376 for a discussion of the effects on private land outside the LAUs.

Alternative E-R would affect lynx habitat on State section 36 T27N, R30W. For effects to lynx habitat on State lands, see the Alternative D-R discussion under the "*Effects to Lynx Habitat Components*" section, as both Alternatives D-R and E-R affect the same acreage on the State section. Alternative E-R vegetation removal and timing mitigation and effects to lynx on State section 36 T27N, R30W are as described for Alternative C-R.

Combined Mine-Transmission Line Effects

With respect to NRLMD applicable Objectives, Standards, and Guidelines, effects to lynx are described in detail under the "*Effects Common to All Action Alternatives*" section and specific action alternative for the mine or transmission line and are briefly summarized in the following paragraphs.

National Forest System Lands

As previously described, the action alternatives for the mine would not affect lynx or lynx habitat in the West Fisher LAU 14503. Impacts in the West Fisher LAU 14503 are due entirely to the effects of the transmission line, while Crazy LAU 14504 would be affected by action alternatives for both the mine and transmission line alternatives.

Objective ALL O1: *Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.*

Standard ALL S1: *New or expanded permanent development and vegetation management projects must maintain habitat connectivity in a LAU and/or linkage area.*

None of the combined mine-transmission line alternatives would affect any NRLMD designated linkage areas within the LAUs. North and south connectivity and identified linkages in the main Crazy and West Fisher LAUs would remain undisturbed. In all of the combined action alternatives, construction and reconstruction of the mine access roads, including the main haul route on the Bear Creek Road #278, would result in increased traffic volume and speeds. Connectivity and movement toward the west or eastward in the LAUs to the identified approach areas along US 2 would be maintained with construction of the transmission line, although movement may be temporarily disturbed during construction activities on any one section of the line being worked on.

In all combined action alternatives, construction of the transmission line and access roads could affect lynx movement within LAUs 14503 and 14504 by removing forest cover in potential movement areas in the Miller, Howard, Libby, West Fisher, and Ramsey creek corridors. Vegetation would be cleared in areas of ground disturbance, such as access roads and pulling and tensioning sites. In some portions of transmission line clearing areas, only the largest trees would be removed, leaving some shrub and tree cover in the transmission line clearing area. Portions of the clearing area would not require clearing, such as within high spans across valleys. Areas of surface disturbance in lynx habitat would return to suitable lynx habitat in the long term if natural successional processes were permitted to occur. Displacement effects from human activity, including low-traffic roads, do not appear to be a major concern for lynx (Ruediger *et al.* 2000), and this would apply to the opened, reconstructed, or new constructed access roads used for the transmission line construction, or maintenance. Construction activities and transmission line access roads may temporarily disturb lynx during construction, but connectivity for lynx movement within and between LAUs 14503 and 14504 would remain.

With respect to the effectiveness of mitigation plans, Alternative 2B and the agencies' combined action alternatives would include a road closure for grizzly bear mitigation, also included as mitigation for the Rock Creek Project. If the Rock Creek Project has not yet implemented the closure, prior to the Evaluation Phase, the Upper Bear Creek Road (NFS road #4784) would be closed with an earthen barrier for the life of the mine and would significantly improve grizzly bear habitat in BMU 5, which would consequently improve security for lynx in the Crazy LAU. In the adjacent Rock LAU, prior to the Construction Phase, the agencies' alternatives only would require the Rock Lake Trail 150A to be closed with a barrier that would also significantly improve grizzly bear habitat in both BMU 4 and BMU 5. As a result of the Rock Lake Trail 150A mitigation closure, connectivity and security for lynx would directly improve in the West Fisher and Rock LAUs by reducing a fracture zone, and would indirectly provide for better connectivity between LAUs to the north and south. This improvement would occur in the linkage area identified in the NRLMD (USDA Forest Service. 2007a, Figure 1-1), and the general wildlife north-south movement corridor displayed in the Wildlife BA 2013, Figure 6d.

With respect to effectiveness of other mitigation plans associated with Alternative 2B, implementation of MMC's proposed Wetland Mitigation Plan would include the Libby Creek Recreation Gold Panning Area Site as potential wetland mitigation, just south of Alternative B, which may maintain wetland and riparian areas used for movement near the transmission line. The vegetation removal or disposition plan as described in Environmental Specifications (Appendix D) does not apply to Alternative 2B. Implementation of the agencies' combined action alternatives proposed Wetland Mitigation Plan would not include the Libby Creek Recreation Gold Panning Site, but includes other additional wetlands, plus the Vegetation Removal and Disposition Plan would apply to Alternatives C-R, D-R, and E-R, and the Environmental Specifications (Appendix D) would promote connectivity by increasing availability of continuous forest or shrub cover.

Alternative 2B and any of the agencies' combined action alternatives would meet ***Objective ALL 01*** and ***Standard ALL S1***.

Guideline ALL G1: *Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses.*

Reconstructed and new roads associated with all combined action alternatives do not incorporate specific measures such as fencing, underpasses, or overpasses to avoid or reduce effects on lynx. Upgrades that would be made would not result in the construction of a forest highway. Roads improved for any of the combined action alternatives mine access would allow higher vehicle speeds and increased traffic, and could increase the risk of lynx mortality due to vehicle collision. Overall, the volume of traffic expected is substantially increased over the existing condition, but is low relative to the volume of traffic known to cause lynx mortality or identified with potential to impede movement (see the ***Standard ALL S1*** discussion for Alternative 2). The USFWS (2003b) concluded the overall threat to lynx populations from high-traffic volume on roads that bisect suitable habitat is low, especially for resident lynx. The Cabinet Mountains has low potential for lynx and travel habitat would be maintained adjacent to mine access roads.

All combined action alternatives would include the construction of new roads and reconstruction of existing roads for transmission line access. Use of most of these roads would be limited to construction equipment during the construction period, and traffic volume would be low. Specific measures that would minimize potential impacts on lynx are not necessary as previously discussed under the transmission line only alternatives.

Alternative 2B would not include any measures to reduce potential effects to lynx from road use or access changes. Alternative 2B would not meet the intent of ***Guideline ALL G1***.

The combined agencies' action alternatives would incorporate adaptive management mitigation measures that would reduce effects to lynx from changes to forest roads. See Alternative 3 ***Guideline ALL G1***. All agency combined action alternatives would meet ***Guideline ALL G1***.

Objectives HU 01, HU 03, and HU 05: No new snowmobile trails or play areas would be created for any of the combined mine-transmission line alternatives. Components of combined action alternatives were designed, to the extent possible, to avoid lynx habitat and to use existing roads and facilities. Where possible, roads currently open year-round would be used for construction access. Although some new access roads would be built and some currently closed roads would be opened for transmission line access, these roads would be used temporarily during transmission line construction and would not be used during the main wintering period.

Alternative 2B or any of the agencies' combined action alternatives would meet ***Objectives HU 01, HU 03,*** and ***HU 05.***

Guideline HU G4: *For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.*

Remote monitoring for snow compaction is difficult and impractical; however, Alternative 2B did not propose on-the-ground monitoring for lynx, lynx habitat, or snow compaction. Alternative 2B would not meet the intent of ***Guideline HU G4***.

The agencies' combined action alternatives propose to monitor snow compaction and new off-road use by monitoring from the access roads. As described in sections 2.5.6, *Monitoring* and 2.5.7*, Mitigation Plans*, to comply with Guideline HU G4, Forest Service personnel would monitor new snow-compaction activities (such as snowmobiling) in the project area and would take appropriate action if compaction monitoring identified increased predator access to new areas. The agencies' combined action alternative would meet ***Guideline HU G4.***

Guideline HU G5: *For mineral and energy development sites and facilities that are closed, a reclamation plan that restores lynx habitat should be developed.*

All combined action alternatives would include a reclamation plan that over the long term (after the 30 year life of the mine) in the mine disturbance areas where all vegetation has been removed, is expected to return disturbed lynx habitat to pre-project quality. Compared to Alternative 2B, the agencies' combined action alternatives success criteria and planting/seeding conditions for reclamation would be more rigorous, as discussed previously, and is expected to result in more successful regeneration of vegetation that may provide lynx habitat.

Guideline HU G6: *Methods to avoid or reduce effects on lynx should be used in lynx habitat when upgrading unpaved roads to maintenance levels 4 or 5.*

As described previously for ***Guideline ALL G1*** above, reconstructed and new roads associated with the combined action alternatives do not incorporate specific physical methods such as construction of overpasses or fences to avoid or reduce effects on lynx. Roads improved for mine access would allow higher vehicle speeds and increased traffic, and could increase the risk of lynx mortality due to vehicle collision.

Alternative 2B would not include any monitoring to detect lynx mortalities in permit areas or along access roads. Alternative 2B, as proposed, would not meet the intent of ***Guideline HU G6***.

The agencies' combined action alternatives would include mitigation plans that incorporate adaptive management strategies to reduce the risk of mortality to lynx, including monitoring of lynx mortalities in permit areas and along access roads, and would meet the intent of ***Guideline HU G6***.

Winter road access for activities associated with the combined action alternatives would be limited to designated routes. Access roads opened or constructed for transmission line access would be used only during the Construction Phase or for maintenance, which is expected to be required infrequently, and based on required mitigation for grizzly bear and big game, would not be used during winter. Annual inspections and most transmission line maintenance would be completed via helicopter or non-motorized access. All combined action alternatives would include plowing of the Bear Creek Road (NFS road #278) and the Libby Creek Road (NFS road #231) during the 2-year evaluation program and the 1-year period while the Bear Creek Road is reconstructed, which would make access to lynx habitat easier for trappers and increase the risk of incidental lynx mortality. Plowing would occur on the Upper Libby Creek Road #2316 through all phases from Evaluation through Operations, but access would limited to mining traffic with a lower potential for increased mortality risk due to incorporated mitigation.

Private Land

The NRLMD management direction does not apply to private land. For effects to lynx habitat on private land, see the *Effects to Lynx Habitat Components* section, p. 1376. Potential movement through private land located in identified approach areas for any of the combined action alternatives transmission lines are as described under Alternative B or C-R.

State Land

The NRLMD management direction does not apply to State land. The combined action Alternative 2B would not be located on State land and, therefore, would not affect State mapped lynx habitat. The agencies' combined action alternatives would not affect lynx habitat on the State section 16, T28N, R30W located outside and adjacent to the Crazy 14504 LAU as no upgrading or widening of the NFS road #231 is proposed prior to use during the Construction Phase while the Bear Creek Road #278 was reconstructed and upgraded. The agencies' mitigated transmission line alternatives would cross portions of State section 36 T27N, R30W and would affect lynx habitat. See the *Effects to Lynx Habitat Components* section, p. 1376.

To mitigate for helicopter displacement on spring bear range on State land, the agencies' transmission line construction schedule for grizzly bears (construction-related activity would occur between June 16 and October 14) would be applied to the State section 36, partially within the West Fisher LAU. This would remove the transmission line construction of any of the agencies' mitigated combined action alternatives activity on State habitat during the important winter period for lynx and early spring and would reduce potential displacement and mortality risk to lynx during this time frame.

For effects to lynx habitat mapped on State lands, see the discussion under the *Effects to Lynx Habitat Components* section, p. 1376 for combined action alternatives effects.

Mine, Transmission Line, and Combined-Mine Transmission Line Alternatives – Summary of Effects within the LAUs

The proposed activities associated with mine or transmission line development would result in a period of increased human activity and noise. Although lynx are generally considered tolerant of human activity, it is expected that a range of behavioral response could occur depending on the individual and circumstances involved (Interagency Lynx Biology Team 2013). As such, implementation of the proposed activities within occupied lynx habitat may result in disturbance and avoidance of the disturbed area by resident lynx for the life of the mine.

Large areas of lynx habitat are not being treated and would not experience increased levels of use within the Crazy and West Fisher LAUs. The proposed Rock Creek Project may occur in the adjacent Rock LAU, but LAUs to the north and south have no known or limited ongoing activities in lynx habitat. Any lynx potentially displaced during project activities would be able to find secure habitat given the ample suitable habitat within the affected LAUs and adjacent LAUs.

The USFWS found no evidence that mineral development was a factor threatening lynx (USFWS 2007d), and concluded that the NRLMD contained guidelines to minimize the impacts of mineral-related activities on individual lynx and lynx habitat. The USFWS concluded that most actions in lynx habitat that are in compliance with the NRLMD would either have no effect on lynx or would not likely adversely affect lynx. Only the agencies' mitigated combined action alternatives comply with all applicable NRLMD Objectives, Standards, and Guidelines and, therefore, human activities associated with the access roads and haul route (including winter use and plowing), impoundment site, mill facility and ore conveyor system, mine adits and ventilation adits (including blasting during construction), helicopter use during transmission line construction and maintenance once a year), monitoring sites, or any other related activities associated with the agencies' alternatives are not expected to measurably affect lynx that may occur or their habitat that occurs in the Cabinet Mountains.

Effects to Lynx Habitat Components

Impacts on lynx habitat from individual mine and transmission line alternatives are shown in Table 237 and Table 238. The impacts described for mine alternatives would be limited to LAU 14504 (Crazy) and include acres for the plant site and associated facilities, impoundment, Libby Adit Site, and all associated reconstructed and new roads. Lynx habitat components associated with the mine alternatives are considered removed for the life of the mine. Impacts from the transmission line alternatives would occur in both LAU 14503 (West Fisher) and LAU 14504 (Crazy) and include disturbance widths for the transmission line, temporary access roads or new road construction or existing road reconstruction, and power pole footprints. Within the transmission line disturbance boundaries, outside of existing and new roads, after commercial tree removal, grasses, shrubs, and short trees are expected to remain and provide some level of cover. Buffer widths are described previously in the *Analysis Method* section. Impacts on lynx habitat from the combined mine-transmission line alternatives, which affect both the Crazy and West Fisher LAUs, are shown in Table 239.

Table 237. Impacts on Lynx Habitat Components with National Forest System and Private Lands in the Crazy LAU 14504 by Mine Alternative.

Lynx Habitat Component	[Alt 1] No Mine/ Existing Condition				[Alt 2] MMC's Proposed Mine		[Alt 3] Agency Mitigated Poorman Tailings Impoundment Alternative		[Alt 4] Agency Mitigated Little Cherry Creek Tailings Impoundment Alternative	
	NFS		Private		NFS	Private	NFS	Private	NFS	Private
	(acres)	(%)	(acres)	(%)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Non-habitat low-elevation	7,824		805		1,349	14	830	0	1,127	14
Travel (matrix) habitat[1]	21,076		219		43	15	35	15	36	15
Total lynx habitat[2]	22,557	44	171	1						
Early stand initiation[3] summer forage only	81	<1	0	0	0	0	0	0	0	0
Stand initiation[4] winter forage	3,009	13	0	0	342	0	137	0	70	0
Other (stem exclusion)[5] Non-forage	1,033	5	31	<1	20	0	0	0	0	0
MSMLS[6] (forage)	18,434	82	140	82	85	0	22	0	14	0
Total lynx habitat on National Forest System lands removed (%)					447 (2%)	0 (0%)	159 (0.7%)	0 (0%)	84 (0.4%)	0 (0%)

Impacted habitat is removed for the life of the mine; see existing condition Table 235 for total ownership.
NFS – National Forest System.
[1]Travel (or matrix) habitat does not support snowshoe hares (SSH) but is suitable for lynx habitat connectivity and occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.
[2]Lynx habitat: Percent of total ownership and comprised of suitable and currently unsuitable habitat. Unsuitable habitat currently does not provide sufficient vegetation quantity or height to be used by SSH/lynx. Acres do not include travel habitat or low-elevation habitat that comprises the remaining percentage of the LAUs.
[3]Early stand initiation stage: These acres are currently unsuitable lynx habitat that do not provide sufficient vegetation quantity or quality (height) to be used by SSH and lynx in winter.
[4]Stand initiation structural stage currently suitable SSH winter habitat.
[5]Other, including stem exclusion, currently unsuitable structural stages that do not provide winter SSH habitat.
[6]MSMLS - Multistory mature late successional stages with multiple age classes and structural components that provide winter SSH habitat.

Table 238. Impacts on Lynx Habitat Components by Transmission Line Alternative within the LAUs.

Lynx Habitat Component	[Alt. A] No Transmission Line Existing Condition				[Alt. B] North Miller Creek		[Alt. C-R] Modified North Miller Creek		[Alt. D-R] Miller Creek		[Alt. E-R] West Fisher Creek	
	NFS		State/ Private		NFS	State/ Private	NFS	State/ Private	NFS	State/ Private	NFS	State/ Private
	(acres)	(%)	(acres)	(%)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
West Fisher LAU (14503)												
Non-habitat low-elevation	6,234		2,163		25	0	56	<1	39	<1 [7]	57	30 [8]
Travel habitat[1]	11,215		806		17	0	53	<1	43	<1 [7]	80	0
Total lynx habitat[2]	12,247		354									
Early stand initiation[3]	0		0		0	0	0	0	0	0	0	0
Stand initiation[4]	337		0		0	0	0	0	0	0	0	0
Other (stem exclusion)[5]	970		0		0	0	1	0	1	0	4	0
MSMLS[6]	10,940		354		6	0	5	0	61	0	37	0
Total lynx habitat cleared or removed (%)					6 (0.5%)	0 (0%)	6 (0.5%)	0 (0%)	62 (0.5%)	0 (0%)	41 (0.5%)	0 (0%)

Lynx Habitat Component	[Alt. A] No Transmission Line Existing Condition				[Alt. B] North Miller Creek		[Alt. C-R] Modified North Miller Creek		[Alt. D-R] Miller Creek		[Alt. E-R] West Fisher Creek	
	NFS		State/ Private		NFS	State/ Private	NFS	State/ Private	NFS	State/ Private	NFS	State/ Private
	(acres)	(%)	(acres)	(%)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Crazy LAU (14504) (only National Forest System lands affected by the transmission line)												
Total LAU	51,457		0									
Non-habitat low-elevation	7,824		0		14	0	15	0	15	0	15	0
Travel habitat[1]	21,076		0		23	0	1	0	10	0	10	0
Total lynx habitat[2]	22,557		0									
Early stand initiation[3]	81	<1	0	0	0	0	0	0	0	0	0	0
Stand initiation[4]	3,009	13	0	0	34	0	20	0	8	0	8	0
Other (stem exclusion)[5]	1,003	5	0	0	3	0	4	0	9	0	9	0
MSMLS[6]	18,434	82	0	0	42	0	33	0	28	0	28	0
Total lynx habitat cleared or removed (%)					79 <(0.5%)	0 (0%)	57 <(0.5%)	0 (0%)	45 <(0.5%)	0 (0%)	45 <(0.5%)	0 (0%)

Impacted habitat is vegetation cleared within the transmission line corridor.
See existing condition Table 235 for total ownership.
Note that transmission line alternatives in the Crazy LAU impact National Forest System lands only.
MSMLS – multistory late successional, SSH - snowshoe hare, NFS – National Forest System.
[1]Travel (or matrix) habitat that does not support SSH that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.
[2]Lynx habitat: Acres do not include "travel\matrix" or low-elevation stands (considered unsuitable SSH habitat, but suitable for lynx habitat connectivity); travel and low-elevation habitat comprises the remaining suitable plus unsuitable habitat.
[3]Early stand initiation stage: These acres are lynx habitat that currently does not provide sufficient vegetation quantity or quality (height) to be used by SSH and lynx in winter.
[4]Stand initiation structural stage currently suitable SSH winter habitat.
[5]Other, non-forage, including stem exclusion, currently unsuitable structural stages not providing winter SSH habitat.
[6]MSMLS - stages with multiple age classes and structural components that provide winter SSH habitat.
[7]These acres are <1-acre portion of State section 36 T27N, R30W. Within the LAU, the KNF mapped the State land impacted by C-R or D-R transmission line alternatives as either travel or low-elevation non-habitat. The State HCP mapped the affected portion of these stands as winter forage habitat.
[8]These 30 cleared acres of non-habitat for the Alternative E-R transmission line are located on Plum Creek property.

Table 239. Impacts on Lynx by Transmission Line Alternative Outside the LAU.

LAU Component	[Alt. A] No Transmission Line Existing Condition	[Alt. B] North Miller Creek	[Alt. C-R] Modified North Miller Creek	[Alt. D-R] Miller Creek	[Alt. E-R] West Fisher Creek
Transmission Line Analysis Area (mainly outside LAU) for compliance with MEPA and MFSA					
Plum Creek		132	107	107	109
Other Private		1	0	0	0
NFS		16	6	6	25
Northwestern Land Office (NWLO) Total Potential Lynx Habitat	65,473				
Montana State S36, T27N, R30W, State HCP Mapped Lynx Habitat	180 acres				
Summer Forage	(<4,000 ft) 18 acres	0	0	0	0
Winter Forage (two stands)	(>4,000ft) 46 ac[1]. (<4,000 ft) 48 ac.	0	<1 2	<1 2	1
Temporary Non-suitable	(<4,000 ft) 69 ac.	0	0	0	6
Not Mapped as Lynx Habitat	322/138[2] 460	0	<3	<3	25
Total State HCP Lynx Habitat Cleared on the NWLO			<3 acres (<1%)	<3 acres (<1%)	7 acres (<1%)

Impacted habitat is vegetation cleared within the transmission line corridor.

[1]The (>4,000-foot) 46-acre portion of State section 36 mapped by the State as lynx habitat is also within the West Fisher LAU and mapped by the KNF as either travel habitat or low-elevation non-habitat, with those effects disclosed previously in Table 238, and corresponding footnote #7.

[2]These 138 acres are also within the West Fisher LAU and mapped by the KNF as either low-elevation non–habitat or travel habitat.

Table 240. Impacts within LAUs by Combined Mine-Transmission Line Alternative.

LAU Habitat Component	[1] No Mine/ Existing Conditions		[2] MMC's Proposed Mine		[3] Agency Mitigated Poorman Impoundment Alternative						[4] Agency Mitigated Little Cherry Creek Impoundment Alternative					
	TL-A		TL-B		TL-C-R		TL-D-R		TL-E-R		TL-C-R		TL-D-R		TL-E-R	
	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate
	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)
West Fisher LAU (14503) *(transmission line and associated road effects only)*																
Non-habitat low-elevation			26	0	56	<1	39	<1	58	30	56	0	39	<1	58	30
Travel habitat			18	0	53	<1	43	<1	8	3	53	0	43	<1	8	3
Total lynx habitat	12,247	353														
Early stand initiation			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stand initiation			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other (stem exclusion)			0	0	1	0	1	0	4	0	1	0	1	0	4	0
MSMLS			6	0	5	0	61	0	37	0	5	0	61	0	37	0
Total lynx habitat removed/cleared in LAU			6 (<1%)	0	6 (<1%)	0	62 (<1%)	0	41 (<1%)	0	6 (<1%)	0	62 (<1%)	0	41 (<1%)	0

LAU Habitat Component	[1] No Mine/ Existing Conditions		[2] MMC's Proposed Mine		[3] Agency Mitigated Poorman Impoundment Alternative						[4] Agency Mitigated Little Cherry Creek Impoundment Alternative					
	TL-A		TL-B		TL-C-R		TL-D-R		TL-E-R		TL-C-R		TL-D-R		TL-E-R	
	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate	NFS	State Pri-vate
	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)	(ac.)
Crazy LAU (14504) *(mine development-impoundment/plant site & conveyor belt/associated roads etc/transmission line/associated road effects)*																
Non-habitat low-elevation habitat			1,363	14	845/0		845/0		845/0		1,143	14	1,142	14	1,142	14
Travel habitat			59	16	36	16	46	16	45	16	36	16	46	16	46	16
Total lynx habitat	22,557	171														
Early stand initiation			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stand initiation			366	0	154	0	142	0	142	0	88	0	76	0	76	0
Other (stem exclusion)			23	0	4	0	9	0	9	0	4	0	9	0	9	0
MSMLS habitat			123	0	54	0	50	0	50	0	47	0	43	0	43	0
Total lynx habitat removed/cleared in LAU			512 (2%)	0	212 (<1%)	0	201 (<1%)	0	201 (<1%)	0	139 (<1%)	0	128 (<1%)	0	128 (<1%)	0

Number in parentheses is percentage of all lynx habitat in LAU.
[1]Travel (or matrix) habitat that does not support SSH that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.
[2]Lynx habitat: Acres do not include "travel\matrix" or low-elevation stands (considered unsuitable SSH habitat, but suitable for lynx habitat connectivity); travel and low-elevation habitat comprises the remaining suitable plus unsuitable habitat.
[3]Early stand initiation stage: These acres are lynx habitat that currently does not provide sufficient vegetation quantity or quality (height) to be used by SSH and lynx in winter.
[4]Stand initiation structural stage currently suitable SSH winter habitat.
[5]Other, non-forage, including stem exclusion, currently unsuitable structural stages not providing winter SSH habitat.
[6]MSMLS - stages with multiple age classes and structural components that provide winter SSH habitat.

Effects to Lynx Habitat Common to All Alternatives

Private Land

Rock LAU 14702. The no action alternatives or any of the individual mine and transmission line alternatives or combined mine-transmission line alternatives would have no measurable impact on lynx habitat on the 13 acres of MMC-owned private land above Rock Lake in the Rock LAU 14702. The 13-acre property is a mosaic of steep rock and talus slopes, interspersed with shrub/grass and trees. The KNF broadly mapped the area as multistory late successional habitat, but aerial imagery clearly shows the preponderance of rock and talus. The Rock Lake Ventilation Adit portal opening would be about 15 feet wide by 15 feet high and would be gated with a steel grate or similar structure. Total surface disturbance associated with the Rock Lake Ventilation Adit would be about an acre (see *Alternative 2 Proposed Action*). Based on aerial imagery, about 0.5 acres of the 1-acre site identified as the disturbance area supports shrubs and some standing timber. According to MMC's Proposed Action, the adit location is very steep and is likely bare rock (see *Alternative 2, Post-mining Topography of Project Facilities, Rock Lake Ventilation Adit*), and does not provide lynx habitat. The National Forest System land surrounding the MMC parcel containing the 1-acre adit disturbance site provides similar habitat of rock, talus, scattered timber, and shrub cover. The availability of lynx habitat within the Rock LAU or the immediate area would not be measurably affected (less than 0.1 percent), and similar habitat would remain on National Forest System land. Thus, this LAU will not be evaluated further.

West Fisher 14503 and Crazy 14504 LAUs. No measurable impact on lynx habitat on private land (MMC or Plum Creek lands) in LAUs 14503 and 14504 would result from the no action alternatives, any of the individual mine or transmission line alternatives, or any of the combined mine-transmission line alternatives. Private lands potentially affected by any of the action alternatives within LAUs 14503 and 14504 have the majority of the acreage mapped as low-elevation non-habitat or travel habitat.

Private Land MFSA Analysis Area Considered Outside of LAU Boundaries. Lynx habitat is not mapped on private lands outside of the LAUs, and no impact on lynx habitat would occur. Any displacement effects to potential lynx movement outside of the LAU would be minimal due to the short duration of the transmission line and Sedlak Park Substation construction activity and low potential for the species to occur in the low-elevation area. Vegetative cover in the form of shrubs and grass would continue to be provided in the transmission line clearing area.

State Lands: As described under the *Affected Environment* section, two DNRC State-owned sections within the Montanore Project action area are identified by the State HCP as being within the general distribution area for lynx, and where lynx will be considered for State activities. State section 16, T28N, R30 is located outside of the Crazy LAU 14504 boundary in the Libby Creek drainage with the Libby Creek Road located through the northwest quarter, and is not affected by any of the mine disturbance or transmission line disturbance boundaries. Libby Creek Road #231, which passes through State section 16, is currently used by MMC to access the Libby Adit site. State section 36 T27N, R30W is partially within the West Fisher 14503 LAU and is considered under 1) existing conditions for lynx habitat components within the West Fisher LAU, and 2) effects to lynx habitat within the Private/State land Montana DEQ MFSA Transmission Line Analysis Area for each alternative where applicable.

National Forest System Lands. Lynx habitat within the West Fisher LAU 14503 (impacted by transmission line alternatives only) and Crazy LAU 14504 (impacted by both mine only and transmission line alternatives) would be affected by the Proposed Action.

The potential for any of the action alternatives to remove or clear lynx habitat and affect lynx is considered low as lynx rarely use, or are absent from, the Cabinet Mountains, although both lynx habitat and records of lynx occur. The reason for the low level of lynx use is unknown, but limiting factors for lynx habitat present in the Cabinet Mountains potentially include the combination of topographic roughness (steep bisected slopes), aspect, and a moist pacific maritime climate resulting in unsuitable snow conditions (Squires, pers. comm. 2012; personal observation by J. Squires, pers. comm. 2011; and Squires and DeCesare, pers. comm. 2006).

Existing conditions provide a mosaic of habitat except for the early stand initiation structural stage, which is lacking in both LAUs due to limited harvest and fire history in the last 15 to 20 years. The most abundant lynx habitat in both LAUs is multistory mature late successional forage habitat (Table 240), with the Crazy LAU having the highest amount of stand initiation at 13 percent. In the Rockies, lynx habitat relationships appear to be less tied to early successional forest stage. High use, especially in the critical winter season, is tied to mature multilayer forests with Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) in the overstory and midstory. These stands are composed of larger diameter trees with higher horizontal cover and more abundant snowshoe hares (*Lepus americanus*), and deeper snow compared to random availability. Multilayer spruce–fir forests provide high horizontal cover, with tree branching that touches the snow surface (Squires *et al.* 2006; Squires *et al.* 2010).

Denning habitat is not limited in the LAUs associated with the proposed action alternatives. Coarse woody materials are found throughout the LAUs, especially in areas that receive limited active management (*e.g.*, Cabinet Mountain Wilderness and old growth stands). Both the West Fisher and Crazy LAUs have a preponderance of multistory mature late successional stands that provide abundant opportunities for denning (Table 240). Currently available winter snowshoe hare habitat in either the stand initiation stage or multistory mature/late successional forests would be near or within a reasonable distance from denning habitat.

None of the mine, transmission line, or combined mine-transmission line alternatives would include the direct use of fire for habitat improvement except as potential mitigation to compensate for the effects of the mine on grizzly bears and their habitat.

No Action Alternatives

The No Mine Alternative 1, No Transmission Line Alternative A, and No Action Combined Mine Transmission Line Alternative would have no direct or indirect impacts on lynx or lynx habitat.

Mine Alternatives

Crazy LAU 14504

The Construction Phases of mine Alternatives 2, 3, and 4 would include vegetation removal to provide space for project facilities, including evaluation and ventilation adits, plant site and conveyor belt, tailings impoundment, and any associated road reconstruction or construction (Table 237). Lynx habitat removed for the mine alternatives would not be expected to provide lynx habitat for at least the life of the mine.

Alternative 2

Alternative 2 would remove lynx habitat on 447 acres, resulting in about 2 percent of lynx habitat within the LAU being affected. Habitat removed would include stands currently providing winter forage (stand initiation structural stage), multistory mature late successional structural stage also providing forage, and other habitat mapped as stem exclusion stands that currently do not provide foraging habitat for snowshoe hare or lynx. The plant site and the impoundment disturbance areas would remove small amounts of stand initiation stage habitat (Table 237), while the LAD and remaining acreage affected by the impoundment within the LAU would remove low-elevation non-habitat.

The Upper Bear Creek Road access road (NFS road #278) follows the low-elevation edge of the LAU and then extends south into the LAU located in low-elevation non-habitat. Once inside the LAU, about the first 1.5 miles of the access road bisects the main LAU from the Hoodoo Mountain area and then continues to the Little Cherry Creek Impoundment and LAD Area 2 at the base of Ramsey Creek. Both the LAD Area 2 and Little Cherry Creek Impoundment are located on the edge of the LAU and extend outside of the boundary. Within the LAU, the majority of vegetation removed for the impoundment and all of LAD Area 2 is mapped as low-elevation non-habitat, but the impoundment would remove a mix of lynx habitat (stand initiation and multistory mature late successional stages providing foraging habitat, and a stem exclusion stand not providing foraging habitat). Lynx habitat removed by the impoundment and LAD Area 1 would be at the lower elevation of mapped lynx habitat within the LAU and would not be expected to deter movement through the LAU. The Ramsey Creek Plant site would affect winter forage habitat at the head of Ramsey Creek, while the access road reconstruction would impact travel habitat further bisecting the drainage. Ramsey Creek would be crossed by the plant site disturbance area boundary and, along with the access road, would be within 900 feet of the creek. The access road from Ramsey Creek to the Libby Adit Site is about 50 percent in low-elevation non-habitat with the remainder a mosaic of travel, stand initiation, or multistory mature late successional habitat and located at the lower elevation of mapped habitat. The Libby Adit Site located on private MMC-owned land and included in travel habitat would be expanded.

Alternative 2 would remove 2 percent of lynx habitat within the LAU for the life of the mine, and removal of habitat would extend up into both the Ramsey and adjacent Libby Creek drainages.

Alternative 2 would affect the most effective and recruitment potential old growth, described in section 3.22.2, *Old Growth Ecosystems*. Alternative 2 would clear or remove 414 acres of effective and recruitment potential old growth (Table 183) and would impact 5 percent of the effective and recruitment potential old growth available within the Crazy PSU. Approximately 95 percent of the Crazy LAU is within the Crazy PSU, and potential habitat provided by effective and recruitment potential old growth for red squirrels would remain well distributed throughout both areas.

Alternative 3 and Alternative 4

Alternatives 3 and 4 would remove 159 acres or 85 acres, respectively, or less than 1 percent of lynx habitat within the Crazy LAU. Habitat removed would include stands currently providing winter forage (stand initiation structural stage) or multistory mature late successional stages also providing foraging habitat.

The location of the access road (NFS road #278) and effects to low-elevation non-habitat would remain the same from the edge of the LAU to either of the agencies' impoundment locations. The

Poorman Creek Impoundment site used in Alternative 3 would mainly remove low-elevation non-habitat, with the site extending outside of the LAU, but it would remove a small stand of multistory mature late successional habitat and the eastern portion of a stand in the initiation stage, both of which provide winter foraging habitat. The impoundment used for Alternative 4 and effects to the Crazy LAU are the same as described for Alternative 2. South from the impoundment locations to the Libby Plant site location, the NFS road #278 access road reconstruction and construction would remove low-elevation non-habitat except for a small amount on the edge of a stand providing winter forage (stand initiation habitat).

The Libby Creek Plant site location for both agency mine alternatives would remove 65 acres of a stand in the initiation stage that provides winter foraging habitat. The construction/reconstruction of the road from the Libby Creek Plant site to the Libby Adit Site would remove foraging habitat consisting of multistory mature late successional habitat and stand initiation habitat located along the lower elevation of mapped lynx habitat. Travel habitat and low-elevation habitat would also be removed by the road reconstruction.

Impacts from Alternative 3 or Alternative 4 on effective and recruitment potential old growth potentially providing red squirrel habitat are described in section 3.22.2, *Old Growth Ecosystems*. Alternative 3 would remove 256 acres of effective and recruitment potential old growth and Alternative 4 would remove 277 acres, with corresponding increases of effective old growth being affected by edge effects (Table 183). At the Crazy PSU scale, both alternatives would result in a 3-percent loss of effective and recruitment potential old growth. Approximately 95 percent of the Crazy LAU is within the Crazy PSU, and potential habitat provided by effective and recruitment potential old growth for red squirrels would remain well distributed throughout both areas.

Evaluation of Effects Resulting from Mitigation
Impacts to lynx habitat resulting from the proposed agencies' alternatives would be mitigated for by habitat enhancement on lynx stem exclusion habitat at a 2:1 ratio (2 acres treated for every acre lost) as described in the agencies' alternatives mitigation plan. Between 436 and 526 acres for Alternative 3 or 290 to 380 acres for Alternative 4 of treatment would occur. Post-Alternative 2, 3, and 4, after the mine closes, reclamation efforts would reinitiate vegetation succession on the tailings impoundment, plant sites, and roads. Based on the inherent habitat potential of the individual stand, and success of the reclamation efforts, lynx habitat could develop over time (after reclamation ends in about 30 years, and for at least an additional 15 years or more until the stands reached the early stand initiation stage).

Transmission Line Alternatives Impact on Lynx Habitat Components within LAUs

Impacts on lynx habitat on KNF/private or State lands within the West Fisher 14503 and Crazy 14504 LAUs from transmission line alternatives are shown in Table 238. Due to the linear nature of the transmission line alternatives, clearing of tall trees in a 150- to 200-foot-wide strip, and the expected retention of low trees, shrub, and grass cover in the transmission line clearing outside of road surfaces or cutbanks, sufficient vegetation providing cover for lynx movement is expected to remain or recover through the Operations Phase. Temporary access roads would remove vegetation during construction, but during the Operations Phase, vegetation succession would continue or be maintained at a certain height within the clearing for the transmission line alternative. Within the Crazy LAU, only federal land would be affected by the transmission line alternatives, while in the West Fisher LAU, both federal and non-federal lands would be affected, depending upon the alternative.

Alternative B – MMC's Proposed Transmission Line North Miller Creek

In Alternative B, about 6 acres and up to 79 acres of commercial timber harvest removal would occur in lynx habitat in LAUs 14503 and 14504, respectively. As shown in Table 238, Alternative B would remove overstory trees and tall shrubs within multistory mature late successional habitat on about 6 acres in LAU 14503, and 42 acres in LAU 14504. In the Crazy 14504 LAU, Alternative B would also remove any overstory trees on 34 acres of stand initiation and 3 acres of stem exclusion habitat. Included in these acres of affected lynx habitat is the construction of new temporary access roads, which would remove vegetation during the Construction Phase. Lynx habitat acres actually impacted on the ground are expected to be less because some shrub and tree cover would be maintained in the transmission line clearing area; only the largest trees would be removed and some areas would not be cleared. However, for Alternative B, no mitigation for limiting vegetation clearing is proposed and it could be removed. For Alternative B, following construction, land within the clearing area that has been rutted, compacted, or disturbed would be reclaimed, and roads opened or constructed for transmission line access would be gated or barriered, regraded, scarified, and reseeded as an interim reclamation activity designed to stabilize the surface. Any vegetation, such as shrubs or low trees, within the transmission line clearing area that may remain or grow back on the temporary access roads during the Operations Phase would provide cover for lynx movement within and across the LAUs and temporary or closed roads used for maintenance would not provide cover for movement. For the West Fisher 14503 or the Crazy 14504 LAUs, less than 0.5 percent of lynx habitat within either individual LAU would be affected by Alternative B.

Impacts from Alternative B on effective and recruitment potential old growth potentially providing red squirrel habitat are described in section 3.22.2, *Old Growth Ecosystems*. A total of about 27 acres of effective and recruitment potential old growth would be cleared in the Crazy PSU; edge effects would increase by 98 acres. Alternative B would affect the most effective and recruitment potential old growth of the transmission line alternatives, but its effects on the proportion of effective old growth in the analysis area would be minor. Alternative B would clear less than 0.4 percent of effective and recruitment potential old growth in the Crazy PSU. As about 95 percent of the Crazy LAU is within the Crazy PSU and 97 percent of the Silverfish LAU is within the Silverfish PSU, potential habitat provided by old growth for red squirrels would remain well distributed both LAUs.

Suitable habitat for snowshoe hares would remain throughout both LAUs, with multistory mature late successional habitat comprising 82 to 89 percent of the lynx habitat available in the Crazy and West Fisher LAUs, respectively. Although stands in the early successional stages (early stand initiation stage, summer forage only and unsuitable for snowshoe hare in winter, or stand initiation structural stages providing winter snowshoe hare habitat) are limited, both LAUs would continue to provide habitat for lynx and snowshoe hares. As previously described, in the Rockies, lynx habitat relationships appear to be less tied to early successional forest stage.

Post-project and after the transmission line was removed, all newly constructed roads would be bladed and re-contoured to match the existing topography, obliterating the road prism. Reclamation efforts would reinitiate vegetation succession on the transmission line. Based on the habitat potential of the individual stand, lynx habitat could develop over time.

Effects on Lynx Habitat on Private and State Land

Within the MFSA Transmission Line Analysis Area, lynx habitat has not been identified on private lands either inside or outside of the LAUs, and no impact on lynx habitat would occur. Within the LAUs, Transmission Line Alternative B would not impact privately owned lands. Any effects to potential lynx movement outside of the LAUs would be minimal due to the short duration of the transmission line and Sedlak Park Substation construction activity, and low potential for the species to occur in the low-elevation area. Vegetative cover in the form of shrubs and grass would continue to be provided on most of the transmission line clearing area.

State Land

Transmission Line Alternative B would not be located near or adjacent to the State lands and no direct or indirect effect to lynx habitat on State lands would occur.

Alternative C-R – Agency Modified North Miller Creek Transmission Line Alternative

In Alternative C-R, in LAUs 14503 and 14504, about 6 acres and 57 acres, respectively, of timber removal would occur in lynx habitat. The least timber harvest and removal of commercial timber would occur with Alternative C-R, compared to the other transmission line alternatives. As shown in Table 238, Alternative C-R would remove overstory trees and tall shrubs within multistory mature late successional habitat on about 5 acres in LAU 14503 and 33 acres in LAU 14504. Compared to the other transmission line alternatives, impacts on multistory or late-successional forest snowshoe hare habitat would be the least for Alternative C-R. In the Crazy 14504 LAU, Alternative C-R would also remove any overstory trees on 20 acres of stand initiation and 4 acres of stem exclusion habitat. Included in these acres of affected lynx habitat is the construction of new temporary access roads, which would remove vegetation during the Construction Phase. Lynx habitat acres actually impacted on the ground are expected to be less because some shrub and tree cover would be maintained in the transmission line clearing of 150 feet; only the largest trees would be removed, some areas would not be cleared, and the clearing would provide cover for lynx movement within and across the LAUs. In the wider 200-foot clearing area considered for the analysis, outside of the 150-foot right of way danger trees may be removed but otherwise vegetation is expected to remain. For Alternative C-R, following construction, land within the clearing area that has been rutted, compacted, or disturbed would be reclaimed, and roads opened or constructed for transmission line access would be gated or barriered, regraded, scarified, and reseeded as an interim reclamation activity designed to stabilize the surface. Coarse down wood would also be left within the right of way and larger clearing area, providing a component for potential denning if the overall habitat remained suitable. This is unlikely, however, as most documented den sites in Montana have been in mature spruce-fir forests with high horizontal cover and abundant coarse woody debris, while younger stands and stands with discontinuous canopies were seldom used (Squires *et al*. 2008).

Within either LAU, less than 0.2 percent of multistory mature late successional habitat would be affected, with this habitat component in the West Fisher and Crazy LAUs remaining at 89 percent and 82 percent, respectively. Overall, for the West Fisher 14503 or the Crazy 14504 LAU, less than 0.5 percent of lynx habitat within either individual LAU would be affected by Alternative C-R.

Impacts from Alternative C-R on old growth forest potentially providing red squirrel habitat are described in section 3.22.2, *Old Growth Ecosystems*. No old growth would be removed in the Crazy PSU; 21 acres of effective and recruitment potential old growth in the Silverfish PSU would be removed. Compared to the other agency-mitigated transmission line alternatives, Alternative C-R would affect the most effective and recruitment potential old growth, but its effects on the proportion of effective and recruitment potential old growth in the analysis area would be minor. Within the PSU's, 2015 KFP desired conditions and guidelines for old growth would be met, providing potential habitat for red squirrels

Suitable habitat for snowshoe hares would remain throughout both LAUs, with multistory mature late successional habitat comprising 82 to 89 percent of the lynx habitat available in the Crazy and West Fisher LAUs, respectively. Although stands in the early successional stages (early stand initiation stage, summer forage only and unsuitable for snowshoe hare in winter, or stand initiation structural stages providing winter snowshoe hare habitat) are limited, both LAUs would continue to provide habitat for lynx and snowshoe hares. As previously described, in the Rockies, lynx habitat relationships appear to be less tied to early successional forest stage. Post-project and after the transmission line was removed, all newly constructed roads would be bladed and re-contoured to match the existing topography, obliterating the road prism. Reclamation efforts would reinitiate vegetation succession on the transmission line. Based on the habitat potential of the individual stand, lynx habitat could develop over time.

Effects on Lynx on Private and State Land

Within the MFSA Transmission Line Analysis Area, lynx habitat has not been identified on private lands and no impact on lynx habitat would occur. Within the LAUs, Transmission Line Alternative C-R would not impact privately owned lands. Any displacement effects to potential lynx movement outside of the LAU would be minimal due to the short duration of the transmission line and Sedlak Park Substation construction activity and low potential for the species to occur in the low-elevation area. Vegetative cover in the form of shrubs and grass would continue to be provided on most of the transmission line clearing area.

State Land

Transmission Line Alternative C-R would cross the northeast quarter of section 36 T27N R30W. Effects to lynx habitat within the section are disclosed in Table 238. Less than 1 acre (about 0.33 acre) of low-elevation non-habitat or travel habitat would be affected based on the KNF LAU mapping. Based on DNRC habitat mapping, a total of 3 acres from two different stands identified as winter forage would be cleared of overstory trees, leaving the majority of the mapped winter foraging habitat within the section untreated. Within the transmission line clearing area disturbance area boundary, cover from the remaining vegetation of shrubs and low trees would provide cover for lynx movement, although suitability for winter forage may be reduced. The remaining area cleared within the section was not mapped as habitat, but cover for movement would remain.

Impacts to lynx habitat on State land would be mitigated by implementing the agencies' alternatives transmission line mitigations on State land. A Vegetation Removal and Disposition Plan, as specified in the Environmental Specifications (Appendix D) developed for Alternative C-R, would minimize tree removal and would maintain more shrub and tree cover in the transmission line clearing area. To provide for down wood within the clearing area, Alternative C-R would leave snags in the clearing area, unless required to be removed for safety reasons, and up to 30 tons per acre of coarse woody debris would be left within the clearing area. Woody material would be scattered and not concentrated within the clearing area. Individual logs would exceed 3 inches in diameter, and preference would be for a down "log" to be at least 8 feet long with a small end diameter of 6 inches or more. This material would originate from existing logs on-site, unused portions of designated cut trees, broken tops, or similar materials. This mitigation would be incorporated into the Vegetation Removal and Disposition Plan. The amounts of coarse woody debris left would depend upon Vegetation Response Unit (VRU). The KNF has mapped VRUs on a landscape scale, including State section 36, and Alternative C-R would be within VRU3 on State section 36, where 15 to 30 tons (23 to 30 logs) per acre of coarse woody debris would be left on-site after timber clearing.

Transmission line construction-related activity would not occur during the critical winter period. By applying the agencies' timing mitigation to reduce disturbance to grizzly bears during the denning and spring seasons, construction-related activity would occur between June 16 and October 14.

Alternative C-R construction would occur during that time frame over a 2-year period, and activity would not occur on the entire line at any one time. Potential for disturbing a lynx would be low due to the short duration of activity, and secure habitat would remain widely available across the adjacent federally designated LAU. Low-growing shrubs would persist in most of the clearing area (150- to 200-foot width), providing some level of cover for movement, and not all areas would be cleared, depending upon the height of the line. Alternative C-R would affect less than 3 acres of winter foraging habitat on the State section 36, and summer foraging habitat potential would remain on the 3 acres. Lynx movement and connectivity of habitat would be maintained through the State section and into the adjacent LAU. Connectivity toward the east and the US 2-Barren/Hunter Peak approach area would be maintained. During construction activities, short-term displacement may occur, but as activity would be spread temporally and spatially across the transmission line, the amount and duration of disturbance that any one lynx may potentially experience would be minimal. As described previously, lynx are highly mobile and movement across the transmission line clearing area could occur in a section with no activity. Most indications are that lynx do not significantly alter their behavior to avoid human activities (summarized in USFWS NRLMD Biological Opinion 2007, p. 68).

Alternative C-R would not measurably change the total potential lynx habitat available within the Libby Unit, which includes State section 36 affected by the transmission line. Less than 3 acres of lynx habitat on State land would be affected by Alternative C-R.

Alternative D-R – Miller Creek Transmission Line Alternative

In Alternative D-R, about 62 acres and 45 acres of timber removal would occur in lynx habitat in LAUs 14503 and 14504, respectively. As shown in Table 238, Alternative D-R would remove overstory trees within multistory mature late successional habitat on about 61 acres in LAU 14503, and 28 acres in LAU 14504. Compared to other agencies' mitigated transmission line alternatives, Alternative D-R would have the greatest effect on multistory or late-successional forest snowshoe hare habitat when both LAUs are considered. Additionally in the West Fisher 14503 LAU, Alternative D-R would remove overstory trees on 1 acre of stem exclusion habitat and in the Crazy 14502 LAU, would remove overstory trees on 8 acres of stand initiation and 9 acres of stem exclusion habitat. Included in these acres of affected lynx habitat is the construction of new temporary access roads, which would remove vegetation during the Construction Phase. Lynx habitat acres actually impacted on the ground are expected to be less due to that some shrub and tree cover would be maintained in the transmission line clearing area; only the largest trees would be removed and some areas would not be cleared. For Alternative D-R, following construction, land within the clearing area that has been rutted, compacted, or disturbed would be reclaimed, and roads opened or constructed for transmission line access would be gated or barriered, regraded, scarified, and reseeded as an interim reclamation activity designed to stabilize the surface. Any vegetation such as shrubs or low trees within the transmission line clearing area that would remain or grow back on the temporary access roads during the Operations Phase would provide cover for lynx movement within and across the LAUs. Coarse down wood would also be left within the clearing area, providing a component for potential denning if the overall habitat remained suitable. This is unlikely, however, as most documented den sites in Montana have been in mature spruce-fir forests with high horizontal cover and abundant coarse woody debris, while younger stands and stands with discontinuous canopies were seldom used (Squires *et al*. 2008). Post-project and after the transmission line was removed, all newly constructed roads would be bladed and re-contoured to match the existing topography, obliterating the road prism. Reclamation efforts would reinitiate vegetation succession on the transmission line. Based on the habitat potential of the individual stand, lynx habitat could develop over time. Within either LAU, less than 0.5 percent of multistory mature late successional habitat would be affected, with this habitat component in the West Fisher and Crazy LAUs remaining at 89 percent and 82 percent, respectively. Overall, for the West Fisher 14503 LAU or the Crazy 14504 LAU, less than 0.5 percent of lynx habitat within either individual LAU would be affected by Alternative D-R.

Impacts from Alternative D-R on old growth forest potentially providing red squirrel habitat are described in section 3.22.2, *Old Growth Ecosystems*. No old growth would be removed in the Crazy PSU; 8 acres of effective and recruitment potential old growth in the Silverfish PSU would be removed. Compared to the other agencies' mitigated transmission line alternatives, Alternative D-R would clear less than Alternative C-R, but more than Alternative E-R, and its effects on the proportion of effective and recruitment potential old growth in the analysis area would also be minor. Within the PSU's, 2015 KFP desired conditions and guidelines for old growth would be met, providing potential habitat for red squirrels.

Effects on Lynx Habitat on Private Land

Within the MFSA transmission line analysis area, lynx habitat has not been identified on private lands either inside or outside of the LAUs, and no impact on lynx habitat would occur. Within the LAUs, Transmission Line Alternative D-R would not impact privately owned lands. Any effects to potential lynx movement outside of the LAU in the MFSA analysis area would be minimal due to the short duration of the transmission line and Sedlak Park Substation construction activity and low potential for the species to occur in the low-elevation area. Vegetative cover in the form of shrubs and grass would continue to be provided on most of the transmission line clearing area.

State Land

Just as Alternative C-R, Alternative D-R would cross the northeast quarter of section 36 T27N, R30W. Effects to lynx habitat within the section are disclosed in Table 238. Less than 1 acre (about 0.33 acre) of low-elevation non-habitat or travel habitat would be affected based on the KNF LAU mapping. Based on State mapping, a total of 3 acres from two different stands identified as winter forage would be cleared of overstory trees, leaving the majority of the winter foraging habitat identified in the section unaffected. Cover from the remaining vegetation of shrubs and low trees would provide cover for lynx movement, although suitability for winter forage may be reduced. The remaining area cleared was not mapped as habitat, but cover for movement would remain. Impacts to lynx habitat on State land would be mitigated by implementing the agencies' alternatives transmission line mitigations on State land as described under Alternative C-R.

Alternative E-R – West Fisher Creek Transmission Line Alternative

In Alternative E-R, about 40 acres and 45 acres of timber removal would occur in lynx habitat in LAUs 14503 and 14504, respectively. The impacts of Alternative E-R at 45 acres in the Crazy 14504 LAU are the same as Alternative D-R. As shown in Table 238, Alternative E-R would remove overstory trees within multistory mature late successional habitat on about 36 acres in LAU 14503 and 28 acres in LAU 14504. Additionally in the West Fisher 14503 LAU, Alternative E-R would remove overstory trees on 4 acres of stem exclusion habitat, and in the Crazy 14502 LAU, would remove overstory trees on 8 acres of stand initiation and 9 acres of stem exclusion habitat, the same as Alternative D-R. Included in these acres of affected lynx habitat is the construction of new temporary access roads, which would remove vegetation during the Construction Phase. Lynx habitat acres actually impacted on the ground are expected to be less due to that some shrub and tree cover would be maintained in the transmission line clearing area; only the largest trees would be removed and some areas would not be cleared. Any vegetation such as shrubs or low trees within the transmission line clearing area that would remain or grow back on the temporary access roads during the Operations Phase would provide cover for lynx movement within and across the LAUs. Coarse down wood would also be left within the clearing area, providing a component for potential denning if the overall habitat remained suitable. However, this is unlikely as most documented den sites in Montana have been in mature spruce-fir forests with high horizontal cover and abundant coarse woody debris, with younger stands and stands with discontinuous canopies seldom used (Squires *et al*. 2008). Post-project and after the transmission line was removed, all newly constructed roads would be bladed and re-contoured to match the existing topography, obliterating the road prism. Reclamation efforts would reinitiate vegetation succession on the transmission line. Based on the habitat potential of the individual stand, lynx habitat could develop over time. Within either LAU, less than 0.5 percent of multistory mature late successional habitat would be affected, with this habitat component in the West Fisher LAU and Crazy LAU remaining at 89 percent and 82 percent, respectively. Overall, for the West Fisher 14503 LAU or the Crazy 14504 LAU, less than 0.5 percent of lynx habitat within either individual LAU would be affected by Alternative E-R.

Alternative E-R would not impact any old growth that provides potential red squirrel habitat as described in section 3.22.2, *Old Growth Ecosystems* Within the PSU's, 2015 KFP desired conditions and guidelines for old growth would be met, providing potential habitat for red squirrels.

Effects on private land due to construction of the transmission line and Sedlak Park Substation within the MFSA analysis area are as described for Alternative D-R.

Evaluation of Effectiveness of Mitigation Plans or Other Plans for Alternatives C-R, D-R, and E-R

For the agencies' Alternatives C-R, D-R, and E-R, calculations for lynx habitat impacted are probably an overestimate of the actual effects because a Vegetation Removal and Disposition Plan would minimize tree clearing. MMC would develop this plan and submit for agencies' approval before the Construction Phase (see section 2.5.3.3.1, *Vegetation Removal and Disposition* in the Alternative 3 discussion). For Alternative C-R, impacts on multistory or late-successional forest would be offset through enhancement of either 336 or 484 acres of lynx stem exclusion habitat, depending on the paired mine alternative, included in the agencies' alternatives. For Alternative D-R, effects on multistory or late-successional forest would be offset through enhancement of either 416 or 552 acres of lynx stem exclusion habitat, depending on the paired mine alternative, included in the agencies' alternatives. For Alternative E-R, effects on multistory or late-successional forest would be offset through enhancement of either 368 or 518 acres of lynx stem exclusion habitat, depending on the paired mine alternative, included in the agencies' alternatives.

Effects on Lynx on Private Land

Within the MFSA Transmission Line Analysis Area, lynx habitat has not been identified on private lands and no impact on lynx habitat would occur. Within the West Fisher LAU, Alternative E-R crosses Plum Creek land. This section occurs below 4,000 feet within the LAU, and is identified as low-elevation non-habitat. As shown in Table 238, about 30 acres of this section would be cleared of overstory trees. Any effects to potential lynx movement on Plum Creek land outside of the LAU (Table 239) would be minimal due to the short duration of transmission line construction activity and low potential for the species to occur in the low-elevation area. Vegetative cover in the form of shrubs and grass would continue to be provided on most of the transmission line clearing area, providing suitable habitat for lynx movement across the transmission line.

Effects to Lynx on State Land

Transmission Line Alternative E-R would pass through section 36 T27N, R30W outside of the LAU. Effects to lynx habitat mapped by the State HCP within the section are disclosed in Table 239. Less than 1 acre along an edge of winter foraging habitat and 6 acres along the outer edge of a stand identified as temporary non-suitable habitat would be affected. Timber removal has already occurred in the temporary non-suitable habitat and effects to the existing stand would be minimal. Cover from the remaining vegetation of shrubs and low trees would provide cover for lynx movement, although suitability for winter forage may be reduced. The remaining area cleared was also not mapped as habitat, but cover for movement would remain.

The effects of Alternative E-R on State land differ from Alternatives C-R and D-R as the transmission line alignment would be in a different location. Alternative E-R would cross section 36 T27N, R30W following the existing Libby Creek Road. Much of the State lynx habitat identified as currently non-suitable within Alternative E-R's clearing area is also in the existing road disturbance area. As shown in Table 239, Alternative E-R would affect less than 1 acre of a stand identified as winter foraging habitat and less than 6 acres total along the edge of a stand currently identified as temporary non-suitable habitat. Due to the lack of tall overstory trees in this stand, it is unlikely any additional clearing would occur during the Construction Phase, but tall trees would be removed as maintenance during the about 25-year Operations Phase. The amounts of coarse woody debris left in Alternative E-R's clearing area would depend upon VRU and the existing condition of the stand. MMC would leave 10 to 15 tons (15 to 20 logs) per acre of coarse woody debris on-site after timber clearing in VRU 2s, and 12 to 25 tons per acre of in and VRU 7n. Impacts to lynx habitat on State DNRC land would be mitigated by implementing the agencies' alternatives transmission line mitigations on State land as described under Alternative C-R.

Combined Mine-Transmission Line Alternatives

Impacts on lynx habitat components from combined mine-transmission line action alternatives are shown in in Table 240 and summarized in the following paragraphs.

Effects on Lynx on National Forest System Lands

Alternative 2B would remove 2 percent of lynx habitat from the Crazy LAU for the life of the mine, the most lynx habitat of any of the combined action alternatives, and would remove the most stand initiation habitat and the most multistory mature late successional habitat (1 percent) of any of the combined action alternatives. The majority of the 512 acres of habitat that would be removed for Alternative 2B are for mine development, including the impoundment, adits, plant site, aboveground conveyor system or pipelines, and associated road reconstruction and construction. The removal of lynx habitat for Alternative 2B in the Crazy LAU is concentrated in the Little Cherry Creek drainage and extends to the upper end of Ramsey Creek. Of the 512 acres, about 79 acres would be cleared for the transmission line construction and associated temporary road construction. Within the West Fisher LAU, about 6 acres of multistory mature habitat would be cleared for transmission line construction. The affected suitable lynx habitat is widely scattered along the transmission line. The removal of overstory timber and vegetation associated with transmission line clearing would be minor relative to the amount of habitat available (Table 240).

For the agencies' mitigated combined action alternatives, no more than 1 percent of LAU 14503 and no more than 1 percent of LAU 14504 would have lynx habitat removed or cleared for the life of the mine. Those areas affected by the transmission line would still largely provide cover and may provide summer foraging habitat. The proposed agencies' mitigated combined action alternatives would remove or clear multistory mature or late successional habitat in the West Fisher 14503 and Crazy 14504 LAUs for mine facility and transmission line development and maintain much of these areas in a state unsuitable for lynx for the life of the mine. Less than 1 percent of the available multistory mature habitat would be affected in each LAU by these alternatives. The size and distribution of these reduced acres of multistory mature or late successional habitat would not be expected to have site-specific adverse effects to snowshoe hare or lynx as the species are highly mobile and the successional stage would remain distributed throughout the LAUs. It is not expected that the small reductions in multistory mature winter foraging habitat (see Table 238, Table 239, and Table 240) would reduce prey availability or increase risk of mortality from starvation as more than 80 percent of each LAU would continue to provide this type of habitat. Vegetation succession on facilities and other sites would only begin after reclamation occurs in about 30 years, plus an additional 15 years for stand initiation habitat to develop.

All combined action alternatives would affect multistory or late-successional forest snowshoe hare habitat. Impacts on multistory or late-successional forest snowshoe hare habitat in the West Fisher LAU 14503 would be 6 to 61 acres for all combined action alternatives. Impacts on multistory or late-successional forest snowshoe hare habitat in the Crazy LAU 14504 would be 50 to 54 acres for Alternatives 3C-R, 3D-R, and 3E-R; 43 to 47 acres for Alternatives 4C-R, 4D-R, and 4E-R; and 123 acres for Alternative 2B. These acreages equate to less than 1 percent of the 10,940 acres and less than 1 percent of the 18,434 acres of multistory late successional habitat available within the West Fisher and Crazy LAUs, respectively. Effects to lynx or their prey would be minimal.

As described in section 3.22.2, *Old Growth Ecosystems*, all combined action alternatives would affect effective and recruitment potential old growth forest potentially providing red squirrel habitat. Impacts on effective and recruitment potential old growth would range from 236 acres for Alternative 4E-R to 440 acres for Alternative 2B. For all combined action alternatives within the Crazy PSU, effective and recruitment potential old growth within the PSU would be at 13 percent in Alternative 2B and 14 percent in the agencies' alternatives. Within the Silverfish PSU, the percentage of effective and recruitment potential old growth would remain at 11 percent for all combined action alternatives. Sufficient effective and recruitment potential old growth would remain to provide red squirrel habitat.

Throughout the remaining areas of the Crazy and West Fisher LAUs, available habitat would remain. In the higher elevations west of the Bear Creek (#278) and Libby-West Fisher (#231) roads, available habitat is predominantly multistory mature late successional habitat with widely scattered stands providing stand initiation habitat. In the lower elevations to the east of these two roads, a more diverse mosaic of habitat exists with increased number of stands providing stand initiation habitat due to previous timber harvest.

Evaluation of Effectiveness of Mitigation Plans or Other Plans for the Combined Action Alternatives

In the agencies' combined alternatives, impacts on multistory or late-successional forest would be offset through enhancement of 484 to 552 acres for Alternative 3, or 336 to 416 acres for Alternative 4, of lynx stem exclusion habitat. These stands are currently in stem exclusion stage (stands that currently have poorly developed understories and do not provide winter snowshoe hare habitat). Field verification with snowshoe hare horizontal cover surveys would be conducted before any treatment occurs. The proposed treatments would be intended to mitigate for the physical loss of currently suitable early stand initiation, stand initiation, and multistory forage habitat resulting from project implementation, and would accelerate the development of suitable habitat that is currently in an unsuitable condition. The West Fisher LAU has 971 acres of stem exclusion habitat available that could potentially be treated, and the Crazy LAU has 1,063 acres. Selected stands would be thinned to allow sun to reach understory vegetation and develop the dense horizontal vegetation favored by snowshoe hares. Mitigation would be at a 2:1 ratio (2 acres treated for each acre lost). Allowing these stands to develop suitable snowshoe hare habitat in a shorter timeframe would benefit lynx by improving the availability of prey. Enhancement of lynx stem exclusion habitat is included in the agencies' combined action alternatives as mitigation for the physical loss of suitable lynx habitat due to construction of the project facilities and transmission line.

For the agencies' alternatives, impacts on lynx habitat would be offset by implementation of the Vegetation Removal and Disposition Plan developed for the agencies' alternatives (section 2.5.2.6.2, *Vegetation Removal and Disposition Plan*).

Effects to Lynx on Private and State Land

The combined action alternatives would not affect lynx habitat on private lands in the Crazy 14504 LAU or West Fisher 14503 LAU. No lynx habitat is mapped on private land within the LAUs. Outside of the LAUs, private lands potentially affected by the combined action alternatives are not mapped as lynx habitat. Impacts on lynx on private lands outside of LAUs 14503 and 14504 would be minimal because they do not provide suitable lynx habitat.

Effects to private land from the combined action alternatives, including the Sedlak Park Substation, within the MFSA analysis area, are as described for the individual transmission line alternatives.

The combined action alternatives would affect section 36 T27N, R30W as described under the transmission line alternatives. Alternative 2B would not be located on or near the two sections in the analysis area and would have no effect to State land. The agencies' combined action alternatives, depending on the combination, would affect less than 7 acres of the total lynx habitat identified on lands managed by the Northwestern Land Office. With the agencies' transmission line mitigations applied to State section 36, and only 7 acres affected, the combined agencies' mitigated action alternatives would have no measurable effect to lynx or their habitat.

Cumulative Effects

Effects on Lynx on National Forest System Lands

The affected environment and existing condition sections describes relevant past and present factors affecting the lynx and existing lynx habitat conditions and trends in the Crazy and West Fisher LAUs. This cumulative effects section summarizes the past actions as well as further describes ongoing and other reasonably foreseeable contributions potentially impacting lynx in terms of the applicable standards and guidelines of the NRLMD and effects to lynx habitat components.

As described under the section "*Analysis Methods*," the affected LAUs were chosen as the appropriate scale for lynx cumulative effects analysis. In summary, 1) the LAU represents the size of a home range of a female lynx; 2) maintaining habitat conditions at the scale of a lynx home range will allow for good distribution of lynx habitat components; 3) expanding the analysis area could dilute the effects of the proposed activities; 4) the LAU provides a consistent boundary for monitoring of and compliance with the Objectives, Standards, and Guidelines of the NRLMD; and 5) the LAU is large enough to include all important effects of the proposed activities.

In addition, areas outside of the impacted LAUs were evaluated for potential impacts related to habitat availability and connectivity to adjacent LAUs. Given the location of the combined action alternatives, the existing conditions of all adjacent LAUs, and type and nature of activities along the shared boundaries of the project and adjacent LAUs, no apparent conditions would warrant expanding the boundary beyond the Crazy and West Fisher LAUs. Therefore, these LAUs were chosen as the appropriate scale for cumulative effects analysis.

Please see Appendix E for a detailed list of all past, present, and reasonably foreseeable activities within the West Fisher and Crazy LAUs.

Past Actions

See existing condition and Table 236, which summarize the existing condition based on effects of past actions and post-treatment conditions as they relate to lynx habitat. The detailed description of previous vegetation management, special uses, and road management activities in the affected PSUs are found in Appendix E. Table 235 summarizes the existing condition based on effects of past actions as they relate to lynx. Stand-replacing wildfires have occurred periodically within the affected LAUs and created early successional habitat that was temporarily unsuitable for lynx foraging. In addition, regeneration harvest has occurred since the 1950s, which also resulted in forest structural changes that were temporarily unsuitable for lynx foraging. After about 15 years, these stands developed into foraging habitat. Over time, the combination of wildfire and regeneration harvest has resulted in a mosaic of structural stages within these LAUs. However, due to the lack of natural wildfires or regeneration timber harvest within the past 15 years, less than 3 percent of the West Fisher, and less than 1 percent of either the Crazy or Rock LAUs are currently providing early stand initiation habitat (unsuitable for winter foraging). Stand initiation habitat, which is suitable winter foraging habitat within these two LAUs, ranges from 3 percent to 13 percent (Table 235). The LAUs predominantly provide multistory mature late successional habitat. As described previously, those stands comprised of multilayer forests of spruce and fir providing high horizontal cover and boughs touching the snow surface receive high use during the critical winter period.

Past Actions Considered with No Action Alternatives
Neither Alternative 1, Alternative A, nor Alternative 1A directly contribute to any cumulative impacts on lynx. Disturbance processes, such as wildfire, contribute to vegetation succession, which provide for diversity of lynx habitat. Any unsuitable stem exclusion habitat, comprising up to 8 percent of the Crazy LAU and 5 percent of the West Fisher LAU affected by wildfire would eventually transition into suitable multistory habitat. Without active management, such as prescribed fire or timber harvest functioning as a source of disturbance, the existing early stand initiation and stand initiation habitat would continue through successional stages and further reduce the diversity of habitat available.

Past Actions Considered with the Combined Mine-Transmission Line Action Alternatives
The KNF considers the condition of lynx habitat on non-federal lands within LAUs to the extent possible in its assessment of baseline conditions during development of projects on National Forest System lands, and adjusts its alternatives to reduce negative effects in the LAU. This is reflected in the agencies' mitigated combined action alternatives. Standard ALL S1 (maintain habitat connectivity) requires evaluating the existing condition to determine where linkage areas and movement corridors exist as their current location and availability are a consequence of past actions. The cumulative effects analysis identifies potential changes to those existing corridors or linkage areas from the Proposed Action in the context of effects resulting from other past, present, and reasonably foreseeable actions. The combined action alternatives would develop a mine (including an impoundment, plant site and conveyor belt system, evaluation and ventilation adits, associated reconstructed and new road construction and, depending on the combined alternative, LAD sites). Large openings would result from the impoundment site and increased traffic would occur on the roads connecting the mine facilities and the Bear Creek Road #278 haul route. Disturbance from the impoundment sites largely occur in low-elevation non-habitat as the locations straddle the boundary of the Crazy LAU. The haul route and many of the mine access roads are also located in low-elevation non-habitat or travel habitat, although lynx habitat would be affected. Alternative 2B removes stand initiation habitat with construction of the impoundment, LAD Area 1, and the Ramsey Plant Site. The agencies' mitigated combined action alternatives mine development and associated facilities remove less lynx habitat. Transmission lines would cross ridges and habitat cleared by the transmission lines is widely scattered along the line with low-growing shrubs and trees expected to remain and cover provided. Alternative 2B, however, could remove the vegetation as no mitigation is specified. The width of the transmission lines clearing area disturbances range from 150 to 200 feet. With the agencies' mitigation, vegetation clearing would be minimized in the clearing area and lynx movement across the clearing area would not be impeded. There would be no increase in the amount of roads open to the public motorized use or development or increase in winter snowmobile routes. Connectivity and movement within the LAUs and to adjacent LAUs would remain. Connectivity and movement potential toward the east and the identified approach areas discussed previously would be maintained. The proposed combined action alternatives would not decrease connectivity in the project LAUs, and cumulatively there would be no change to overall connectivity.

If connectivity is considered with the combined action alternatives grizzly bear mitigation, connectivity for lynx would improve. Both Alternative 2B and the agencies' combined action alternatives would include implementing a road closure associated with the proposed Rock Creek Project mitigation prior to Montanore's Evaluation Phase, but only if the Rock Creek Project has not already implemented the closure. This Rock Creek Project access mitigation on the Upper Bear Creek Road (NFS road #4784) would significantly contribute to the core created by the Montanore Mine Project road access mitigation within the north-south movement corridor, and would result in improvement to grizzly bear habitat in BMU 5 as well as secure habitat for lynx in the Crazy LAU.

In the adjacent Rock LAU, prior to the Construction Phase, the agencies' alternatives only would require the Rock Lake Trail 150A to be closed with a barrier that would also significantly improve grizzly bear habitat in both BMU 4 and BMU 5. As a result of the Rock Lake Trail 150A mitigation closure, connectivity and security for lynx would directly improve in the West Fisher and Rock LAUs by reducing a potential fracture zone and indirectly would provide for better connectivity between LAUs to the north and south. This improvement would occur in the linkage area identified in the NRLMD (USDA Forest Service 2007, Figure 1-1) and the general wildlife north-south movement corridor displayed in the Wildlife BA 2013, Figure 6d. The grizzly bear mitigation plan also would require habitat compensation for habitat loss and displacement. Although the amount of mitigation lands required for habitat compensation varies (Table 28 and Table 29) by combined mine-transmission line alternatives (Alternative 2B or any of the agencies' combined action alternatives), the acquisition of mitigation lands for grizzly bears could improve connectivity for lynx habitat and provide additional habitat for both lynx and their prey. Some of the parcels identified for potential acquisition occur within the directly affected LAUs or in areas identified as important for linkage outside of LAUs.

Both inside and outside the LAUs, development of private land would continue. Although the majority of the private land is located in low-elevation non-habitat or outside the LAU, private land does exist at higher elevations within the LAUs and is providing multistory mature late successional habitat, as well as travel habitat. Within the US 2-Barren Peak/Hunter Creek Approach area identified on the eastern edge of the West Fisher LAU, human development potential on most of the Plum Creek land has been removed due to the successful Fisher River Conservation Easement that Plum Creek enacted with Montana FWP. This helps to maintain connectivity to LAUs located to the north and east. Development on private land outside the LAU would continue. Cumulative effects of this development to lynx would be partially dependent on the extent and type of development of these parcels, but many already support year-round residences. Within the LAU, development of private land could contribute to cumulative effects to connectivity, but this again would be partially dependent on the extent and type of development and disturbance, and habitat alteration of these parcels. Activities that may occur on private land can only be estimated and are outside the control of the Forest Service. Because proposed activities would occur within the Crazy and West Fisher LAUs and in the Rock LAU to the west; private property is within the general location of the linkage area identified in the NRLMD (USDA Forest Service 2007, Figure 1-1); and the general wildlife north-south movement corridor is displayed in the Wildlife BA 2013, Figure 6d, cumulative effects to lynx movement could occur. However, this is unlikely considering the amount of suitable habitat or travel habitat that would remain on the National Forest System land surrounding the scattered parcels and the low potential for lynx to occur in the Cabinet Mountains. Connectivity corridors with source populations in Canada identified by Squires *et al*. 2013 would not be affected by the proposed activities.

Less than 1 percent of the available lynx habitat in the Crazy, West Fisher, and Rock LAUs is currently in a temporarily unsuitable condition. Most of the private land within the LAUs is located in low-elevation non-habitat, but removal of multistory late successional habitat could occur on scattered private parcels. This stage of lynx habitat comprises 82 to 89 percent of the lynx habitat available on federal lands. Development of the private land and effects to lynx habitat would depend on the level of habitat alteration. Loss of multistory late-successional habitat on scattered private parcels may potentially disturb or displace an individual lynx that could occur, but ample habitat remains in the LAUs on federal lands and cumulative effects to lynx habitat in the LAUs would be negligible.

The proposed combined action alternatives would remove lynx habitat for the life of the mine. Alternative 2B would remove 2 percent of lynx habitat from the Crazy LAU, while the agencies' mitigated combined action alternatives would remove less than 1 percent of lynx habitat in this LAU. Habitat would not be provided on these sites within the Crazy LAU for the life of the mine. Based on the habitat potential of the individual stand, and success of the reclamation efforts, lynx habitat could develop over time (in about 30 years and for at least an additional 15 years or more until the stands reached the early stand initiation stage). In the West Fisher LAU, all combined action alternatives would clear vegetation within the transmission line clearing areas, with the amount removed likely being more under Alternative 2B and less in the agencies' mitigated combined alternatives due to the Vegetation Removal and Disposition Plan that would minimize tree and vegetation clearing. Early stand initiation habitat may be provided, and cover for movement would remain in the clearing areas.

Ongoing Actions and Reasonably Foreseeable Actions

Present and reasonably foreseeable actions in the West Fisher and Crazy LAUs are described in detail in Appendix E, and summarized here. Actions that could occur on any land ownership include road construction and/or maintenance (including roadside brushing), timber harvest, fire suppression, mining, real estate/residential development, and recreational pursuits such as hunting, trapping, fishing, pleasure driving, camping, snowmobiling, skiing, and forest product gathering (*e.g.*, firewood, Christmas trees, mushrooms, and huckleberries).

Vegetation changes from timber harvest or road construction can add to the effects of the proposed combined action alternatives on lynx if it occurs in the habitat types that support lynx prey. Road construction could permanently remove acres from available habitat. Timber harvest could change one lynx habitat successional stage to another, but it would also contribute to the mosaic of successional stages favorable for lynx habitat. This would be beneficial for lynx due to the limited acres in this age class in both LAUs. Roadside brushing could occur on other lands as part of road maintenance and could reduce some roadside cover for lynx travel and foraging.

Hunting and trapping is likely to continue to occur on all lands throughout the life of any of the combined action alternatives. Hunting activities are regulated by the FWP. The Forest Service influences hunter access through road management. Such activities always carry the risk of accidental mortality from non-target trap captures, misidentified targets, or malicious killings. Potential human-caused mortality is a function of other factors such as hunting or trapping regulations that are outside Forest Service control. This risk of mortality on other lands would be independent of the proposed combined action alternatives and would not involve cumulative effects with this project to lynx.

Christmas tree cutting is likely to occur on all lands throughout the life of the combined action alternatives. Removing individual trees that contribute to winter snowshoe hare habitat and lynx foraging habitat would not be expected to occur on a large enough scale to affect the suitability of lynx winter habitat, and any cumulative effects of the combined action alternatives with incidental tree cutting on other lands would be negligible.

Snowmobiling and/or skiing (generally cross-country) would continue to occur on all land ownerships, and would most likely increase over the next 30 to 40 years. Recreational snow activities can compress snow surfaces; however, as previously discussed, current research has not shown that snow compression significantly increased competitor access to lynx and hare habitat (Kolbe *et al.* 2007). Future development of ski areas in either of the two LAUs on non-federal lands is not likely. No recreational or over-the-snow routes are proposed under the combined action alternatives. No cumulative adverse effects with snow-related activities on other lands are expected.

Other actions such as mining, fishing, pleasure driving, camping, and other forest product gathering (*e.g.*, mushrooms and huckleberries) would continue to occur on all land ownerships throughout the life of any of the combined action alternatives. These activities typically have little to no effect on lynx due to their short-term nature and limited vegetation disturbance. However, they would still have the potential to displace or increase the risk of mortality for lynx under unique circumstances.

Firewood gathering would continue to occur adjacent to open roads and would reduce potential habitat for denning structure. Denning habitat has not been identified as a limiting factor for lynx and is widely available across the action area. Firewood gathering would not likely measurably modify lynx habitat to the extent that cumulative effects with any of the combined action alternatives would be anticipated.

Wildfires are likely to occur in the two LAUs associated with the project over the 30- to 40-year span of any of the combined action alternatives and may include fire-suppression activities as well. Initial suppression would be aimed specifically at controlling undesirable wildfire, but suppression of fires that escape initial attack, regardless of ownership, would be planned with all resource values considered, including lynx habitat. Historically, wildfires have had beneficial effects to lynx habitat by providing the regular influx of early successional stages needed for a mosaic of age classes. Larger fire-suppression efforts would include consideration of the NRLMD to conduct fire use activities to restore ecological process and maintain or improve lynx habitat, which relate to the NRLMD Objective VEG O3.

The USFWS biological opinion for the NRLMD (USFWS 2007d) found no evidence that mineral development was a factor threatening lynx. Lynx appear to be quite tolerant of such activities (Ruediger *et al*. 2000), and these activities are generally not considered to have adverse impacts on lynx. Most disturbances associated with locatable minerals are less than 20 acres in size (USFWS 2007d) on National Forest System lands. The NRLMD contains guidelines designed to minimize the impacts of mineral-related activities on individual lynx and lynx habitat. Small locatable mining-associated activities may incidentally affect lynx use within some areas on a temporary basis due to disturbance, but these effects would not be measurable. Alternative 2B would not comply with NRLMD Guideline ALL G1, Guideline HU G4, or Guideline HU G6 and could add to cumulative effects to lynx. The agencies' mitigated combined action alternatives comply with the NRLMD applicable Standards, Objectives, and Guidelines and would not add to cumulative effects to lynx.

Actions on State-Owned Lands

The State owns a section of land partially within the West Fisher LAU (14503) and adjacent to the Crazy LAU (14504). NRLMD management direction does not apply to private or State land, but if the land occurs within a LAU, the NRLMD Standard VEG 01 takes into account the amount of unsuitable habitat on State land in determining compliance with the standard. As described under the *Analysis Method* section, the DNRC manages for lynx and their habitat on the lands managed by the Northwestern Land Office, which includes the Libby DNRC Unit. Because State-owned lands comprise less than 1 percent of the West Fisher LAU, the potential for adverse cumulative effects with any of the agencies' mitigated combined action alternatives are low.

Two recently completed State timber sales occurred just outside of both LAUs. The Six Hills Timber Sale had one unit of 175 acres of overstory removal in the Crazy PSU, located in section 16, T28W, R30W, and was completed in 2012. The sale covered six widely spaced sections, but no activity occurred within a LAU. The second recently completed project was a small 17-acre seed tree treatment in section 36 T29W, R31W, called the Crazy Man Timber Sale, and was completed by 2011.

Because of the long time span of any of the combined action alternatives, it is possible that additional actions on the two State sections that occur adjacent to the Crazy LAU or partially within the Fisher LAU boundary could occur at a future date. Any future federal activity would consider State lands under the NRLMD for determining compliance with Vegetation Standard VEG S1. Activities that alter vegetation are not likely to impact lynx due to the limited amount of lynx habitat that occurs on State land within the West Fisher LAU, and the DNRC would follow the State HCP implementation guide for lynx habitat. Any activities affecting lynx habitat mapped on State land either inside or outside the LAU would be managed under the HCP management for lynx. Lynx habitat would be maintained on State land within the Montana DNRC Libby Management Unit. The State HCP has been previously discussed in detail.

Other actions (not addressed above) on the two sections of State lands within the analysis area that are likely to occur include data collection and other administrative access use, prescribed fire, fire suppression, pre-commercial thinning, or other non-commercial treatments of vegetation. The potential for adverse cumulative effects from these actions with any of the combined action alternatives would not be measurable.

Montana FWP developed the first State Wildlife Action Plan, the Comprehensive Fish and Wildlife Conservation Strategy, in 2005 and it was approved by the USFWS in 2006. Montana FWP submitted a revised State Wildlife Action Plan in 2014 (FWP 2014). The East Cabinet Face, which encompasses the analysis area, is one of 55 Tier I terrestrial focal areas. The lynx was identified as a species of greatest conservation need in the 2014 plan. The State HCP has been previously discussed in detail.

Actions on Tribal-Owned Lands

No tribal-owned lands are within the analysis area or within any of the LAUs associated with the project. Tribal members are likely to use both federal and non-federal lands for various cultural or recreation activities, but these would not be expected to affect lynx or their habitat. The combined action alternatives would have no cumulative effects on tribal-owned lands.

Actions on Privately Owned Lands
A number of land parcels are owned by private individuals within the West Fisher LAU (14503), Crazy LAU (14504), and Rock LAU (14702). Of the about 729 privately owned acres within the West Fisher LAU boundary, 355 of those acres are currently suitable lynx habitat (multistory mature/late-successional). Of the 1,079 privately owned acres within the Crazy LAU boundary, only 140 acres are currently suitable lynx habitat (also multistory mature/late-successional). Within the Rock LAU are about 789 acres of privately owned land, with one 640-acre section being harvested in 1999. No habitat data are available for most of this section, but a small stand of multistory forage may occur. Most of the private lands in the lower elevations of the West Fisher and Crazy LAUs do not provide lynx habitat, with either travel or low-elevation non-habitat identified, which could be used for travel cover and connectivity within and between LAUs. Some of the higher elevation parcels provide lynx habitat. Timber harvest has occurred on some of the private lands. Vegetation-altering activities, such as private land development for homes or businesses with associated access road construction, is likely to occur on private lands over the next 30 to 40 years during the life of any of the combined action alternatives. Commercial timber harvest is also likely to occur over the same time span. These actions, especially on the east side of the Cabinet Mountains, have the potential to affect lynx connectivity or habitat due to the direct loss of or reduced suitability of existing habitat. The Forest Service has no regulating authority over activities on private lands, and activities such as private land development are expected to continue. Activities on private land in-holdings, when added to the effects of any of the combined action alternatives, could have localized negative cumulative effects to lynx habitat, but overall, due to the small percentage of lynx habitat that occurs within the LAUs, there is low potential for negative cumulative effects to lynx or their habitat.

Road construction and/or timber harvest actions could remove or reduce the effectiveness of existing lynx habitat or could create large openings that would alter travel patterns, similar to that discussed in *Actions Common to All Ownerships*. Large-scale timber harvest or development on some land parcels could create large openings that lynx may be reluctant to cross. This is unlikely on most land parcels due to parcel size and previous harvest activities. However, in the West Fisher LAU, some of the larger privately owned lands are being considered for real estate sale that currently provide multistory forage habitat. Timber harvest and/or residential development on lynx habitat would have the potential to occur at a future date, and could cumulatively add to the small decrease in multistory forage resulting from the transmission line.

Actions on Industry-Owned Lands
The majority of corporate timberland in the affected LAUs is owned by Plum Creek. Within the West Fisher LAU (14503) are 2,408 acres of Plum Creek and 46 acres are in the Crazy LAU (14504). Stimson Lumber Corporation owns a total of 62 acres in the Crazy LAU and 42 acres in the Rock LAU.

Within the Crazy LAU (14504), both pieces of Stimson Lumber Company lands, which are located along the boundary of the LAU, were identified as low-elevation non-habitat for lynx. The small 8-acre parcel within the LAU was harvested about 10 years ago and within about 5 years should begin to develop cover for lynx travel. The larger 54-acre parcel was harvested between 1990 and 1999, the harvest is 15 to 24 years old, and the parcel likely already provides some cover for lynx movement. The 42 acres of Stimson property within the Rock LAU is comprised of small portions (7 acres, 19 acres, and 16 acres) of three separate sections. The 7- and 19-acre parcels have been previously harvested and, based on 2009 NAIP aerial photos, may provide lynx habitat in the stand initiation stage, but no on-the-ground data are available. The remaining 16-acre piece appears to be providing multistory forage habitat, based on the surrounding National Forest System lands and the 2009 photos.

At some point in the next 30 to 40 years, tree thinning could occur on these acres; however, as the majority of industry ownership occurs in low-elevation non-habitat, no adverse cumulative effects with any of the combined action alternatives is expected. All of the 2,407 Plum Creek acres within the West Fisher LAU boundary are non-lynx habitat, either travel (339 acres) or low-elevation (2,068 acres), and all of the 100 acres of Plum Creek within the Crazy LAU boundary are considered non-habitat, either travel (33 acres) or low-elevation (67 acres). Most of the Plum Creek properties were harvested 23 to 32 years ago, with some harvest occurring within the last 3 to 12 years. The units harvested 23 to 32 years ago would be providing travel cover and connectivity within and between LAUs. Future timber harvest or tree thinning is likely to occur on these lands, but would not cumulatively affect lynx habitat. For all lands within lynx habitat, Plum Creek follows guidelines for pre-commercial thinning. Future land sale to private individuals or land developers is possible, especially parcels near existing road systems. Because Plum Creek lands in both the Crazy and West Fisher LAUs occur at low elevations and do not provide lynx habitat, potential future alteration of vegetation would not be expected to cause cumulative adverse effects to lynx with any of the combined action alternatives. One section of Plum Creek land in the West Fisher LAU is located on the boundary with the LAU to the south (Silver Butte 14502) within lynx habitat. The portion of this section within the West Fisher LAU is identified as travel habitat, and across the boundary in the Silver Butte LAU, the Plum Creek harvest 23 to 32 years ago has created stand initiation stage lynx habitat. These units provide winter foraging habitat within a mosaic of multistory forage and stem exclusion habitat. Harvest within the Plum Creek travel habitat stands would not inhibit lynx movement around the section due to the availability of habitat on surrounding National Forest System lands.

Industry has and continues to work with private (non-governmental), state, and federal agencies to conserve habitat, including lynx habitat, on their lands. Avista Corporation, The Conservation Fund, Plum Creek, and FWP completed a conservation agreement on more than 1,800 acres of land formerly owned by Plum Creek and Genesis Mining Company. The result was the creation of the Bull River Wildlife Management Area (WMA), which is managed by FWP. The Bull River WMA was formally dedicated in 2005. This WMA is at the south end of Bull Lake and connects/protects habitat on either side of MT 56. This general area has been identified as a potential lynx linkage area.

The Thompson-Fisher Conservation Easement, discussed in the *Land Use and Recreation* section, includes lands near the Fisher River just outside the West Fisher LAU boundary. The easement does not protect lynx habitat related to the Crazy and West Fisher LAUs, but benefits lynx by protecting the conservation values of the easement lands, which include low-elevation travel cover in linkage corridors between the West Fisher LAU and other lynx habitat to the east.

Actions on Federal Lands

Reasonably foreseeable and ongoing federal actions with treatments occurring in the Crazy, West Fisher, and Rock LAUs are listed in Appendix E and include the Miller-West Fisher Vegetation Management Project, Wayup Mine/Fourth of July Access, Bear Lakes Access, and the Rock Creek Project. These and other cumulative projects are discussed in detail under the summary of NRLMD Objectives, Standards, and Guidelines below.

Standard ALL S1 (connectivity) requires evaluating the existing condition to see what linkage areas and movement corridors exist as their location and availability have been influenced by past actions. The cumulative effects analysis identifies potential changes in those movement corridors/linkage areas from the proposed actions in the context of effects to those corridors/linkages resulting from other past, present, and reasonably foreseeable actions. None of the combined mine-transmission line alternatives would contribute to negative cumulative impacts on any designated linkage areas. Cumulative effects of both mine and transmission line alternatives, in combination with other ongoing or reasonably foreseeable actions on federal lands, on lynx movement within the Crazy LAU would be minor. Lynx movement would not appear to be affected by the level of traffic expected on the mine access roads, and areas of reduced cover would be small relative to surrounding habitat. The combined mine and transmission line alternatives would largely affect low-elevation non-habitat within the Crazy LAU and scattered lynx habitat within the transmission line clearing area in both the Crazy and the West Fisher LAUs. Less than 0.5 acre of lynx habitat on private land owned by MMC within the Rock LAU would be affected by any of the Montanore Project combined mine-transmission line alternatives as a result of the Rock Lake Ventilation Adit.

The Miller-West Fisher Vegetation Management Project maintained habitat connectivity within the West Fisher LAU and some timber harvest units would re-initiate several areas of general lynx habitat no longer providing foraging opportunities. Stand re-initiation, while it may impact travel in the short term, would benefit snowshoe hares in the 20 or so years following treatment. The Miller-West Fisher Project was determined to not affect the ability of lynx to move within LAUs or established linkage areas. The cumulative effects of both projects occurring in the West Fisher LAU would be alterations of lynx habitat and lynx travel or non-habitat, disturbance, and possibly avoidance of the analysis areas during construction of any of the transmission line action alternatives and Miller-West Fisher Project activities. Construction-related activities for transmission line Alternative B would occur outside of the winter period on big game winter range, which overlaps all lynx habitat affected in the West Fisher LAU 14503, and part of the lynx habitat affected in the Crazy LAU. Construction-related activities for any of the agency combined alternatives would occur over a 2-year period between June 16 and October 14 due to grizzly bear mitigation, and would not be expected to occur over the entire length of the transmission line at any one time. This timing mitigation designed to remove construction-related activity associated with the transmission line during the grizzly bear spring use period, as well as during fall hunting season and the grizzly bear denning period would also benefit lynx within the West Fisher LAU and a portion of the Crazy LAU. No measurable cumulative effects to suitable lynx habitat would occur. Suitable lynx habitat would remain in the vicinity, across the directly affected LAUs and in adjacent LAUs for lynx to use.

Other reasonably foreseeable activities in the West Fisher LAU include the Fourth of July Project. The Fourth of July proposal involves reconstruction of 0.72 mile of road and will begin at the end of NFS road #6748 at the Lake Creek trailhead and proceed southwest on the non-system Irish Boy Mine Road to a proposed bridge site on Lake Creek. Reconstruction will consist of clearing trees, brush, and stumps from the existing road corridor. The project will also include removing slumps, outsloping and installing surface drainage structures, and disposing of slash. New construction of 1.8 miles of road would begin at the proposed bridge site and extend to the Fourth of July parcel. Construction would consist of clearing trees, brush, and stumps for a road corridor up to 60 feet wide on steep slopes, earthmoving to create a 12- to 16-foot surface, installation of road surface drainage structures and culverts, construction of one bridge, and slash disposal.

Construction of the new road would decrease the amount of secure high-elevation habitat available for lynx. The project would mitigate for construction impacts by gating the newly constructed road and restricting motorized access to the Fourth of July parcel to the claimant. More than half of the new road construction and the Fourth of July parcel are within lynx habitat that the KNF has identified as multistory mature late successional habitat. The cumulative effects of the three projects occurring in the West Fisher LAU would be alterations of lynx habitat and lynx travel or non-habitat, disturbance, and possibly avoidance of the activity areas during construction of any of the transmission line action alternatives and Miller-West Fisher Project activities. Connectivity through the LAU would remain, allowing for lynx movement within and to adjacent LAUs.

Within the Rock LAU, the Rock Creek Project exploration adit would be within a 10-acre parcel on which the KNF mapped stem exclusion and multistory mature late-successional habitat. Aerial imagery shows a mix of rocky talus with timber. Existing conditions within the Rock LAU (Table 235) show a preponderance of multistory mature late-successional habitat exists, with 93 percent comprising the lynx habitat on federal lands. Suitable habitat is well connected within the Rock LAU and toward the Bull and Crazy LAUs to the north and the West Fisher and Silver Butte LAUs toward the south. Below the elevation boundary of the Rock LAU along Rock Creek, busing mine employees and incorporation of animal-friendly crossings along NFS road #150 would reduce mortality risk to dispersing lynx (USDA Forest Service 1998). All combined action alternatives, in combination with reasonably foreseeable actions, would not contribute to a decline in connectivity or movement within the Rock LAU. The combined action alternatives, in combination with reasonably foreseeable actions, including the Rock Creek Project, would result in greater connectivity within the LAUs due to grizzly bear mitigation associated with habitat acquisition and road closures as compensation for grizzly bear habitat lost or displacement effects.

Guideline ALL G1: All combined action alternatives, in combination with reasonably foreseeable actions, would result in increases in traffic speeds and volume in LAUs 14503 and 14504, thereby increasing the risk of lynx mortality due to vehicle collisions. Within the Rock LAU, the combined action alternatives would not contribute to cumulative effects relating to traffic speeds or volume. For the transmission line alternatives, cumulative traffic increases would occur primarily during the construction period and would be short-term. Cumulative traffic increases for the combined alternatives associated with mine related development would be long-term (lasting for the life of the mine) and would last through the Closure Phase. Alternative 2B would not incorporate any measure to avoid or reduce effects on lynx. Alternative 2B could cumulatively increase mortality risk to lynx within the Crazy 14504 LAU. The agencies' combined action alternatives would incorporate adaptive mitigation measures to avoid negative effects to lynx, and when considered in combination with reasonably foreseeable actions, would not result in cumulative increases to mortality risks to lynx associated with increased traffic volume and speed associated with the mine access routes.

Objectives HU 01, HU 03, and HU 05: New winter road use would be minimal for the mine alternatives and would be limited to a few new access roads within permit boundaries. With the exception of the Bear Creek Road, all open roads in the impoundment permit area would be gated and limited to mine traffic only. Non-motorized public access would be restricted within each permit area by signage at the permit area boundary. During the Construction and Closure Phases, transmission line access roads would not be used during the critical winter period when snow would occur due to mitigation incorporated for species other than lynx. Use of roads during the winter may occur during the Operations Phase if maintenance needs occurred on the transmission line. This would not occur on a regular basis, and activity would be of short duration. All combined action alternatives would include plowing of the Bear Creek Road (NFS road #278), the Libby Creek roads (NFS road #231 and #2316) during the 2-year Evaluation Phase, and for 1 year while the Bear Creek Road was reconstructed, which would make access to lynx habitat easier for trappers and increase the risk of incidental lynx mortality. These roads would continue to be snowplowed during the Operations Phase to allow access to the surface facilities at the Libby Adit Site. MMC would install and maintain a gate on the Libby Creek Road, and the KNF would seasonally restrict access on the Libby Creek Road (NFS road #231) and the Upper Libby Creek Road (NFS road #2316) as long as MMC used and snowplowed the two roads, or as directed by the KNF or the Oversight Committee. Only mining access would occur on NFS road #2316 during the closure period of April 1 to May 15. Most of this activity would occur in low-elevation non-habitat within the Crazy LAU 14504. The restriction was implemented to reduce displacement and mortality risk to grizzly bears on spring range, but also provides some benefit to lynx. Public access on the Libby Creek and upper Libby Creek could occur at any other time during the year outside of the closure period, including winter. Minor levels of additional winter road use could occur for other ongoing and reasonably foreseeable actions. Cumulatively, when considered with reasonably foreseeable actions, expansion of snow-compacting activities and increased winter access for trappers is expected to be minimal in all combined action alternatives.

In all combined action alternatives, traffic volume and speeds may cumulatively be greater in the Miller Creek and West Fisher Creek drainages and near main access roads (see section 3.21, *Transportation*), resulting in an increased risk of lynx mortality from vehicle collisions. Cumulative traffic increases in the West Fisher LAU 14503 would occur primarily during transmission line construction and would be short-term. Cumulative traffic increases from the mine alternatives in the Crazy LAU 14504 would be long-term and would last through the Closure Phase, although traffic increases would be lower during Closure than Operations. The agencies' mitigated combined action alternatives would include monitoring of lynx mortalities in permit areas and along access roads. If threatened and endangered species mortality occurred, MMC would haul future road-killed animals to a disposal location approved by FWP, if deemed necessary by the grizzly bear specialists or law enforcement officer to avoid additional grizzly bear or other threatened and endangered species mortality. Mitigation plan item A.1.o provides agreement that all mortality-reduction measures would be subject to modification based on adaptive management, where new information supports changes. Modifications to reduce vehicle collisions, if appropriate, could include installing wildlife crossing signs or reducing speed limits on roads used for the agencies' combined alternatives. Cumulative traffic volumes are not anticipated to be high enough to warrant incorporation of specific road design measures, such as underpasses, or fencing to minimize potential impacts on lynx, but the adaptive management strategies associated with the agencies' alternatives would allow for changes to reduce lynx mortality if necessary.

Cumulative Effects to Lynx Habitat Components

Alternative 2B would remove 2 percent of lynx habitat in the Crazy LAU 14503 for the life of the mine. Alternative 2B, in combination with other ongoing or reasonably foreseeable actions, potentially could result in cumulative effects to lynx habitat in the LAU. Habitat in the stand initiation stage is already limited in the LAU, and Alternative 2B would remove 11 percent of the habitat currently in the stand initiation stage for the life of the mine.

The agencies' combined alternatives would remove less than 1 percent of lynx habitat in either the Crazy or West Fisher LAU. The total amount of habitat removed is small compared to the amount of habitat that would remain in each LAU. The habitat affected by the transmission line alternatives is widely scattered and not likely to hinder lynx movement in the Libby Creek and Miller Creek drainages.

Activities associated with the Miller-West Fisher Vegetation Management Project would retain down wood per KFP desired conditions for the Silverfish PSU, and while prescribed burns associated with the Miller-West Fisher Vegetation Management Project would consume some down wood, it also would create down wood by killing live trees. Down wood created in burned areas could provide lynx denning habitat and habitat for alternative prey species such as red squirrels. Cumulative impacts from the action alternatives would not result in a shortage of snags and down wood associated with lynx denning habitat. Denning habitat is not limited on the KNF.

The combined mine-transmission line alternatives, in combination with other current and reasonably foreseeable actions on federal lands would not preclude achieving the forest plan desired conditions to increase old growth forestwide (see section 3.22.2, *Old Growth Ecosystems*). Sufficient amounts and distribution of old growth would continue to be maintained with potential cumulative effects of the combined action alternatives and ongoing or reasonably foreseeable actions. Thus, the combined action alternatives would maintain red squirrel habitat in both the Crazy and West Fisher LAUs.

As proposed, Alternative 2B would not meet the intent of the NRLMD, and in combination with the existing condition and other current and reasonably foreseeable actions, could result in cumulative changes to lynx.

The agencies' mitigated combined action alternatives, in combination with the existing condition and ongoing actions, would not result in cumulative changes in or significant loss of lynx habitat, and would be consistent with the 2007 NRLMD. The affected LAUs would continue to meet the NRLMD Objectives, Standards, and Guidelines. No reasonably foreseeable activities are planned that would change the magnitude or scope of effects described above.

Cumulative Effects on Lynx on Private and State Land
The combined action alternatives, in combination with reasonably foreseeable actions, could result in a cumulative increase in temporary housing facilities developed on private lands, potentially resulting in cumulative impacts on lynx habitat in the West Fisher 14503, Crazy 14504, and Rock 14702 LAUs. Also, as discussed in section 3.18, *Social/Economics*, many areas of private land are being converted from timber or agricultural production and open space use into residential subdivisions and ranchettes. Development of private land would likely occur primarily outside of the Crazy, West Fisher, and Rock LAUs. More private land exists within the Crazy and West Fisher LAUs within the low-elevation non-habitat areas and development could occur on those areas in the future. Impacts of the combined action alternatives, in combination with increased development of private land, could result in cumulative losses of lynx habitat on private land; however, most potentially affected parcels supporting lynx habitat are adjacent to or interspersed with Forest Service land providing lynx habitat, and some of the potential negative effects on the private parcels would be moderated by the amount of lynx habitat remaining on federal lands, and federal land management decisions would meet NRLMD Objectives, Standards, and Guidelines. In addition, grizzly bear mitigation associated with the combined

action alternatives may reduce potential private land development within the LAUs and, therefore, would also improve the availability of secure habitat and lower mortality risk for lynx.

NRLMD Biological Opinion – Terms and Conditions

In addition to the evaluation of the above NRLMD Standards for cumulative effects, the Terms and Conditions of the Biological Opinion are also a measure to evaluate cumulative effects. The Terms and Conditions address the exemptions from Standards VEG S1, S2, S5, and S6 for fuels management projects within the Wildland-Urban Interface and exceptions under VEG S5 and S6 for pre-commercially thinned and vegetation management projects that reduce snowshoe hare habitat. Both the exemptions and exceptions are limited to a certain amount of activity within lynx habitat that is measured cumulatively within a LAU and/or within an administrative unit (*i.e.*, National Forest). Table 241 describes the Terms and Conditions and the project's compliance with the Terms and Conditions.

Canada Lynx Critical Habitat

Effects to Canada Lynx Critical Habitat

The USFWS listed the contiguous U.S. distinct population segment of the Canada lynx as threatened in March 2000 (USFWS 2000). In February 2008, the USFWS issued a proposed rule revising critical lynx habitat (USFWS 2008b). Then, in February 2009, the USFWS issued their final rule to revise the critical habitat designation for lynx in the U.S. (USFWS 2009). The final rule delineated lynx critical habitat units across the lower 48 states from Maine to Washington. Based on this delineation, the directly affected LAUs 14503 (West Fisher), 14504 (Crazy), and 14702 (Rock) and the Montanore Project, all of which are located south of US 2, are not within the Northern Rocky Mountains Critical Habitat Unit #3. A new proposal to revise critical habitat was issued in September 2013, which would change the existing boundary based on State boundaries to wherever the lynx population occurs within the contiguous U.S. (USFWS 2013b). The directly affected LAUs (Rock, Crazy, and Silverfish), the Montanore Project analysis area (Crazy and Silverfish PSUs), and all of the combined action alternatives would remain outside of Unit #3 and critical habitat under the proposed rule.

The combined action alternatives are not within designated lynx critical habitat, and would have no direct, indirect, or cumulative effects on lynx critical habitat.

Table 241. Terms and Conditions from the Biological Opinion on the Effects of the NRLMD on Canada Lynx.

Term and Condition	Compliance
Fuels management projects conducted under the exemptions from Standards VEG S1, S2, S5, and S6 in occupied habitat shall not occur in greater than 6 percent of lynx habitat on any forest.	The KNF currently conducted 3,548 acres of fuels management projects under the exemptions for NRLMD Standards VEG S1, S2, S5, and S6 in lynx habitat within the Wildland-Urban Interface (see project record). Vegetation management standards to not apply to mining development. The combined action alternatives would comply with the Terms and Conditions and no exemptions would be used. No acres would be added to the forest total and the KNF would remain at about 6 percent of the 60,600 acres allocated for the forest.
Fuels management projects conducted under the exemptions from Standards VEG S1, S2, S5, and S6 in occupied habitat shall not result in more than three adjacent LAUs not meeting the VEG S1 standard of no more than 30 percent of a LAU in stand initiation structural stage.	All affected and adjacent LAUs are currently far below the standard of no more than 30 percent of a LAU in stand initiation structural stage (with affected LAUs 0 to 3 percent, and adjacent LAUs at 0 percent). Vegetation management standards do not apply to mining development. The combined action alternatives would comply with the Terms and Conditions. No exemptions would be used.
In occupied lynx habitat, pre-commercially thinned and vegetation management projects allowed per the exceptions listed under VEG S5 and S6 shall not occur in any LAU exceeding VEG S1, except for protection of structures.	The KNF has currently pre-commercially thinned on 1,658 acres allowed per the exceptions under VEG S5 and S6 (see project record). The affected Crazy, Rock Creek, and West Fisher Creek LAUs meet VEG S1. Vegetation management standards do not apply to mining development. The combined action alternatives would comply with the Terms and Conditions. No exceptions would be used for proposed activities. No acres would be added to the KNF total and the KNF would remain well below the allocated 13,520 acres.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Mineral Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest System surface resources; comply with applicable state and federal water quality standards including the Clean Water Act; take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations; and construct and maintain all roads so as to assure adequate drainage and to minimize or, where practicable, eliminate damage to soil, water, and other resource values.

Alternative 2B would not take all practicable measures to maintain and protect lynx or lynx habitat, would not comply with NRLMD direction as incorporated into the 2015 KFP, and would not comply with 36 CFR 228.8. The agencies' combined action alternatives would comply with 36 CFR 228.8 by taking practicable measures to maintain and protect lynx habitat that may be affected by the operations.

Endangered Species Act

Alternative 2B as proposed would require additional consultation to be in compliance with the ESA. This is because Alternative 2B 1) would not meet all NRLMD Objectives, Standards, or Guidelines; and 2) would remove 2 percent of lynx habitat for the life of the mine (about 30 plus years) from the Crazy LAU. If Alternative 2B was selected, then ESA compliance would be ensured through Section 7 formal consultation.

Consultation with the USFWS has occurred for the agencies' combined action Alternative 3D-R. Regarding the Canada lynx, the USFWS reviewed the KNF biological assessment and additional information and concurred that the agencies' combined action Alternative 3D-R (Agency Mitigated Poorman Impoundment Miller Creek Transmission Line) may affect, but is not likely to adversely affect, this threatened species (USFWS 2014a).

National Forest Management Act/Kootenai Forest Plan

Alternative 2B would not comply with NRLMD direction incorporated into the 2015 KFP. Alternative 2B would not meet the intent of NRLMD Guideline ALL G1, Guideline HU G4, or Guideline HU G6. Alternative 2B would remove 2 percent of lynx habitat within the Crazy LAU 14504 for the life of the mine due to the mine and associated facility development, including the impoundment, LADs, plant site and ore conveyor belt system, and associated constructed and reconstructed roads.

All of the agencies' mitigated combined mine-transmission line alternatives would comply with 2015 KFP direction on threatened and endangered species that applies to the lynx (Goal-WL-01 and FW-DC-WL-03) including the NRLMD.

GOAL-WL-01. The KNF manages wildlife habitat through a variety of methods (e.g., vegetation alteration, prescribed burning, invasive species treatments, etc.) to promote the diversity of species and communities and to contribute toward the recovery of threatened and endangered terrestrial wildlife species. The agencies' mitigated combined action alternatives are within the Crazy (facilities and transmission line), West Fisher (transmission line), and Rock (Rock Lake Ventilation Adit) LAUs. As discussed in the above analysis, less than 1 percent of lynx habitat on federal land would be removed for the life of the mine in either the West Fisher LAU or the Crazy LAU, and less than 1 acre of lynx habitat on private land in the Rock LAU has potential to be affected.

In addition, the agencies' mitigation Plan would treat currently unsuitable habitat and would improve the acres of winter snowshoe hare habitat in the long term. Connectivity within and between LAUs would be maintained.

FW-STD-WL-01. The Northern Rockies Lynx Management Direction (2007) and ROD is included in appendix B, and shall be applied. All of the agencies' mitigated combined action alternatives comply with or meet the intent of the NRLMD applicable Objective, Standards, and Guidelines: Objective ALL 01, Standard ALL S1, Guideline ALL G1, Objective HU 01, Objective HU 02, Objective HU 03, Objective HU 05, Objective HU 06, Guideline HU G4, Guideline HU G5, Guideline HU G6, Guideline HU G7, Guideline HU G8, Guideline HU G9, Guideline HU G12, and Objective Link 01.

Statement of Findings

The No Action Alternatives (Alternative 1, Alternative A, and Alternative 1A) *may affect, are not likely to adversely affect, Canada lynx*. This determination is based on: 1) no activities would take place that would alter lynx habitat, 2) all LAU vegetation management standards would continue to be met in the short term with no increases in mortality risk, 3) active fire suppression would continue the trend toward uncharacteristic vegetative and fuel conditions, 4) risk of severe fire behavior or insect and disease would increase, and 5) the potential for large-scale changes in available suitable and unsuitable lynx habitat within the affected LAUs would increase.

Although the USFWS (2007 NRLMD Biological Opinion) concluded adverse effects would not always occur where guidelines were not implemented, **Alternative 2B** *may affect, and is likely to adversely affect, the Canada lynx***.** This determination is based on: Alternative 2B 1) would remove 2 percent of lynx habitat within the Crazy LAU for the life of the mine (about 30 years, plus at least an additional 15 years for plant succession to reach early stand initiation habitat stage, if reclamation was successful), 2) would not comply with the NRLMD by not meeting the intent of Guideline ALL G1 (avoid or reduce effects on lynx) or Guideline HU G4 (monitoring of snow compaction), and 3) would not comply with Guideline HU G6 (methods to avoid or reduce effects on lynx in lynx habitat).

In its BA (USDA Forest Service 2013), and as concurred by the USFWS (USFWS 2014b), the KNF determined that the agencies combined action **Alternative 3D-R** *may affect, but is not likely to adversely affect, the Canada lynx***.** All other agencies' mitigated combined action alternatives (Alternatives 3C-R, 3E-R, 4C-R, 4D-R, and 4E-R) would require and incorporate the same Terrestrial Threatened and Endangered Species Mitigation Plan, and the effects of these combined alternatives are within the extent considered in the Alternative 3D-R consultation. The KNF's determination for Alternative 3D-R, and the rationale supporting the finding, would apply to the other agencies' combined action alternatives due to similar effects and the same mitigation plans required. The USFWS concluded in the NRLMD Biological Opinion (USFWS 2007d) that most actions in lynx habitat in compliance with the NRLMD would either have no effect on lynx or would not likely adversely affect lynx. The **agencies combined mine-transmission action alternatives** *may affect, are not likely to adversely affect, the Canada lynx and its habitat*. This determination is based on:

1) If another agency mitigated combined action alternative besides Alternative 3D-R was selected, additional consultation with the USFWS would occur.

2) All agency mitigated combined action alternatives have the low potential to displace or disturb a lynx due to location of the proposed activities.

3) The agencies' mitigated combined action alternatives have the potential for an increase in risk of mortality with snowplowing and increased traffic volume (mitigated for by limiting vehicular traffic, and limiting use of salt and monitoring and removal of roadkill).

4) The agencies' mitigated combined action alternatives have the potential for an increase in risk of mortality due to increased snow-compaction activities (mitigated for by monitoring and appropriate action if monitoring identifies increased snowmobiling and/or predator access, Lynx Mitigation Plan item B).

5) No more than 1 percent of physical habitat loss would occur due to the construction of project-related facilities and transmission line, depending upon the agencies' mitigated combined action mine-transmission line alternative for the life of the mine, and up to 15 years following reclamation for vegetation succession to proceed into the early stand initiation stage.

6) The agencies' mitigated combined action alternatives mitigate for habitat physically lost by implementing habitat enhancement on lynx stem exclusion habitat at a 2:1 ratio (2 acres treated for every acre lost) to improve lynx winter foraging opportunities, with acreage depending on the combined mine-transmission line alternative (484 to 556 acres with Alternative 3 and transmission line alternative, or 336 to 416 acres with mine Alternative 4, depending on transmission line alternative) (Table 31 in Chapter 2).

7) Linkage and movement areas would be maintained within and between adjacent LAUs.

8) Large areas within all affected LAUs are free of activity to accommodate potential lynx displacement from activity areas.

9) All agencies' mitigated combined action alternatives would comply with all applicable Objectives, Standards, and Guidelines of the NRLMD (USDA Forest Service 2007f) (see above under 2015 KFP consistency), which is incorporated into the 2015 KFP).

10) The NRLMD USFWS Biological Opinion (USFWS 2007d) found no evidence that mineral development was a factor threatening lynx; the agencies' mitigated combined action alternatives comply with all applicable NRLMD Objectives, Standards, and Guidelines, including the guidelines designed to specifically minimize impacts of mineral-related activities HU G4, HU G5, HU G6, HU G9, and HU G12 and, thus, is consistent with the NRLMD Biological Opinion (USFWS 2007d) conclusion that the effects of mineral development would not appreciably reduce the reproduction, numbers, and distribution of lynx.

Canada Lynx Critical Habitat

Statement of Findings

Implementation of any of the no action or combined mine-transmission line action alternatives would have ***no effect*** on Canada lynx critical habitat. This determination is made because the alternatives are not within designated lynx critical habitat.

During consultation with the USFWS for Alternative 3D-R, the KNF made a no effect determination for designated lynx critical habitat for the Canada lynx. Although the USFWS does not review or provide concurrence on no effect determinations, the USFWS acknowledged the Forest Service's analysis (USFWS 2014b). Therefore, pursuant to 50 CFR 402.13(a), formal consultation on this species' critical habitat was not required.

Effects to Lynx on State Land

Transmission Line Alternative B would not affect State trust land. The agencies' mitigated Transmission Line Alternatives C-R, D-R, and E-R, depending on the alternative, would affect up to 7 acres total of lynx habitat on section 36 T27N, R30W, and would have no measurable effect to lynx habitat on the section 36 or on the total of lynx habitat available on State lands managed by the DNRC Libby Unit. Mitigation associated with the agencies' mitigated transmission line alternatives for the lynx would be applied to State land affected: 1) the Vegetation Removal and Disposition Plan to minimize vegetation clearing within the clearing area; 2) retention of snags and down wood within the clearing area, where safety allows; and 3) the grizzly bear transmission line scheduling requirement that all transmission line construction activity would occur between June 16 and October 14, which would also prevent construction disturbance-related activity during the important winter and early spring period for lynx. As a result of the minimal acreage of lynx habitat affected and incorporation of the agencies' mitigation associated with the transmission line located on State trust land, no measurable effects to lynx or lynx habitat on the State section 36 would occur.

3.25.6 Migratory Birds

3.25.6.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

The 2015 KFP direction considered in the analysis of migratory birds is:

> **GOAL-WL-01.** The KNF manages wildlife habitat through a variety of methods (*e.g.*, vegetation alteration, prescribed burning, invasive species treatments, etc.) to promote the diversity of species and communities and to contribute toward the recovery of threatened and endangered terrestrial wildlife species.
>
> **FW-DC-WL-19.** By trending towards the desired conditions for vegetation, habitat is provided for native fauna adapted to open forests and early seral habitats, or whose life/natural history and ecology are partially provided by those habitats.
>
> **FW-GDL-WL-16. Raptors.** Management activities on NFS lands should avoid/minimize disturbance at known active raptor nests, including owls. Timing restrictions and distance buffers should be based on the best available information, as well as site-specific factors (e.g., topography, available habitat, etc.). Birds that establish nests near pre-existing human activities are assumed to be tolerant of that level of activity.

Executive Order 13186, Responsibilities of Federal agencies to Protect Migratory Birds, requires analysis of effects of federal actions on migratory birds as part of the environmental analysis process. This order requires that each Federal agency develop a MOU that promotes the conservation of migratory bird populations. A MOU was signed between the Forest Service and USFWS (USFWS and USDA 2008) and extended in 2014 (USFWS and USDA 2014) that outlines the responsibilities for both parties regarding migratory birds. The responsibilities include the Forest Service's consideration of migratory birds in NEPA analyses and as well as guidance for developing effects analyses. The purpose of the MOU "is to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds."

3.25.6.2 Analysis Area and Methods

Neotropical migratory birds are those bird species that migrate to more northerly latitudes to breed on the KNF each spring. In the fall, these species migrate south to spend the winter months. Of the 205 bird species known to occur on the KNF as breeders, migrants, winter visitors, or transients, about 70 species could be classified as neotropical migratory land birds (Bratkovich 2007). A wide range of habitat preferences exist from open environments (*e.g.*, grassland communities) to a variety of forest habitat types. A mosaic of habitat types that reflect the historical range of vegetation communities and seral stages would provide the greatest diversity of migratory species. Migratory birds have been recognized for their ecological (biological diversity) and economic (*e.g.*, bird watching and hunting) value.

The analysis area includes the PSUs impacted by proposed activities. While the bulk of activities occur within the Crazy and Silverfish PSUs, there are also project activities within McElk, Riverview, Treasure, and Rock PSUs. The analysis area boundary for direct effects is the proposed activity areas, as activities and alteration of the habitat would affect suitability for different species. The acres directly impacted by activities are put into the context of the PSU scale to provide a consistently sized analysis unit and better gauge the relative impacts of the activities. The boundaries for indirect and cumulative effects are the planning subunits that contain the analysis area as alteration of habitat could affect the availability and use of habitats. The impacts to the Rock PSU are limited to a less than 1 acre of patch of steep, rocky ground, the impacts are nearly undetectable at the PSU scale, and therefore this PSU is not carried forward in detailed analysis. This section summarizes a specialist’s report on migratory birds available in the Project record.

3.25.6.3 Affected Environment

A report issued by several organizations and Federal agencies summarized the general condition of birds across the U.S. (National American Bird Conservation Initiative 2009, 2011). It described declines in multiple species across a variety of habitats. Climate change was one of the contributing factors to these declines, and is likely to continue impacting birds into the future. As the climate warms, breeding seasons and migrations are being altered. These activities may become out of sync with prey abundance, and climate change may also impact where and when those food items are available. This reinforces the need to have resilient habitat that is better able to handle climate change.

The following tables are included to provide a framework to focus the analysis in this EIS by focusing on migratory bird priority species and their habitats. Not all of these habitats and species occur within the analysis area.

Partners in Flight produced a North American Landbird Conservation Plan in 2004 (Rich *et al.* 2004). Their plan was broken down by “biomes” and the KNF is within the Intermountain West Avifaunal Biome, which includes several Bird Conservation Regions and encompasses several western states. Their plan is very broad in scale. Table 242 displays the species they identified for continental importance within the Intermountain West Avifaunal Biome. Of these species, flammulated owl is analyzed elsewhere in the document.

Table 242. Species of Continental Importance Identified for the Intermountain West Avifaunal Biome in the Partners in Flight North American Landbird Conservation Plan.

Species	Primary Habitat	Is the KNF within the Range of the Species?[1]
Management[2]		
Brewer's Sparrow	Western shrublands	Yes
Pinyon Jay	Woodland	No
Lewis's Woodpecker	Riparian	Yes
Cassin's Finch	Coniferous forest	Yes
Willow Flycatcher	Riparian	Yes
White-throated Swift	Various	Yes
Rufous Hummingbird	Western shrublands	Yes
Black Swift	Various	Yes
Olive-sided Flycatcher	Coniferous forest	Yes
Swainson's Hawk	Grassland	Yes
Grace's Warbler	Mixed forest	No
Long-term Planning and Responsibility[2]		
Black Rosy-Finch	Tundra	No
Brown-capped Rosy-Finch	Tundra	No
Sage Thrasher	Western shrublands	No
Gray Flycatcher	Woodland	No
Calliope Hummingbird	Western shrublands	Yes
Red-naped Sapsucker	Mixed forest	Yes
Williamson's Sapsucker	Coniferous forest	Yes
Green-tailed Towhee	Western shrublands	No
Clark's Nutcracker	Coniferous forest	Yes
Dusky Flycatcher	Western shrublands	Yes
Sage Sparrow	Western shrublands	No
Mountain Bluebird	Western shrublands	Yes
Gray Vireo	Woodland	No
Virginia's Warbler	Woodland	No
Flammulated Owl	Coniferous forest	Yes
White-headed Woodpecker	Coniferous forest	Yes
McCown's Longspur	Grassland	No

[1]NatureServe Explorer http://www.natureserve.org/explorer/index.htm on 9/20/10 and AMS Technical Report (USDA 2003b). Includes accidental, migratory, or transient occurrences.
[2] Partners in Flight (PIF) categorized species by the level of immediacy of conservation attention. Those in the "management" category are identified because management/conservation actions are needed to halt long-term population declines or sustain vulnerable populations (Rich *et al*. 2004). The KNF is within the range of nine of these species. Those in the "long-term planning and responsibility" category are identified because planning is needed to maintain populations. The KNF is within the range of seven of these species.
Source: Rich *et al*. 2004.

PIF's North American Landbird Conservation Plan (Rich *et al*. 2004) does not contain a set of requirements that the KNF must follow, and the document was used to organize the discussion in this analysis by focusing on those species/habitats that have been identified at a broad scale as being important. It was essentially used to provide a framework, along with the following documents, to facilitate discussion of migratory landbirds within this analysis by focusing on key species and habitats.

The following two documents (USFWS 2008 and PIF 2000) provide a narrower focused look at key birds and habitats as those documents pertain on a smaller area (a single Bird Conservation Region or State). Again, these documents and the following tables were used as a framework to facilitate the discussion/analysis of migratory landbirds and their habitats within this specialist's report by focusing on key species and habitats.

In 2008 the USFWS released a report titled "Birds of Conservation Concern" in which they listed species of concern by Bird Conservation Regions (USFWS 2008). The report helps focus conservation effort on the species that need it. The KNF lies within BCR 10 (Northern Rockies). Table 243 lists below are the species of concern for that BCR, not all of which are found on the KNF. Three of these species are additionally analyzed elsewhere in this document: bald eagle, peregrine falcon, and flammulated owl.

Table 243. Birds of Conservation Concern in Bird Conservation Region 10, Northern Rockies.

Common Name	Scientific Name	Is the KNF w/in the range of species?*
Bald Eagle	*Haliaeetus leucocephalus*	Yes
Black Rosy-Finch	*Leucosticte atrata*	No
Black Swift	*Cypseloides niger*	Yes
Brewer's Sparrow	*Spizella breweri*	Yes
Calliope Hummingbird	*Stellula calliope*	Yes
Cassin's Finch	*Carpodacus cassinii*	Yes
Ferruginous Hawk	*Buteo regalis*	Yes
Flammulated Owl	*Otus flammeolus*	Yes
Lewis's Woodpecker	*Melanerpes lewis*	Yes
Loggerhead Shrike	*Lanius ludovicianus*	Yes
Long-Billed Curlew	*Numenius americanus*	Yes
McCown's Longspur	*Calcarius mccownii*	No
Olive-Sided Flycatcher	*Contopus cooperi*	Yes
Peregrine Falcon (b)	*Falco peregrinus*	Yes
Sage Sparrow	*Amphispiza belli*	No
Sage Thrasher	*Oreoscoptes montanus*	No
Swainson's Hawk	*Buteo swainsoni*	Yes
Upland Sandpiper	*Bartramia longicauda*	Yes
White-Headed Woodpecker	*Picoides albolarvatus*	Yes
Williamson's Sapsucker	*Sphyrapicus thyroideus*	Yes
Willow Flycatcher	*Empidonax traillii*	Yes
Yellow-Billed Cuckoo	*Coccyzus americanus*	No

b = breeding.
*NatureServe Explorer http://www.natureserve.org/explorer/index.htm and AMS Technical Report (USDA 2003). Includes accidental, migratory, or transient occurrences.

The KNF is within the Partners in Flight Montana Conservation Plan (PIF 2000). These conservation strategies are recommendations to use in management but they are not binding requirements. However, they provide a way to categorize and analyze important migratory bird habitat and species. The use of these plans supports the goal of maintaining long-term sustainability of migratory bird species and their habitats as specified by Executive Order and Migratory Bird Treaty Act (MBTA). The priority habitats and species are listed below. The use of this document and Table 244 was to provide a framework to focus the discussion/analysis in this specialist's report by focusing on priority species/habitats. Several of these birds are additionally analyzed elsewhere in the document: flammulated owl, black-backed woodpecker, common loon, harlequin duck, and peregrine falcon.

Table 244. Partners in Flight Priority Habitats/Species for Montana.

Habitat	Species	Priority Level[1]	Is the KNF w/in the range of species?[2]
Grasslands			
Mixed Grass Prairie	Mountain plover	I	No
	Burrowing owl	I	Yes
	Sprague's pipit	I	No
	Baird's sparrow	I	Yes
	Ferruginous hawk	II	Yes
	Long-billed curlew	II	Yes
	Lark bunting	II	Yes
	Grasshopper sparrow	II	Yes
	McCown's longspur	II	No
	Chestnut-collared longspur	II	No
	Northern harrier	III	Yes
	Short-eared owl	III	Yes
	Bobolink	III	Yes
Intermountain Grasslands	Columbian sharp-tailed grouse	II	Yes
Shrubland			
Sagebrush Shrubsteppe	Sage grouse	I	No
	Loggerhead shrike	II	Yes
	Brewer's sparrow	II	Yes
	Sage thrasher	III	No
	Lark sparrow	III	Yes
Montane Shrubland	Calliope hummingbird	II	Yes
	Nashville warbler	III	Yes
	MacGillivray's warbler	III	Yes
	Lazuli bunting	II	Yes
	Common poorwill	III	No
	Green-tailed towhee	III	No
	Clay-colored sparrow	III	Yes
Forest			
Dry Forest	Flammulated owl	I	Yes
	Lewis's woodpecker	II	Yes
	Blue grouse	III	Yes
	Chipping sparrow	III	Yes
	Cassin's finch	III	Yes
	Red crossbill	III	Yes
Cedar Hemlock	Brown creeper	I	Yes
	Vaux's swift	II	Yes
	Winter wren	II	Yes
	Chestnut-backed chickadee	III	Yes
	Golden-crowned kinglet	III	Yes
	Varied thrush	III	Yes
Burned Forest	Black-backed woodpecker	I	Yes
	Olive-sided flycatcher	I	Yes
	Three-toed woodpecker	II	Yes
	Townsend's solitaire	III	Yes
Moist Douglas-fir/Grand fir	Northern goshawk	II	Yes
	Williamson's sapsucker	II	Yes
	Sharp-shinned hawk	III	Yes
	Pileated woodpecker	II	Yes
	Plumbeous/Cassin's vireos	III	No/Yes
	Townsend's warbler	III	Yes

Habitat	Species	Priority Level[1]	Is the KNF w/in the range of species?[2]
Whitebark pine Aspen	Clark's nutcracker	III	Yes
	Ruffed grouse	II	Yes
	Red-naped sapsucker	II	Yes
	Ovenbird	III	Yes
Wet Subalpine fir (spruce/fir)	Great gray owl	III	Yes
	Boreal owl	III	Yes
Limber Pine/Juniper	N/A		
Dry Subalpine fir/Lodgepole pine	N/A		
	Riparian		
Riparian Deciduous Forest (Cottonwood/Aspen)	Interior least tern	I	No
	Barrow's goldeneye	II	Yes
	Hooded merganser	II	Yes
	Bald eagle	II	Yes
	Black-billed cuckoo	II	No
	Yellow-billed cuckoo	II	No
	Red-headed woodpecker	II	No
	Cordilleran flycatcher	II	Yes
	Veery	II	Yes
	Red-eyed vireo	II	Yes
	Killdeer	III	Yes
	Eastern screech owl	III	No
	Western screech owl	III	Yes
	Downy woodpecker	III	Yes
	Least flycatcher	III	Yes
	American redstart	III	Yes
	MacGillivray's warbler	III	Yes
	Orchard oriole	III	Yes
Riparian Shrub	Willow flycatcher	II	Yes
	Rufous hummingbird	III	Yes
	Gray catbird	III	Yes
	Warbling vireo	III	Yes
	Song sparrow	III	Yes
Hardwood Draws	Swainson's hawk	III	Yes
Riparian Coniferous Forest	Harlequin duck	I	Yes
	Hammond's flycatcher	II	Yes
	American dipper	III	Yes
	Wetlands		
Prairie Pothole	Piping plover	I	No
	Horned grebe	II	Yes
	White-faced ibis	II	Yes
	Marbled godwit	II	Yes
	Franklin's gull	II	Yes
	Forster's tern	II	Yes
	Black tern	II	Yes
	Clark's grebe	III	No
	Black-crowned night heron	III	No
	Black-necked stilt	III	Yes
	Willet	III	No
	Wilson's phalarope	III	Yes
	LeConte's sparrow	III	Yes
	Nelson's sharp-tailed sparrow	III	No
Intermountain Valley	Common loon	I	Yes

Habitat	Species	Priority Level[1]	Is the KNF w/in the range of species?[2]
Wetlands	Trumpeter swan	I	No
	Common tern	II	Yes
	American bittern	III	Yes
	Yellow-headed blackbird	III	Yes
Irrigation Reservoirs >640 ac	Caspian tern	II	Yes
	American white pelican	III	Yes
Irrigation Reservoirs <640 ac	Transient shorebirds	II	Yes
High Elevation Wetlands	N/A		
Unique Habitats			
	Peregrine falcon	II	Yes
	Black swift	II	Yes
	Black rosy finch	II	No
	White-tailed ptarmigan	III	Yes
	Chimney swift	III	No
	Red-winged blackbird	III	Yes
	Brewer's blackbird	III	Yes

[1]Montana Priority Levels. PIF uses a priority system rather than producing planning information about all species. Their assumption is that if conservation measures are focused on the identified species/habitats then other species will benefit as well (p. 23 in PIF 2000). The priority levels are: (I) Conservation Action – species with declining populations or high area importance, (II) Monitoring Species – species in need but with lesser threat or stable/increasing populations in Montana, (III) Local Concern – species of concern which are not in imminent risk or are near-obligates for high priority habitats, (IV) Non-priority – rare migrants, extremely peripheral occurrence, or lack of imminent risk and are not included in the PIF conservation planning effort (p. 24-25 in PIF 2000).
[2] NatureServe Explorer http://www.natureserve.org/explorer/index.htm and AMS Technical Report (USDA 2003). Includes accidental, migratory, or transient occurrences.
Source: Partners in Flight (2000).
The habitat requirements of the species listed above, as well as range information, can be found online at NatureServe Explorer's database: http://www.natureserve.org/explorer/index.htm. Population estimates can be found on the Partners in Flight online database: http://rmbo.org/pif_db/laped/.

Most of the habitats found on the KNF host one or more species of migratory birds. Generally speaking the birds arrive in the spring to set up territories for breeding purposes. Young are raised and fledged by mid-summer. Most species leave the KNF by mid- to late summer.

Table 245 displays the existing vegetation types within the planning subunits that contain the analysis area. The available vegetation data on the KNF was grouped into categories that matched the above listed priority landbird habitats as closely as possible. The vegetation types are categorized based on the dominant tree species, although those tree species may be found as a lesser component of other vegetation types. A review of the tables above from Rich *et al*. 2004, USFWS 2008, and PIF 2000 reveal that a variety of the habitats listed are present in the analysis area and may provide habitat for some of the bird species listed. Dry mixed conifer habitat provide habitat for species such as chipping sparrow, Cassin's finch, and red crossbills. Moist Douglas-fir/grand fir provides habitat for species such as Townsend's warblers, sharp-shinned hawks, and pileated woodpeckers. Cedar-hemlock habitats are used by species such as brown creeper, Vaux's swift, chestnut-backed chickadee, golden-crowned kinglet, and varied thrush. Clark's nutcracker use whitebark pine habitat. The riparian deciduous or hardwoods, particularly aspen, provide habitat for ruffed grouse, and red-naped sapsuckers, among others. Other species associated with riparian hardwoods and shrubs include McGillivray's warbler, rufous hummingbird, warbling vireo, song sparrow, and Hammond's flycatcher.

Table 245. Existing Vegetation Types in Analysis Area.

Existing Vegetation Type	Crazy	McElk	Riverview	Silverfish	Treasure
Cedar/Hemlock	4,893 (7%)	169 (<1%)	92 (<1%)	1,362 (2%)	3,668 (4%)
Dry Mixed Conifer	7,700 (11%)	38,309 (50%)	64,287 (61%)	10,764 (16%)	12,065 (15%)
Miscellaneous Forest	9,155 (13%)	9,462 (12%)	10,374 (10%)	10,519 (15%)	6,187 (7%)
Moist Douglas-Fir/Grand Fir	18,310 (27%)	19,603 (26%)	24,927 (24%)	11,866 (17%)	21,720 (26%)
Non Vegetated	4,968 (7%)	193 (<1%)	212 (<1%)	3,113 (4%)	3,410 (4%)
Riparian –Conifer	1,531 (2%)	12 (<1%)	28 (<1%)	105 (<1%)	1,533 (2%)
Riparian – Deciduous	94 (<1%)	320 (<1%)	369 (<1%)	33 (<1%)	3,180 (4%)
Riparian – Shrub/Hardwoods	5,637 (8%)	275 (<1%)	506 (<1%)	1,807 (3%)	3,831 (5%)
Sod (*e.g.*, grass, meadow)	0 (0%)	1,523 (2%)	442 (<1%)	0 (0%)	2,781 (3%)
Wet Subalpine Fir/Lodgepole Pine	15,809 (23%)	6,118 (8%)	3,854 (4%)	29,848 (43%)	24,310 (29%)
Whitebark Pine	84 (<1%)	7 (<1%)	0 (0%)	0 (0%)	134 (<1%)
Total	68,180	75,991	105,092	69,417	82,818

All units are acres and (% of habitat type in PSU).
Dry Mixed Conifer includes ponderosa pine and dry Douglas-fir; miscellaneous forests include larch, whitepine, whitebark/subalpine larch, mountain hemlock/subalpine fir.
Percentages and acres do not tally to 100 percent due to rounding.
Only one fire has occurred in the last 8 years within analysis area. The Parmenter fire occurred in 2008 in the Treasure PSU and burned about 137 acres, none of which overlap the project activities. More recent burns are more valuable for birds such as black-backed woodpeckers.
Aspen and other hardwoods also occur intermixed with the other stand types.

The area surveyed by Western Resource Development (1989f) and Westech (2005a) included the permit areas and road corridors for Alternative 2, and the transmission line corridor for Alternative B. The Westech study area extended to the southeast to the Sedlak Park Substation (Figure 1 in Westech 2005a), but the study area of Western Resource Development did no extent that far southeast (Figure 2.2.2 in Western Resource Development 1989f). A complete list of birds observed in the analysis area during baseline studies is provided in Western Resource Development (1989f) and Westech (2005a). Similar species were recorded during both studies. Species observed were expected for the particular habitats surveyed. Western Resource Development (1989f) found that the number of bird species was greatest in riparian habitat, followed by shrubfield habitat. Studies conducted by Westech (2005a) yielded somewhat different results; the number of species observed was greatest in shrubfield habitat. Differences between the two studies in the number of species observed were likely due to differences in sampling methods and intensity (Westech 2005a).

A number of species from the tables above (Rich *et al*. 2004, USFWS 2008, PIF 2000) were detected by Western Resource Development (1989f) in the analysis area, such as: Cassin's finch, willow flycatcher, rufous hummingbird, black swift, olive-sided flycatcher, calliope hummingbird, Clark's Nutcracker, dusky flycatcher, mountain bluebird, Nashville warbler, MacGillivray's warbler, lazuli bunting, chipping sparrow, red crossbill, brown creeper, Vaux's swift, winter wren, chestnut-backed chickadee, golden crowned kinglet, varied thrush, three-toed woodpecker, Townsend's solitaire, northern goshawk, sharp-shinned hawk, pileated woodpecker, Townsend's warbler, ruffed grouse, veery, red-eyed vireo, downy woodpecker, least flycatcher, American redstart, gray catbird, warbling vireo, song sparrow, Hammond's flycatcher, American dipper, and Brewer's blackbird.

A number of species from the tables above (Rich *et al*. 2004, USFWS 2008, PIF 2000) were detected by Westech (2005a) in the analysis area, such as: rufous hummingbird, olive-sided flycatcher, red-naped sapsucker, dusky flycatcher, MacGillivray's warbler, chipping sparrow, red crossbill, chestnut-backed chickadee, golden crowned kinglet, varied thrush, Townsend's solitaire, Cassin's vireo, Townsend's warbler, warbling vireo, song sparrow, and Hammond's flycatcher.

There is an ongoing landbird monitoring effort within the Region, and one of these survey transects is located adjacent to project activities along the access route in the Crazy PSU (transect MT-BCR10-KO10). Several other transects are within the analysis area. One is located in the Silverfish PSU (MT-BCR10-KR1), one in the McElk PSU (MT-BCR10-KO14), and four in the Riverside PSU (MT-BCR10-K06, MT-BCR10-KO22, MT-BCR10-KO18, and MT-BCR10-KO2). All of these transects have been surveyed at least once since 2010. A number of species from the tables above (Rich *et al*. 2004, USFWS 2008, PIF 2000) were detected on these transects, such as: Cassin's finch, rufous hummingbird, olive-sided flycatcher, calliope hummingbird, red-naped sapsucker, Clark's nutcracker, dusky flycatcher, mountain bluebird, Nashville warbler, MacGillivray's warbler, lazuli bunting, clay-colored sparrow, blue grouse, chipping sparrow, red crossbill, brown creeper, Vaux's swift, chestnut-backed chickadee, golden-crowned kinglet, varied thrush, black-backed woodpecker, three-toed woodpecker, Townsend's solitaire, sharp-shinned hawk, pileated woodpecker, Cassin's vireo, Townsend's warbler, ruffed grouse, killdeer, downy woodpecker, warbling vireo, song sparrow, Hammond's flycatcher, and red-winged blackbird.

Geographic features such as north-south-oriented riparian corridors, ridgelines, cliffs, and bluffs can funnel bird movements in localized areas. High mountain ridges that parallel flight paths offer updrafts to soaring birds (Lincoln *et al*. 1998). Although some birds may migrate along the Cabinet Mountains and some birds may use stream corridors in the analysis area to move between habitat areas, no major migratory corridors have been identified in the analysis area.

3.25.6.4 Environmental Consequences

3.25.6.4.1 Alternative 1 – No Mine

No effects would occur under this alternative. Natural disturbance processes and succession would be the main factors determining the types and amounts of habitat within the analysis area. Over time, with continued fire suppression and lack of active forest management, indirect effects of this alternative would include a continued trend toward later successional habitats

3.25.6.4.2 Alternative 2 – MMC's Proposed Mine

Most effects from Alternative 2 would come from loss of habitat within the disturbance area of the mine facilities such as the mill/plant, impoundment, conveyor, and access road. Within the disturbance area, habitat would be converted to an unusable condition until reclamation was completed. Clearing for mine facilities would remove forest habitat used by some species (*e.g.*, brown creeper, golden-crowned kinglet, Townsend's warbler, and Swainson's thrush) and shrub field habitat used by other species (*e.g.*, orange-crowned warbler, yellow warbler, and spotted towhee). While Alternative 2 would result in localized impacts on the availability of habitats, it would not result in widespread changes in bird communities within these planning subunits given the small footprint of the mine facilities.

Table 246 displays the acres impacted by Alternative 2. In all mine alternatives, very little impact would occur within the Treasure PSU due to clearing along the access road. Most of the habitat loss in the Crazy PSU would amount to only a small percentage (5 percent or less) of the

Table 246. Impacts on Migratory Bird Habitat in the Crazy and Treasure PSUs by Mine Alternative.

Existing Vegetation Type	[2] MMC's Proposed Mine		[3] Agency Mitigated Poorman Impoundment Alternative		[4] Agency Mitigated Little Cherry Creek Impoundment Alternative	
	Crazy	Treasure	Crazy	Treasure	Crazy	Treasure
Cedar/Hemlock	467 (10%)	0	141 (3%)	0	277 (6%)	0
Dry Mixed Conifer	6 (<1%)	3 (<1%)	6 (<1%)	3 (<1%)	6 (<1%)	3 (<1%)
Miscellaneous Forest	875 (10%)	0	520 (6%)	0	587 (6%)	0
Moist Douglas-Fir/Grand Fir	446 (2%)	1 (<1%)	369 (2%)	1 (<1%)	353 (2%)	1 (<1%)
Non Vegetated	15 (<1%)	0	19 (<1%)	0	15 (<1%)	0
Riparian-Conifer	1 (<1%)	0	1 (<1%)	0	1 (<1%)	0
Riparian-Deciduous	2 (2%)	0	3 (3%)	0	3 (3%)	0
Riparian-Shrub/Hardwoods	2 (<1%)	0	0	0	0	0
Wet Subalpine Fir/Lodgepole Pine	760 (5%)	4 (<1%)	496 (3%)	4 (<1%)	674 (4%)	4 (<1%)
Total	2,573 (4%)	8 (<1%)	1,556 (2%)	8 (<1%)	1,915 (3%)	8 (<1%)

All units are acres and (% of habitat type in PSU).
Dry Mixed Conifer includes ponderosa pine and dry Douglas-fir; miscellaneous forests include larch, whitepine, whitebark/subalpine larch, mountain hemlock/subalpine fir.
Ground disturbance in Treasure PSU would be for road upgrade work on the access road.

representative vegetation types within the PSU. The largest percent impact, although not large, would be to cedar/hemlock and miscellaneous forest (10 percent of those habitats within the PSU impacted). The loss of habitat within the footprint of the Alternative 2 disturbance footprint means that species using impacted habitats would no longer have that habitat available. In Alternative 2, at least 90 percent of cedar/hemlock and miscellaneous forest habitat in each PSU would remain undisturbed. Species such as brown creepers, Vaux's swift, golden-crowned kinglet, and varied thrush would still have most of the existing amounts of their habitat left within the PSU as a result of this alternative. The overall amount of migratory bird habitat impacted by Alternative 2, for all habitat types, would be 4 percent of the Crazy PSU and less than 1 percent of Treasure PSU. The overall bird species composition and abundance within the PSU would likely be unchanged at the PSU level due to the small relative footprint of this alternative, although localized shifts in species presence and distribution within the ground disturbance area boundary is expected.

In the early stages after reclamation those sites would favor species adapted to open or early successional habitats. As the trees grow on those sites they will go through the different successional stages until possibly reaching late successional forest, assuming that a disturbance such as fire, insects, or disease does not disrupt the successional processes. In each stage a different collection of migratory birds would potentially use those stands.

Alternative 2 would impact 367 acres of effective old growth in the Crazy PSU through clearing and facility construction (Table 183). The effective old growth removed would be 5 percent of effective old growth in the PSU. Because the amount of old growth impacted would be minor, most of the old growth within the PSU would remain for migratory bird species that use this habitat type and impacts on migratory birds would be small. Species composition and abundance of migratory birds that use old growth would not likely change at the scale of the PSU. Additionally, 236 acres of effective old growth would be impacted by edge influence, thereby reducing the quality of those acres as habitat for some species. The effect would be a small percentage of the overall acreage of effective old growth in the PSU and therefore the impacts to migratory birds would be correspondingly small.

About 40 acres of wetlands would be impacted by Alternative 2 in the Crazy PSU. An additional 3 acres or more may be affected by a pumpback well system, if installed at the impoundment site. Approximately 33,753 linear feet of streams would also be affected directly and indirectly by Alternative 2. Changes in wetlands and associated vegetation would likely change bird species use of these areas. In the case of the loss of wetlands associated with construction activities in this alternative, these sites would no longer provide wetland habitat. The feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC's plan is conceptual and would be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. Section 3.23, *Wetlands and Other Waters of the U.S.* discusses proposed wetland mitigation in more detail. Although there may be localized shifts in species presence, the overall species composition and abundance at the scale of the analysis area given the small footprint of the ground disturbance would likely remain consistent as a result of this alternative.

Most birds migrate at altitudes between 500 and 1,000 feet (Lincoln *et al*. 1998), although migrating birds often fly at lower altitudes on nights with inclement weather or low cloud cover (Able 1973, Ogden 1996). Nocturnally migrating songbirds can be attracted to steady-burning lights (Ogden 1996, Manville 2005, Gehring *et al*. 2009). Lighting from permanent facilities could attract nocturnally migrating birds, particularly on nights with low cloud cover (Longcore and Rich 2004, Kerns and Kerlinger 2004). Although no major migratory corridors have been identified in the analysis area, when the weather is inclement, lighting from mine facilities could disrupt movements of some nocturnally migrating birds. Effects of night lighting on nocturnally active birds, such as owls, are discussed in the flammulated owl section.

Woodland songbird use may decline when noise levels reach an average of 42 decibels (dB), and grassland birds may decline at average noise levels of 48 dB (Forman and Alexander 1998). Forman and Alexander (1998) described the noise effects from roadways on birds and gave several reasons for the effects. These included interference with communication during breeding and altered behaviors. Ambient noise levels in the vicinity of the Little Cherry Creek Impoundment Site and Ramsey Plant Site are below these levels (Table 173). Noise near activity areas during the Construction Phase under this alternative would exceed levels impacting birds. This includes noise from trucks/equipment, generators, and blasting. Depending on the activity, noise levels may exceed those in Forman and Alexander (1998) for several hundred feet or more from activities while they were ongoing. This may result in declines in bird use in habitats adjacent to construction activities. Noise levels during operation at mine facilities (*e.g.,* impoundment, plant site, conveyor, access road) would also exceed those levels in Forman and Alexander (1998) for several hundred feet or more from those facilities/activities (see section 3.20.4.1, *Sound*). At the end of reclamation, noise levels are expected to return to pre-mine levels (see section 3.20.4.1, *Sound*). As during construction, bird use near mine facilities during operation may be less than existing conditions due to noise levels. The majority of the analysis area would remain near existing condition noise levels and therefore not impact bird use.

MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section).

3.25.6.4.3 Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Impacts on migratory birds from Alternative 3 would be the similar to Alternative 2, except that less migratory bird habitat would be affected in Alternative 3 (Table 245). Most of the habitat loss in the Crazy PSU would amount to only a small percentage (3 percent or less) of the representative vegetation types within the PSU. The largest percent impact, although not large, would be to miscellaneous forest (6 percent of that habitat within the PSU impacted). This loss of habitat within the Alternative 3 disturbance footprint means that species using impacted habitats would no longer have that habitat available. In Alternative 3, 94 percent of the miscellaneous forest habitat in the Crazy PSU would remain undisturbed. Miscellaneous forest is a general habitat type and likely provides habitat for a variety of species such as hairy woodpecker, Clark's nutcracker, and pileated woodpeckers, although other, more specific habitat types may provide higher quality habitats for species with specific needs. The overall bird species composition and abundance within the PSU would likely be unchanged at the PSU level due to the small relative footprint of this alternative, although localized shifts in species presence and distribution within the ground disturbance area boundary is expected.

Alternative 3 would impact 245 acres of effective old growth in the Crazy PSU through clearing and facility construction (Table 182). The effective old growth removed would be 3 percent of the effective old growth in the PSU. Additionally, 241 acres of effective old growth would be impacted by edge influence, thereby reducing the quality of those acres as habitat for some species. The effect would be a small percentage of the overall acreage of old growth in the PSU and therefore the impacts to migratory birds would be correspondingly small. Because the amount of effective old growth impacted would be minor, most of the effective old growth within the PSU would remain for migratory bird species that use this habitat type and impacts to migratory birds would be small. Species composition and abundance of migratory birds that use old growth would not likely change at the scale of the PSU.

About 13 acres of wetlands would be directly affected by Alternative 3 in the Crazy PSU; an additional 11 acres may be affected by a pumpback well system at the tailings impoundment. Approximately 19,059 linear feet of streams would be directly and indirectly affected by Alternative 3. Impacts on wetlands would be mitigated through implementation of the agencies' Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan. The effect would be the same as Alternative 2.

Effects on nocturnally migrating birds and nocturnally active bird species would be the same as Alternative 2, except that MMC would use fixture baffles and directional light sources to minimize ambient light emanating from the mine facilities during operations. Some ambient light would remain, however, and movements of some nocturnally migrating birds may be disrupted.

Effects from noise would be similar to Alternative 2, although in different locations (*e.g.*, different plant site, access route, impoundment site).

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to migratory birds. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

3.25.6.4.4 Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts on migratory birds from Alternative 4 would be similar to Alternative 2, except that less migratory bird habitat would be affected in Alternative 4 (Table 245). Most of the habitat loss in the Crazy PSU would amount to only a small percentage (4 percent or less) of the representative vegetation types within the PSU. The largest percent impact, although not large, would be to cedar/ hemlock and miscellaneous forest (6 percent of that habitat within the PSU impacted). This loss of habitat within the Alternative 4 disturbance footprint means that species using impacted habitats would no longer have that habitat available. In Alternative 4, 94 percent of the cedar/hemlock and miscellaneous forest habitat in the Crazy PSU would remain undisturbed. Species such as brown creepers, Vaux's swift, golden-crowned kinglet, and varied thrush would still have most of the existing amounts of their habitat left within the PSU as a result of this alternative. The overall amount of migratory bird habitat impacted by Alternative 4, for all habitat types, is only 3 percent of the Crazy PSU and 1 percent of the Treasure PSU. The overall bird species composition and abundance within the PSU would likely be unchanged at the PSU level due to the small relative footprint of this alternative, although localized shifts in species presence and distribution within the disturbance area boundary is expected.

As described in the old growth analysis in the Vegetation section, Alternative 4 would impact 216 acres of effective old growth in the Crazy PSU through clearing and facility construction. The effective old growth removed would be 3 percent of the effective old growth in the PSU. Additionally, 220 acres of old growth would be impacted by edge influence, thereby reducing the quality of those acres as habitat for some species. The effect would be a small percentage of the overall acreage of effective old growth in the PSU and therefore the impacts to migratory birds would be correspondingly small. Because the amount of effective old growth impacted would be minor, most of the old growth within the PSU would remain for migratory bird species that use this habitat type and impacts to migratory birds would be small. Species composition and abundance of migratory birds that use old growth would not likely change at the scale of the PSU.

About 40 acres of wetlands would be directly or indirectly affected by Alternative 4 in the Crazy PSU. Approximately 34,063 linear feet of streams would also be directly or indirectly affected by Alternative 4. Impacts on wetlands would be mitigated through implementation of the agencies' Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan. The effect would be the same as Alternative 2.

Effects from noise would be similar to Alternative 3, although in different locations (*e.g.*, different impoundment site).

3.25.6.4.5 Alternative A – No Transmission Line

Alternative A would have no impacts on migratory bird habitat.

3.25.6.4.6 Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B would impact 313 acres of habitat (Table 247). Although more new roads would be built for Alternative B than other transmission line alternatives, direct impacts of road construction on vegetation communities would be relatively minor. At the end of operations, disturbed habitat would be revegetated. Roads would be redisturbed for transmission line decommissioning and reclaimed after transmission line removal. After reclamation, disturbed habitat would potentially be restored to pre-transmission line conditions in the long term through natural succession. Very little habitat loss/change would occur (less than 1 percent) for any of the representative vegetation types within the PSUs (Table 247). This small loss/change of habitat due to Alternative B means that species using impacted habitats would no longer have that habitat available. In Alternative B, at least 99 percent of all habitat types in the analysis area would remain undisturbed. Species such as brown creeper, Vaux's swift, golden-crowned kinglet, varied thrush, pileated woodpecker, Cassin's finch, and rufous hummingbird would still have most of the existing amounts of their habitat left within the PSUs as a result of this alternative. The overall amount of migratory bird habitat impacted by Alternative B, for all habitat types, is less than 1 percent of each PSU. The overall bird species composition and abundance in the PSUs would likely be unchanged at the PSU level due to the small relative clearing and disturbance areas, although localized shifts in species presence and distribution within the clearing and disturbance areas is expected.

Alternative B would impact 27 acres of effective old growth in the Crazy PSU through clearing and facility construction (Table 182). The effective old growth impacted would be less than 1 percent of the effective old growth in the PSU. Alternative B would clear 2 acres of old growth in the Silverfish PSU. Because the amount of effective old growth impacted would be minor, most

Table 247. Impacts on Migratory Bird Habitat in the Analysis Area by Transmission Line Alternative B.

Existing Vegetation Type	Crazy	McElk	Riverview	Silverfish
Cedar/Hemlock	24 (<1%)	0 (0%)	0 (0%)	0 (0%)
Dry Mixed Conifer	<1 (<1%)	39 (<1%)	8 (<1%)	46 (<1%)
Miscellaneous Forest	7 (<1%)	14 (<1%)	8 (<1%)	7 (<1%)
Moist Douglas-Fir/Grand Fir	51 (<1%)	2 (<1%)	20 (<1%)	22 (<1%)
Non Vegetated	0 (0%)	<1 (<1%)	0 (0%)	0 (0%)
Riparian – Deciduous	0 (0%)	0 (0%)	1 (<1%)	0 (0%)
Riparian – Shrub/Hardwoods	4 (<1%)	1 (<1%)	0 (0%)	0 (0%)
Wet Subalpine Fir/Lodgepole Pine	27 (<1%)	0 (0%)	2 (<1%)	29 (<1%)
Total	114 (<1%)	55 (<1%)	39 (<1%)	105 (<1%)

All units are acres and (% of habitat type in PSU).
Dry Mixed Conifer includes ponderosa pine and dry Douglas-fir; miscellaneous forests include larch, whitepine, whitebark/subalpine larch, mountain hemlock/subalpine fir.
Most of this alternative is on National Forest System lands within Crazy and Silverfish PSUs and some Plum Creek land in Silverfish, and with the transmission line primarily running through Plum Creek land in Riverview and McElk PSUs. Within the McElk PSU, these acres include the portion of the transmission line extending to the Sedlak Park Substation and the substation itself.

of the old growth within the PSU would remain for migratory bird species that use this habitat type and impacts to migratory birds would be small. Species composition and abundance of migratory birds that use old growth would not likely change at the scale of the PSU. Additionally, 98 acres of effective old growth would be impacted by edge influence in the Crazy PSU and 20 acres in the Silverfish PSU, thereby reducing the quality of those acres as habitat for some species. Again, this is a small percentage of the overall acreage of effective old growth in the PSU and therefore the impacts to migratory birds would be correspondingly small.

About 4 acres of wetlands would be within the clearing area of Alternative B. Less than 0.1 acre of wetlands and streams would be in the disturbance area for new or upgraded roads. Approximately 5,111 linear feet of streams would also be within the Alternative B clearing area or the disturbance area for new or upgraded roads. Direct effects to wetlands are expected to be avoided by placement and location of transmission line facilities and roads outside of wetlands and streams. Species composition and abundance of migratory birds that use wetlands and streams would not likely change at the scale of the PSU.

Response of migratory birds to timber harvest depends upon their individual habitat preferences and needs. Clearing of forested areas for the transmission line would remove forest habitat used by some species (*e.g.*, brown creeper, golden-crowned kinglet, Townsend's warbler, and Swainson's thrush) and create grassland and shrubland habitat used by other bird species (*e.g.*, American kestrel, calliope hummingbird, and chipping sparrow). Clearing also would create edge habitat used by birds such as the dark-eyed junco, red-tailed hawk, and great-horned owl.

The risk of bird electrocutions potentially caused by the transmission line would be minimized through implementation of recommendations outlined in APLIC (2006), which are based on a minimum spacing of 60 inches between phases or between phase and ground wires. The potential for collisions of migratory birds with the transmission line would be reduced by constructing the transmission line according to recommendations outlined in APLIC (2012) and in compliance with MMC's Environmental Specifications (MMI 2005b). Applicable recommendations include locating the transmission line away from streams, mountain passes, and other potential flight corridors; placement of the lines below treeline or other topographical features; and installation of line marking devices. MMC indicated no aviation flight paths were identified for the preferred corridor and no markers or other warning devices were planned (MMI 2005b).

Woodland songbird use may decline when noise levels reach an average of 42 decibels (dB), and grassland birds may decline at average noise levels of 48 dB (Forman and Alexander 1998). Forman and Alexander (1998) described the noise effects from roadways on birds and gave several reasons for the effects. These included interference with communication during breeding and altered behaviors. Noise levels during clearing and construction activities on the transmission line would exceed these levels in the vicinity of the transmission line (see section 3.20.4.1, *Sound*). The transmission line itself would make enough noise during wet weather (see section 3.20.4.1, *Sound*) to exceed the noise levels described in Forman and Alexander (1998). The result may be less use by birds near the transmission line during construction. The noise levels during operation are generally expected to be less than those identified in Forman and Alexander (1998) except during wet weather, which is expected to occur about 10 percent of the time (see section 3.20.4.1, *Sound*). Given that most of the time the noise would be low, the operation of the transmission line would not be expected to greatly impact bird use near the line. Helicopter use to monitor the line may also temporarily and infrequently increase noise levels as well. Helicopters may be used in line stringing but would not be used during clearing activities or structure placement. Bird use near these activities while they are occurring would potentially decline temporarily due to the noise. Most of the PSUs would have noise levels near existing conditions given the small analysis area for this alternative, consequently allowing birds to have most of the analysis area relatively quiet.

3.25.6.4.7 Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Impacts on migratory birds from Alternative C-R would be similar to Alternative B, except that less habitat would be affected in the Crazy and Riverview PSUs and more would be affected in the Silverfish and McElk PSUs (Table 248). Approximately 320 acres would be affected by Alternative C-R (Table 248). Very little habitat loss/change would occur (less than 1 percent) for any of the representative vegetation types in the analysis area. This small loss/change of habitat within Alternative C-R disturbance area means that species using impacted habitats would no longer have that habitat available. In Alternative C-R, at least 99 percent of all habitat types in the analysis area would remain undisturbed. Species such as brown creeper, Vaux's swift, golden-crowned kinglet, varied thrush, pileated woodpecker, Cassin's finch, and rufous hummingbird would still have most of the existing amounts of their habitat left within the PSUs as a result of this alternative. The overall amount of migratory bird habitat impacted by Alternative C-R, for all habitat types, is less than 1 percent of each PSU. The overall bird species composition and abundance in the PSUs would likely be unchanged at the PSU level due to the small relative clearing and disturbance areas, although localized shifts in species presence and distribution within the clearing and disturbance areas is expected. The location of the Alternative C-R transmission line alignment on an east-facing ridge immediately north of the Sedlak Park Substation would reduce the risks of migratory bird wire strikes and electrocutions relative to Alternative B in the Fisher River corridor. In addition, areas of high risk for bird collisions where line marking devices may be needed (*i.e.*, major drainage crossings) and recommendations for the type of marking device would be identified through a study conducted by a qualified biologist and funded by MMC.

Alternative C-R would not impact effective old growth in the Crazy PSU. Alternative C-R would impact 10 acres of effective old growth in the Silverfish PSU through clearing. Because the

Table 248. Impacts on Migratory Bird Habitat in the Analysis Area by Transmission Line Alternative C-R.

Existing Vegetation Type	Crazy	McElk	Riverview	Silverfish
Cedar/Hemlock	11 (<1%)	0 (0%)	0 (0%)	0 (0%)
Dry Mixed Conifer	<1 (<1%)	44 (<1%)	5 (<1%)	62 (<1%)
Miscellaneous Forest	9 (<1%)	7 (<1%)	0 (0%)	17 (<1%)
Moist Douglas-Fir/Grand Fir	36 (<1%)	21 (<1%)	2 (<1%)	62 (1%)
Riparian – Shrub/Hardwoods	0 (0%)	1 (<1%)	0 (0%)	1 (<1%)
Wet Subalpine Fir/Lodgepole Pine	17 (<1%)	0 (0%)	0 (0%)	26 (<1%)
Total	73 (<1%)	72 (<1%)	6 (<1%)	168 (<1%)

All units are acres and (% of habitat type in PSU).
Dry Mixed Conifer includes ponderosa pine and dry Douglas-fir; miscellaneous forests include larch, whitepine, whitebark/subalpine larch, mountain hemlock/subalpine fir.
Most of this alternative is on National Forest System lands within Crazy and Silverfish PSUs and some Plum Creek and State land in Silverfish, and with the transmission line primarily running through Plum Creek land in Riverview and McElk PSUs. Within the McElk PSU, these acres include the portion of the transmission line extending to the Sedlak Park Substation and the substation itself.

amount of old growth impacted would be minor, most of the old growth within the PSU would remain for migratory bird species that use this habitat type and impacts to migratory birds would be small. Species composition and abundance of migratory birds that use old growth would not likely change at the scale of the PSU. Edge influence on effective old growth would be 3 less acres and the impacts to migratory birds would be small. Edge effects to old growth would not occur in the Crazy PSU.

Approximately 2 acres of wetlands, all jurisdictional, would be within the Alternative C-R clearing area. Less than 0.1 acre of wetlands and streams would be affected by new or upgraded road construction. Approximately 1,922 linear feet of streams would also be within the Alternative C-R clearing area or the disturbance area for new or upgraded roads. Direct effects to wetlands are expected to be avoided by placement and location of transmission line facilities and roads outside of wetlands and streams. Species composition and abundance of migratory birds that use wetlands and streams would not likely change at the scale of the PSU.

The effects from noise are expected to be similar to Alternative B, although in different locations given the different transmission line alignment. More helicopter use would occur than in Alternative B given that helicopters may be used for structure placement and vegetation clearing in addition to line stringing and monitoring/maintenance. This would result in more noise while these activities are ongoing and therefore more (temporary) impacts to birds in the areas adjacent to the activities. Most of the noise levels in the analysis area would remain near existing conditions, therefore most of the analysis area would be relatively quiet for bird use.

3.25.6.4.8 Alternative D-R – Miller Creek Transmission Line Alternative

Impacts on migratory birds from Alternative D-R would be similar to Alternative C-R, except that more habitat would be disturbed due to the longer length of Alternative D-R (Table 249). Approximately 334 acres would be affected by Alternative D-R. Very little habitat loss/change would occur (less than 1 percent) for any of the representative vegetation types in the analysis area. This small loss/change of habitat in the Alternative D-R disturbance area means that species using impacted habitats would no longer have that habitat available. In Alternative D-R, at least 99 percent of all habitat types in the PSUs would remain undisturbed. Species such as brown creeper, Vaux’s swift, golden-crowned kinglet, varied thrush, pileated woodpecker, Cassin’s finch, and rufous hummingbird would still have most of the existing amounts of their habitat left within the PSUs as a result of this alternative. The overall amount of migratory bird habitat impacted by Alternative D-R, for all habitat types, is less than 1 percent of each PSU. The overall bird species composition and abundance in the PSUs would likely be unchanged at the PSU level due to the small relative clearing and disturbance areas, although localized shifts in species presence and distribution within the clearing and disturbance areas is expected.

Alternative D-R would not impact effective old growth in the Crazy PSU. Alternative D-R would clear 8 acres of effective old growth in the Silverfish PSU. Because the amount of effective old growth impacted would be small, most of the effective old growth within the analysis area would remain for migratory bird species that use this habitat type and impacts to migratory birds would be small. Species composition and abundance of migratory birds that use effective old growth would not likely change at the scale of the PSU. Additionally, 4 acres of effective old growth would be impacted by edge influence in the Crazy PSU, thereby reducing the quality of those acres as habitat for some species. The loss in the Crazy PSU would be offset by a reduction of 5 acres in edge influence in the Silverfish PSU. The impacts to migratory birds would be small.

Table 249. Impacts on Migratory Bird Habitat in the Analysis Area by Transmission Line Alternative D-R.

Existing Vegetation Type	Crazy	McElk	Riverview	Silverfish
Cedar/Hemlock	13 (<1%)	0 (0%)	0 (0%)	0 (0%)
Dry Mixed Conifer	0 (0%)	44 (<1%)	5 (<1%)	21 (<1%)
Miscellaneous Forest	22 (<1%)	7 (<1%)	0 (0%)	72 (<1%)
Moist Douglas-Fir/Grand Fir	10 (<1%)	21 (<1%)	2 (<1%)	43 (<1%)
Riparian – Shrub/Hardwoods	0 (0%)	1 (<1%)	0 (0%)	0 (0%)
Wet Subalpine Fir/Lodgepole Pine	27 (<1%)	0 (0%)	0 (0%)	48 (<1%)
Total	72 (<1%)	72 (<1%)	6 (<1%)	184 (<1%)

All units are acres and (% of habitat type in PSU).
Dry Mixed Conifer includes ponderosa pine and dry Douglas-fir; miscellaneous forests include larch, whitepine, whitebark/subalpine larch, mountain hemlock/subalpine fir.
Most of this alternative is on National Forest System lands within Crazy and Silverfish PSUs and some Plum Creek and State land in Silverfish, and with the transmission line primarily running through Plum Creek land in Riverview and McElk PSUs. Within the McElk PSU, these acres include the portion of the transmission line extending to the Sedlak Park Substation and the substation itself.

Approximately 2 acres of wetland, all jurisdictional, would be within the Alternative D-R clearing area. Less than 0.1 acre of wetlands and streams would be affected by new or upgraded road construction. Approximately 2,935 linear feet of streams would also be within the Alternative D-R clearing area or the disturbance area for new or upgraded roads. Direct effects to wetlands are expected to be avoided by placement and location of transmission line facilities and roads outside of wetlands and streams. Species composition and abundance of migratory birds that use wetlands and streams would not likely change at the scale of the PSU.

The effects from noise are expected to be similar to Alternative B and C-R, although in different locations given the different alignment for the transmission line. More helicopter use may occur compared to Alternative B given that helicopters may be used for structure placement and vegetation clearing in addition to line stringing, annual monitoring, and periodic maintenance. This would result in more noise while these activities are ongoing and therefore more (temporary) impacts to birds in the areas adjacent to the activities. Most of the noise levels in the analysis area would remain near existing conditions, therefore most of the analysis area would be relatively quiet for bird use.

The effect on migratory birds that use old growth and wetlands would be the same as Alternative B. The effects from noise are expected to be similar to Alternative C-R, although in different locations given the different alignment for the transmission line. The mitigation described for Alternative C-R would be implemented and reduce effect on migratory birds.

3.25.6.4.9 Alternative E-R – West Fisher Creek Transmission Line Alternative

Impacts on migratory birds from Alternative E-R would be similar to Alternatives C-R and D-R except that more habitat would be disturbed due to the longer length of Alternative E-R. Alternative E-R would have the largest clearing and disturbance areas, affecting 367 acres (Table 250). Very little habitat loss/change would occur (less than 1 percent) for any of the representative vegetation types in the analysis area. This small loss/change of habitat in the Alternative E-R disturbance area means that species using impacted habitats would no longer have that habitat

Table 250. Impacts on Migratory Bird Habitat in the Analysis Area by Transmission Line Alternative E-R.

Existing Vegetation Type	Crazy	McElk	Riverview	Silverfish
Cedar/Hemlock	13 (<1%)	0 (0%)	0 (0%)	0 (0%)
Dry Mixed Conifer	0 (0%)	44 (<1%)	5 (<1%)	64 (1%)
Miscellaneous Forest	22 (<1%)	7 (<1%)	0 (0%)	49 (<1%)
Moist Douglas-Fir/Grand Fir	10 (<1%)	21 (<1%)	2 (<1%)	84 (1%)
Riparian – Shrub/Hardwoods	0 (0%)	1 (<1%)	0 (0%)	0 (0%)
Wet Subalpine Fir/Lodgepole Pine	27 (<1%)	0 (0%)	0 (0%)	19 (<1%)
Total	72 (<1%)	72 (<1%)	6 (<1%)	216 (<1%)

All units are acres and (% of habitat type in PSU).
Dry Mixed Conifer includes ponderosa pine and dry Douglas-fir; miscellaneous forests include larch, whitepine, whitebark/subalpine larch, mountain hemlock/subalpine fir.
Most of this alternative is on National Forest System lands within Crazy and Silverfish PSUs and some Plum Creek and State land in Silverfish, and with the transmission line primarily running through Plum Creek land in Riverview and McElk PSUs. Within the McElk PSU, these acres include the portion of the transmission line extending to the Sedlak Park Substation and the substation itself.

available. In Alternative E-R, at least 99 percent of all habitat types in the analysis area would remain undisturbed. Species such as brown creeper, Vaux's swift, golden-crowned kinglet, varied thrush, pileated woodpecker, Cassin's finch, and rufous hummingbird would still have most of the existing amounts of their habitat left within the PSUs as a result of this alternative. The overall amount of migratory bird habitat impacted by Alternative E-R, for all habitat types, is less than 1 percent of each PSU. The overall bird species composition and abundance within the PSUs would likely be unchanged at the PSU level due to the small relative clearing and disturbance areas, although localized shifts in species presence and distribution within the clearing and disturbance areas is expected.

Alternative E-R would not impact effective old growth in either the Crazy or the Silverfish PSU through clearing. Additionally, 4 acres of effective old growth would be impacted by edge influence in the Crazy PSU, thereby reducing the quality of those acres as habitat for some species. Species composition and abundance of migratory birds that use old growth would not likely change at the scale of the PSU.

Approximately 2 acres of wetland, all jurisdictional, would be within the Alternative E-R clearing area. Less than 0.1 acre of wetlands and streams would be affected by new or upgraded road construction. Approximately 3,380 linear feet of streams would also be within the Alternative E-R clearing area or the disturbance area for new or upgraded roads. Direct effects to wetlands are expected to be avoided by placement and location of transmission line facilities and roads outside of wetlands and streams. Species composition and abundance of migratory birds that use wetlands and streams would not likely change at the scale of the PSU.

The effects from noise are expected to be similar to Alternative B and C-R, although in different locations given the different alignment for the transmission line. More helicopter use may occur compared to Alternative B given that helicopters may be used for structure placement and vegetation clearing in addition to line stringing, annual monitoring, and periodic maintenance. This would result in more noise during these activities and therefore more temporary impacts to birds in the areas adjacent to the activities. Most of the noise levels in the analysis area would remain near existing conditions, therefore most of the analysis area would be relatively quiet for bird use.

3.25.6.4.10 Combined Mine-Transmission Line Effects

The combined alternatives would not have large impacts to migratory bird habitat, particularly because the transmission line alternatives impact so few acres (1 percent or less). The mine alternatives also do not have large impacts to migratory bird habitats within the footprint of the ground disturbance, as discussed previously for each alternative. Alternative 3 has the least wetland acres impacted, so any transmission line alternative combined with Alternative 3 would be least impacting for wetlands compared to other alternative combinations (mitigation would replace impacted wetlands, making the end result of alternatives similar). At mine closure, disturbed habitat would be reclaimed (revegetated through seeding/planting), and habitat would potentially be restored to pre-mine conditions in the long term through successional processes. Roads would be redisturbed for transmission line decommissioning and reclaimed after transmission line removal.

Response of migratory birds to timber harvest depends upon their individual habitat preferences and needs. Clearing of forested areas for transmission lines would remove forest cover used by some species (*e.g.*, brown creeper, golden-crowned kinglet, and hermit thrush) and create grassland and shrubland habitat used by other bird species (*e.g.*, American kestrel, calliope hummingbird, and chipping sparrow). Clearing associated with all alternatives, both mine and transmission line, also would create edge habitat used by birds such as the dark-eyed junco, western tanager, Townsend’s warbler, red-tailed hawk, and great-horned owl. For additional discussion of edge effects related to old growth, see the old growth analysis in the Vegetation section. Edge habitat favors some species while diminishing habitat for interior forest species. Given that the edge effects to old growth impact relatively few acres within the PSUs, the overall impact on interior forest birds that use old growth would be minimal.

The construction of some mine facilities, such as the plant, access road, impoundment, conveyor, and adits, would not provide habitat for any species as discussed above in the effects from Alternatives 2, 3, and 4 until reclamation occurred and those facilities were reclaimed. While all combined action alternatives would result in localized changes in species composition, they would not result in widespread changes in bird communities in the analysis area.

Lands would be acquired to improve grizzly bear habitat in all alternatives. These parcels would likely provide migratory bird habitat, although the exact type would not be known until purchase. Whether the parcels have open habitats, open canopied stands, closed canopy stands, late successional forests, or riparian areas, they would likely provide habitat for some species of migratory birds. Over the long term, land acquisition would reduce the likelihood that those parcels would be developed, thus maintaining habitat for migratory birds on those parcels. In the mine alternatives, impacted wetlands would be replaced with similar type wetlands, thus maintaining riparian/wetland habitats for migratory birds using those habitats. The agencies’ Wetland Mitigation Plan would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan.

The amount of snags and downed wood resulting from the mine and transmission line alternatives, as described in the Snags and Downed Wood section would provide sufficient quality and quantity of those habitat features to maintain habitat for wildlife, including migratory birds.

3.25.6.4.11 Cumulative Effects

Introduction

The Affected Environment/Existing Condition section describes the migratory bird species found on the KNF and the variety of habitat types they use. This cumulative effects section summarizes the past actions as well as further describes ongoing and other reasonably foreseeable contributions potentially impacting migratory birds.

The planning subunits comprising the analysis area were chosen for the cumulative effects analysis as localized alteration of habitat could affect the use of the impacted stand as well as affect the availability of habitats within the surrounding area.

Past Actions

Migratory birds represent a wide range of preferences and habitat use. Past harvest has had both positive and negative impacts depending on the activity and species of bird being considered. Harvest has occurred in the analysis area over the last 60+ years and has provided a variety of age classes and successional stages across the analysis area. Regeneration harvests would have benefitted species that prefer more open habitats while at the same time reduced habitat for those species that prefer heavily forested habitat. Past harvest would have also reduced snags, down woody materials, late successional habitats, and riparian habitats that are important to many species. Road construction would have also contributed to the reduction of these habitat types and components. A more detailed list of previous vegetation and road management activities are found in Appendix E. In unharvested areas, natural disturbances such as wildfire would have contributed to this mosaic of habitats and forage conditions. In contrast, fire suppression since the early 1900s has altered stand structure resulting in more homogenous stands with greater canopy closure in some areas, which has favored those species that prefer heavily forested habitats.

Since the 1990s, application of KFP direction has resulted in better retention of snags and down woody materials and protection of old growth and riparian habitats. Also, more reliance on intermediate harvest that leaves more forest structure (including large old trees), snags, and cover has since provided more intermediate or edge conditions than the extremes of open and heavily forested habitats.

To a lesser extent, habitat changes have occurred as a result of other activities, such as mining, in these planning subunits, although the footprint of these activities is relatively small compared to the factors listed above. The results were either a conversion of habitat into unvegetated conditions, or into openings with early successional habitats that in some cases have progressed through natural succession to again provide forested habitats.

Alternative 1 – No Mine; Alternative A – No Transmission Line

No direct effects from federal actions would occur; therefore, these alternatives would not contribute to cumulative effects to migratory bird habitat. Implementation of these alternatives would maintain existing vegetative condition on the landscape and migratory bird use would continue at current levels.

Action Alternatives for the Mine and Transmission Line: Ongoing and Reasonably Foreseeable Actions

Reasonably foreseeable actions include those federal, state, or private activities that are ongoing or scheduled to occur during the life of the mine/reclamation, independent of this federal action.

Chapter 3 identifies those current and foreseeable actions in the analysis area that were determined to be appropriate for inclusion in the analysis of environmental effects.

Miller-West Fisher Vegetation Management Project will occur within the Silverfish PSU. Only the transmission line alternatives would occur within this PSU. Miller-West Fisher will treat 5,000 acres in addition to temp road construction, road storage, decommissioning, and road conversion to trail. The vegetation management would improve the availability of open habitats. The openings created under the transmission line alternatives for Montanore would be longer lasting (the life of the mine) than Miller-West Fisher due to maintenance of those openings under the lines. Loss of closed forest habitat and gain in open forest habitat would occur with Miller-West Fisher, and that improves conditions toward providing more open habitats similar to what would have been found in the analysis area historically under natural disturbance processes. Ecosystem Research Group found that, in general, early successional stage habitats are less than historic range of variation on the KNF (Ecosystem Research Group 2012). This means that early successional habitats (*e.g.,* openings, seedling/saplings) are less available for migratory birds on the KNF than they would have been historically under natural disturbance processes.

The Coyote Improvement vegetation management project is in the planning stages and would take place within the Crazy PSU. The project would harvest 240 acres to increase stand resiliency to mountain pine beetles. This project would contribute to open canopy habitat/openings within the analysis area. As mentioned above, this habitat component is generally lacking on the landscape and Coyote Improvement project would contribute toward improving its availability within these planning subunits. The transmission line alternatives in Montanore would contribute openings as well, although they are expected to be maintained longer before natural succession is allowed to occur compared to Coyote Improvement.

Silverbutte Bugs timber sale is in the Silverfish PSU and would be a small project like Coyote. Similar to the timber sales mentioned above, it would contribute some openings/open-canopied habitat within this PSU. If Silverbutte Bugs mainly treats stands already impacted by insects/disease, those stands may already be in an open-canopied condition.

Flower Creek timber sale is in the Treasure PSU and only has minimal overlap with the project with a small amount of the access road for Montanore within this PSU. Flower Creek timber sale, like the timber sales mentioned above, would contribute openings or open-canopied habitat as well. Approximately 900 acres are proposed for treatment. Due to the minimal overlap, cumulative effects would be minimal.

Increased use of public lands is likely with population growth and development, but use is expected to be gradual and focused on areas along or near roads open to motorized traffic. Activities include firewood cutting which removes snags and down wood that may provide habitat for migratory birds. Loss would be limited to individual trees and logs and to areas within about 150-200 feet of open roads and has been accounted for in available snag habitat. Also, the Montanore Project proposes no change in the amount of roads open for public motorized use. However, new clearings within viewing distance of the open roads may make existing snags more visible for cutting. Therefore, cumulatively there would be a negligible increase in the expected loss of snags and down wood due to proposed activities and firewood gathering within the analysis area.

Development of private land within the analysis area likely altered migratory bird habitat by both permanently removing forested habitats and converting them to non-vegetated sites, or by changing stand structure. Timber harvest on corporate timberlands also impacted the amount and distribution of stand types within the analysis area. Opening up canopies likely favored birds that use those conditions and did not favor those species preferring closed canopied stands.

Given that many of the activities included in the list of cumulative effects impact relatively few acres compared to natural disturbance processes, and that those natural disturbance processes largely determine the amounts and pattern of habitats on the landscape (Ecosystem Research Group 2012), Montanore is expected to have only a small contribution to cumulative effects.

Cumulatively, when other activities including the Montanore Project and all past, present, and reasonably foreseeable activities are considered, habitat on federal lands is considered to provide sufficient habitat to maintain migratory birds.

3.25.6.4.12 Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. All mine and transmission line alternatives would comply with 36 CFR 228.8.

National Forest Management Act/Kootenai Forest Plan

The Montanore Project is not a habitat management activity designed to trend vegetation toward desired conditions, so all alternatives would be neutral to progress toward GOAL-WL-01and FW-DC-WL-19. Although there would be site-specific reductions of old growth within the land clearing for mine and transmission line facilities, none of the alternatives would preclude achievement of the forestwide desired condition over the long term. The amount of old growth that is predicted to occur across the Forest in the future increases substantially during the next 50 years. In the absence of large scale dramatic disturbances over the Forest, old growth amounts should increase in the future due to the large number of acres of forest stands on the KNF that currently meet every old growth criteria except age, but that will meet the age criteria relatively soon (USDA Forest Service 2014). The survey requirements and timing restrictions described in section 3.25.4.2, *Bald Eagle*, would address all raptor nests and meet the intent of FW-GDL-WL-16.

Statement of Findings

All action alternatives would result in small changes to migratory bird habitat within the analysis area. The alternative disturbance areas are small compared to the analysis area. Some alternative components, such as the plant site and impoundment, would result in a small loss of habitat until reclamation. The transmission line would result in conversion of habitat from forested to open habitat, which would shift the bird species composition within the clearing footprint during construction/operation. After reclamation when natural succession is allowed to occur, these areas may shift back toward forested habitats. ***Due to the small disturbance area compared to the analysis area, none of the action alternatives are expected to measurably change overall migratory bird species composition or abundance in the analysis area.***

Migratory Bird Treaty Act and Executive Order 13186

All alternatives would comply with the Migratory Bird Treaty Act, Executive Order 13186, and associated MOU by evaluating the effects of federal actions on migratory birds as part of the NEPA process and promoting conservation of and minimizing adverse impacts on migratory birds.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53. All alternatives would comply with the Nongame and Endangered Species Act.

3.25.7 Other Species of Interest

3.25.7.1 Moose

3.25.7.1.1 Regulatory Framework

The Organic Administration Act authorizes the Forest Service to regulate the occupancy and use of National Forest System lands. The Forest Service's locatable minerals regulations are promulgated at 36 CFR 228, Subpart A. The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. One of these regulations (36 CFR 228.8) requires that mining activity be conducted, where feasible, to minimize adverse environmental impacts on National Forest surface resources. 36 CFR 228.8 also requires that mining operators take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations.

The 2015 KFP direction considered in the analysis of big game habitat, including mountain goat, is described under section 3.25.3.2, *Big Game (Elk/Deer Habitat)*.

The MFSA directs DEQ to approve a facility if, in conjunction with other findings, DEQ finds and determines that the facility minimizes adverse environmental impact, considering the state of available technology and the nature and economics of the alternatives. An assessment of effects on moose winter range and state species of concern is part of the transmission line certification process. In addition, FWP has also expressed concerns about potential impacts of the Montanore Project on moose.

3.25.7.1.2 Analysis Area and Methods

The analysis area for evaluating direct, indirect, and cumulative effects on individual moose and their habitat on National Forest System lands consists of the Crazy and Silverfish PSUs, because activities in these areas could result in disturbance and displacement effects to moose (Figure 96). These PSUs are large enough to account for effects on the various components of moose habitat and use in this area. Connectivity and movement within home ranges could be impacted by the proposed activities as well as activities in adjacent PSUs. The boundaries for determination of population trend and contribution toward population viability are the FWP moose HD number 105 and the KNF, respectively.

According to DEQ's MFSA requirements, potential impacts within 1 mile of each alternative transmission line alignment must be evaluated (DEQ 2004). To evaluate potential direct, indirect, and cumulative impacts of the transmission line on moose on private and state land, the analysis area includes all non-National Forest System land within a corridor 1 mile on each side of the alternative transmission line alignments.

Moose occurrence data come from District wildlife observation records, Forest historical data (NRIS Wildlife), and other agencies (MNHP, FWP). Moose winter range was provided by FWP and was consistent with the 2015 KFP mapped winter range. Impacts on moose are quantitatively evaluated based on effects on moose winter range, cover to forage ratios, and wetlands providing important moose foraging habitat. Other impacts, such as impacts to connectivity areas described in section 3.25.3.2, *Big Game (Elk/Deer) Habitat*, effects of increased traffic, potential effects of ingestion of tailings water, and disturbance from helicopter construction are qualitatively described.

MMC's proposed Alternatives 2 and B include an access change in NFS road #4724 from April 1 to June 30 and a yearlong access change in a segment of NFS road #4784 to mitigate for impacts on grizzly bears. NFS road #4784 is proposed for an access change by the Rock Creek Project. The access change on NFS road #4784 would be implemented for all action alternatives only if it was not already implemented as part of the Rock Creek Project mitigation. Additional road access changes may also occur on land acquired as part of the grizzly bear mitigation proposed by MMC or the agencies (see mitigation plan descriptions in sections 2.4, *Alternative 2—MMC's Proposed Mine*, and section 2.5, *Alternative 3—Agency Mitigated Poorman Impoundment Alternative*).

Other mitigation measures incorporated into MMC's or the agencies' alternatives that could benefit moose include implementation of wetland mitigation plans for MMC's proposed alternative and the agencies' alternative, winter construction timing restrictions in moose winter range, prohibiting employees from carrying firearms, and monitoring road-killed animals along mine access roads to determine if improved access resulted in increased wildlife mortality.

Impacts on moose on private and State lands from the transmission line corridor were evaluated based on FWP-derived winter habitat mapping (Figure 96); FWP hunting and population data, research, and plans; KNF and FWP information on wildlife connectivity areas; and mapping of broad vegetation types shown on Figure 85.

3.25.7.1.3 Affected Environment

The moose is a large ungulate that occupies mountain meadows, river valleys, swampy areas, and clearcuts in the summer; and willow flats or mature coniferous forests in the winter. Due to their large size and long limbs, moose negotiate deep snow better than other ungulates. Conifer stands composed of uneven-aged classes and willows are important components of cover for moose (MNHP 2014).

Moose use riparian habitat throughout the year along the various creeks in the analysis area. They also use drier mid-elevation areas during summer. Their food consists primarily of shrubs, with some forbs during summer. In the analysis area, moose concentrate along riparian areas, in 15- to 20-year-old clearcuts with shrubby understories, in shrubfields, and in forested areas with shrubby understories. Moose prefer to live well up the Libby Creek and Ramsey creek drainages, as well as the other drainages along the east face of the Cabinet Mountains. They move out of these areas to the east and down the drainages only when forced to do so by increasing snowpack.

They return to the upper portions of these drainages as early in the late winter/early spring as snow hardness allows (FWP 2009b; Chilton and Newby 2014). During some years, they remain high in the drainages into late January and early February. Moose could be expected to occupy areas around proposed impoundment and plant sites for 8 to 10 months of the year, depending on winter severity (Brown, pers. comm. 2008b; Chilton and Newby 2014). Moose winter range occupies 27,889 acres of the Crazy PSU and 22,358 acres of the Silverfish PSU and 4,666 acres on State and private lands.

The area near Little Cherry Creek and Bear Creek is a very productive moose calving area in HD 105 (Williams, pers. comm. 2006). During late fall and winter, moose concentrate along Little Cherry Creek, Poorman Creek, Ramsey Creek, Miller Creek, West Fisher Creek, and on Big Hoodoo Mountain and west-facing slopes above the Fisher River (Figure 96) (Brown, pers. comm. 2008b).

HD 105 is one of seven hunting districts in Region 1 selected by FWP for long-term moose population trend monitoring, based on its importance to moose. A standard “trend route” along the east slope of the Cabinet Mountains in HD 105 is surveyed annually to collect moose population composition and trend monitoring data (FWP 2007b). Trends in population, size, and composition are evaluated based on total moose, calf/cow ratios, and bull/cow ratios observed during trend area surveys. Harvest data and hunter effort data for HD 105 are also taken into consideration in the evaluation of population trends (Brown, pers. comm. 2008b). Based on trend area data collected since 1990, harvest data collected since 1985, and 2014 radio tracking and GIS monitoring, the moose population in in the east Cabinet Mountains in HD 105 may be declining, although a high degree of uncertainty is associated with population trend estimates derived from these data (Chilton and Newby 2014). During moose surveys of HD 105 conducted in 2007, moose were observed in the highest concentrations on south- and west-facing slopes of the Little Hoodoo and Big Hoodoo mountains in the Big Cherry Creek and Bear Creek drainages, and on west-facing slopes of the Libby Creek drainage near Horse Mountain (Brown, pers. comm. 2008b). FWP did not conduct a moose survey in HD 105 in December, 2008 due to inadequate snow cover, surveying instead in April 2009. During the 2009 survey, 12 moose were observed, primarily in the upper drainages of the Cabinet Mountains (FWP 2009b).

Most forage habitat occurs in lower elevation areas of the Little Cherry Creek drainage and the mouths of its tributaries, or in isolated patches of past disturbance. Historically, wildfire would create a mosaic of successional stages and result in vegetative diversity in this area. However, fire suppression and past timber management has resulted in a trend toward homogenous stand composition and structure consisting of high density stands of shade-tolerant species (see section 3.22, *Vegetation*) that reduce the presence and productivity of understory forage species. Most forage habitat occurs in lower elevation areas of the Little Cherry Creek drainage and the mouths of its tributaries, or in isolated patches of past disturbance. Most past harvest areas have recovered to the point they are no longer considered openings and contribute to the high cover to forage ratio in the Crazy and Silverfish PSUs. Historically, wildfire would create a mosaic of successional stages and result in vegetative diversity in this area. In contrast, fire suppression and past timber management has resulted in a trend toward homogenous stand composition and structure consisting of high density stands of shade-tolerant species (see section 3.22, *Vegetation*) that reduce the presence and productivity of understory forage species. In summary, the analysis area is does not currently meet the desired conditions for moose and other big game species with high cover and limited forage availability.

Potential connectivity areas (movement areas) are described in section 3.25.3.2, *Big Game (Elk/Deer) Habitat* and were determined to be ridgetops (3rd order or larger drainages) or drainages. Moose cross US 2 in the vicinity of Raven and Brulee creeks in the McElk PSU (moving between Barren/Teeters Peaks and Kenelty/Fritz Mountains) as they move between summer and winter ranges. Much of the land near US 2 in this vicinity is either corporate or private ownership.

3.25.7.1.4 Environmental Consequences

None of the mine alternatives would affect moose in the Silverfish PSU. Impacts on habitat connectivity areas are described in section 3.25.3.2, *Big Game (Elk/Deer) Habitat*.

Alternative 1 – No Mine

Alternative 1 would not have direct impacts on moose. Over time, with continued fire suppression and lack of active forest management, indirect effects of this alternative would include a continued trend toward later successional habitats. Forage habitat would decrease over time unless harvest or other stochastic events, such as a wildfire or windstorm, creating additional forage. Large-scale fires could potentially occur in the analysis area. Although vegetative succession would reduce forage openings over time, openings created following large fires would likely be relatively large, with long distances between hiding cover. Until hiding cover developed (about 15 to 20 years, depending on site conditions), individual animals may be more vulnerable to predation and hunting mortality in areas where large openings develop following wildfire.

Alternative 2 – MMC's Proposed Mine

Alternative 2 would remove 2,336 acres, or 8 percent, of moose winter habitat in the Crazy PSU, mostly as a result of the tailings impoundment and the LAD Areas (Table 251). This loss of habitat also would include key calving habitat. Alternative 2 would likely result in the displacement of moose to adjacent winter range and calving sites. Moose may occupy a home range of a few hundred acres during the winter, and certain individuals could be completely or partially displaced from their traditional wintering sites. If moose populations in surrounding areas subsequently exceed carrying capacity as a result of this habitat loss, the local moose population in the Crazy PSU may be adversely affected. Because considerable moose winter range habitat is available in the analysis area (Figure 96), Alternative 2 would not likely affect the viability of the moose population in HD 105 or the KNF.

Table 251. Impacts on Moose Winter Range in the Crazy PSU by Mine Alternative.

Habitat Component	[1] No Mine/ Existing Conditions	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Tailings Impoundment Alternative	[4] Agency Mitigated Little Cherry Creek Tailings Impoundment Alternative
Moose Winter Range (acres)	27,889	25,553 (2,336/8)	26,478 (1,411/5)	26,183 (1,706/6)
Cover in Winter Range impacted (acres)	0	2,011	1,284	1,391

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Source: GIS analysis by ERO Resources Corp. using KNF data.

Cover would decrease, but most cleared areas would not provide forage habitat until after they were reclaimed. Some areas would be reclaimed during mine operations and would provide foraging habitat once vegetation was established. In the long term, after reclamation success criteria were achieved, areas disturbed by Alternative 2 would provide forage for moose.

Widening, improvement, and yearlong use of the Bear Creek Road would lead to increased vehicle volumes and speed. Estimates of increased annual traffic volume range from 187 percent to 234 percent during operations (Table 177 in section 3.21, *Transportation*). The increase in traffic in Alternative 2 would substantially increase the risk of increased moose mortality on the access road. MMC would limit concentrate haulage to daylight hours during the day shift (0800 to 1630), which would minimize vehicular-moose collisions during the early morning, evening and night time-periods. MMC would provide transportation to employees using buses, vans, and pickup trucks, thereby limiting the use of personal vehicles. MMC would report road-killed animals to the FWP as soon as road-killed animals were observed. The FWP would either remove road-killed animals or direct MMC how to dispose of them. When the mill ceased operations in the Closure Phase, mine traffic volume would be substantially less than shown in Table 177 in section 3.21, *Transportation*. Future traffic volume when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and loss of the Little Cherry Loop Road beneath the impoundment. Mortality risk to the moose would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (increased road width, improved sight distance, paving) and higher traffic speeds would result in a permanently higher moose mortality risk compared to pre-mine conditions. At mine closure, all new roads (except the Bear Creek access road) constructed for the project would be reclaimed, which would include grading to match the adjacent topography and obliterating the road prism. After reclamation success criteria are achieved, areas disturbed by Alternative 2 would provide forage for moose.

Impacts on moose winter range would be at least partially reduced through MMC's proposed land acquisition. Acquired parcels would be managed for grizzly bear use in perpetuity, and could improve or contribute suitable moose winter habitat if the acquired parcels potentially provided winter range characteristics and were managed to improve winter moose habitat through road access changes or other means.

About 39 acres of wetlands providing water and high-quality forage would be impacted by Alternative 2 in the Crazy PSU. An additional 3 acres or more may be affected by a pumpback well system, if installed at the impoundment site. The feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC's plan is conceptual and would be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. Section 3.23, *Wetlands and Other Waters of the U.S.* discusses proposed wetland mitigation in more detail.

MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table

122 in the *Water Quality* section). The Ramsey Plant Site would be fenced, restricting moose access.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

Impacts on moose from Alternative 3 would be similar to Alternative 2, except that less moose winter range and calving habitat would be disturbed. In Alternative 3, about 1,411 acres, or 5 percent, of moose winter range would be removed in the Crazy PSU, mostly as a result of the tailings impoundment (Table 251). Alternative 3 would include more road access changes and more habitat acquisition, and would more effectively reduce potential effects on moose. The effect of increased traffic on the Bear Creek Road would be the same as Alternative 2, except that in Alternative 3, MMC would remove big game animals killed by any vehicles daily from road rights-of-way within the permit area and along roadways used for access or hauling ore for the life of the mine and monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. Highway safety signs such as “Caution – Truck Traffic” would help slow public traffic speeds in anticipation of meeting oncoming trucks. Staging shipments of supplies in a general location prior to delivery to the mine site would reduce traffic and moose mortality risk.

About 13 acres of wetlands providing water and high-quality forage would be directly affected by Alternative 3 in the Crazy PSU; an additional 16 acres may be affected by a pumpback well system at the tailings impoundment. Impacts on wetlands would be mitigated through implementation of the agencies’ Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan.

Water management in Alternatives 3 and 4 would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to moose. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts on moose from Alternative 4 would be similar to Alternative 3, except that more moose winter range and calving habitat would be affected. In Alternative 4, about 1,706 acres, or 6 percent, of moose winter range in the Crazy PSU would be disturbed, mostly as a result of the tailings impoundment (Table 251).

About 43 acres of wetlands providing water and high-quality forage would be directly or indirectly affected by Alternative 4 in the Crazy PSU. Impacts on wetlands would be mitigated through implementation of the agencies’ Wetland Mitigation Plan, which would have a greater likelihood of replacing lost functions than the Alternative 2 Wetland Mitigation Plan.

Alternative A – No Transmission Line

Alternative A would have no direct impacts on moose. Over time, with continued fire suppression and lack of active forest management, indirect effects of this alternative would include a continued trend toward later successional habitats. Forage habitat would decrease over time unless harvest or other stochastic events, such as a wildfire or windstorm, created additional forage. Large-scale fires could potentially occur in the analysis area. Although vegetative succession would reduce forage openings over time, openings created following large fires would likely be relatively large, with long distances between hiding cover. Until hiding cover develops (about 15 to 20 years, depending on site conditions), individual animals may be more vulnerable to predation and hunting mortality in areas where large openings develop following wildfire.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

For Alternative B, about 108 acres, or less than 1 percent, of winter range on National Forest System lands in the analysis area would be disturbed, chiefly in the Crazy and Silverfish PSUs. On state and private lands, including the Sedlak Park Substation and loop line, 127 acres, or 3 percent, of moose winter range in the analysis area would be disturbed (Table 252). All disturbed areas, such as access roads and pulling and tensioning sites would be seeded with grass and shrub species after transmission line construction. Areas where trees were trimmed, but otherwise not disturbed, would be allowed to remain as grassland or shrubland. Disturbed areas of winter range would provide additional forage habitat as forage species became established. After the transmission line was removed, all newly constructed roads would be redisturbed during blading and contouring, before being seeded. Impacts on moose winter range would be at least partially minimized through MMC's proposed land acquisition. Acquired parcels would be managed for grizzly bear use in perpetuity, and could improve or contribute suitable moose winter habitat if the acquired parcels potentially provided winter range characteristics and were managed to improve winter moose habitat.

Table 252. Impacts on Moose Winter Range in the Analysis Area by Transmission Line Alternative.

Habitat Component	[A] No Trans-mission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
National Forest System Lands					
Moose Winter Range (acres)	50,257	50,149 (108/<1)	50,093 (164/<1)	50,091 (166/<1)	50,110 (147/<1)
Cover in Winter Range Impacted (acres)					
Crazy PSU	0	42	30	16	16
Silverfish PSU	0	60	114	131	114
State and Private Lands					
Moose Winter Range (acres)[1]	4,666	4,539 (127/3)	4,566 (100/2)	4,566 (100/2)	4,515 (151/3)

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions
[1] For Alternative A, includes analysis area for all transmission line alternatives combined.
Source: GIS analysis by ERO Resources Corp. using KNF data.

Helicopter use could contribute to short-term displacement of individual moose from the transmission line corridor. Helicopter use for line stringing would occur during a relatively short period (about 10 days). Except for annual inspection and infrequent maintenance operations, helicopter use and other construction activities would cease after transmission line construction until decommissioning. Helicopter use and other activities could result in short-term disturbance of moose during line decommissioning. Overall, moose populations would not likely be affected by helicopter activity because sufficient winter range habitat would be available for any moose displaced due to short-term disturbance, and because construction timing restrictions would reduce the extent of potential displacement effects.

About 4 acres of wetlands providing water and high-quality forage would be within the clearing area of Alternative B in the Crazy PSU. Direct effects to wetlands are expected to be avoided by placement and location of transmission line facilities and roads outside of wetlands and streams. Less than 0.1 acre of wetlands and streams would be affected by new or upgraded road construction.

Current populations of moose would likely be maintained in Alternative B because a very small proportion of winter range would be disturbed, cover to forage ratios would not change, sufficient winter range habitat would be available for any moose displaced due to short-term helicopter disturbance and reclaimed areas would provide additional forage.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Impacts of Alternative C-R on moose would be similar to Alternative B, except that impacts on winter range would be slightly greater and more winter range would be impacted on National Forest System lands (164 acres) than on state and private lands (100 acres), including the Sedlak Park Substation and loop line (Table 252). Alternative C-R would include more road access changes and more habitat acquisition, and would more effectively minimize potential effects on moose. Also, in Alternatives C-R, D-R, and E-R, two seasons of helicopter construction would occur and the total duration of helicopter use each season would be about 2 months because helicopters would be used for vegetation clearing and structure construction. The type and duration of impacts from helicopter use for line stringing would be the same as Alternative B (about 10 days). Avoidance of wetlands would be the same as Alternative B. Overall, moose populations would not likely be affected by helicopter activity because sufficient winter range habitat would be available for any moose displaced due to short-term disturbance, and because construction timing restrictions would reduce the extent of potential displacement effects.

Current populations of moose would likely be maintained in Alternative C-R because a very small proportion of winter range would be disturbed, cover to forage ratios would not change, sufficient winter range habitat would be available for any moose displaced due to short-term helicopter disturbance and reclaimed areas would provide additional forage.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts of Alternative D-R would be similar to Alternative C-R. Impacts of Alternative D-R on moose in the wildlife approach area in the Fisher River Valley would be the same as Alternative C-R. Avoidance of wetlands would be the same as Alternative B.

Alternative E-R – West Fisher Creek Transmission Line Alternative

Impacts of Alternative E-R would be similar to Alternative C-R, except that Alternative E-R would disturb the most (151 acres) moose winter range on state and private lands, including the Sedlak Park Substation and loop line (Table 252).

Combined Mine-Transmission Line Effects

Impacts on moose winter range and cover in moose winter range in the analysis area are shown in Table 253. Alternative 2B would affect the most moose winter range of all combined mine-transmission line alternatives, resulting in impacts on 2,652 acres, or 5 percent of the analysis area, while Alternative 3C-R would impact the least moose winter range, impacting 1,732 acres, or 3 percent of the analysis area. For all combined action alternatives, the greatest loss of moose habitat would occur within the disturbance areas for the impoundment sites, and in Alternative 2B, LAD Areas. Habitat loss would likely result in the displacement of moose to adjacent winter range and calving sites. Moose may occupy a home range of a few hundred acres during the winter, and certain individuals could be completely or partially displaced from their traditional wintering sites. If moose populations in surrounding areas subsequently exceed carrying capacity as a result of this habitat loss, the local moose population in the Crazy PSU may be adversely affected.

In all combined action alternatives, most areas cleared for the mine components would not provide forage habitat until after they were reclaimed. Some mine disturbance areas would be reclaimed during mine operations and would provide foraging habitat once vegetation was established. In the long term, after reclamation success criteria were achieved, mine disturbance areas would provide forage for moose. In all combined mine-transmission line alternatives, areas disturbed for transmission line construction would be seeded with grass and shrub species after transmission line construction and could provide additional forage habitat as shrubs become established.

Table 253. Impacts on Moose Winter Range in the Analysis Area by Combined Mine-Transmission Line Alternative.

Measurement Criteria	[1] No Mine/ Existing Conditions	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Cherry Creek Impoundment Area		
	TL-A	TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
National Forest System Lands								
Cover in Winter Range Impacted (acres)								
Crazy PSU	0	2,052	1,310	1,296	1,296	1,417	1,403	1,403
Silverfish PSU	0	60	114	131	114	114	131	114
All Lands in Analysis Area								
Moose Winter Range (acres)[1]	54,923	52,271 (2,652/5)	53,191 (1,732/3)	53,191 (1,734/3)	53,157 (1,766/3)	52,893 (2,030/4)	52,891 (2,032/4)	52,859 (2,064/4)

Number in parentheses is the reduction in habitat acres/percent in habitat area compared to existing conditions.
Impacts shown are for the transmission line Construction Phase, which represents maximum estimated impacts.
[1]For Alternative 1A, includes analysis area for all transmission line alternatives combined.
Source: GIS analysis by ERO Resources Corp. using KNF data.

In all combined mine-transmission line alternatives, widening, improvement, and yearlong use of the Bear Creek Road would lead to increased vehicle volumes and speed. Estimates of increased annual traffic volume range from 187 percent to 234 percent (Table 177 in section 3.21, *Transportation*). The increase in traffic in the combined mine-transmission line alternatives would substantially increase the risk of increased moose mortality. MMC would provide transportation to employees using buses, vans, and pickup trucks, thereby limiting the use of personal vehicles. MMC would report road-killed animals to the FWP as soon as road-killed animals were observed. The FWP would either remove road-killed animals or direct MMC how to dispose of them. In the agencies' combined mine-transmission line alternatives, MMC would remove big game animals killed by any vehicles daily from road rights-of-way within the permit area and along roadways used for access or hauling ore for the life of the mine and monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. When the mill ceased operations in the Closure Phase, mine traffic volume would be substantially less than shown in Table 177 in section 3.21, *Transportation*. Future traffic volume when all activities at the mine are completed in the Post-Closure Phase would be higher than in Alternative 1 because of reconstruction of Bear Creek Road and loss of the Little Cherry Loop Road beneath the impoundment. Mortality risk to the moose would decrease on the Bear Creek Road compared to operations, but the permanently improved road conditions (increased road width, improved sight distance, paving) and permanently higher traffic speeds would result in a higher moose mortality risk compared to pre-mine conditions. At mine closure, all new roads (except the Bear Creek access road) constructed for the project would be reclaimed, which would include grading to match the adjacent topography and obliterating the road prism. After reclamation success criteria are achieved, areas disturbed by the combined mine-transmission line alternatives would provide forage for moose.

For all combined mine-transmission line alternatives, helicopter and other transmission line construction activities could result in short-term displacement of moose from the transmission line corridor and surrounding habitat. Disturbance from helicopter use and other transmission line construction activities are described for Alternatives B and C-R above. For all combined action alternatives, impacts on moose winter range during transmission line construction would be minimized through the application of construction timing restrictions.

Winter range impacts also would be at least partially minimized through land acquisition. Acquired parcels would be managed for grizzly bear use in perpetuity, and could improve or contribute suitable moose winter habitat if the acquired parcels potentially provided winter range characteristics and were managed to improve winter moose habitat. The agencies' Wildlife Mitigation Plan (section 2.5.7, *Mitigation Plans*) would include more road access changes and more habitat acquisition, and would more effectively minimize potential effects on moose.

MMC would create or enhance from 22.0 to 51.8 acres, depending on the alternative, of wetland habitat to mitigate for impacts to wetlands. For all combined mine-transmission line alternatives, implementation of the respective wetland mitigation plan would slightly reduce the effects of lost moose habitat. The feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain.

In Alternative 2B, MMC would store mine, adit, or tailings water at the Ramsey Plant Site, a surge pond at the LAD Areas, and the tailings impoundment. The metals in the tailings water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section). The Ramsey Plant Site would be fenced, restricting moose access.

Water management in the agencies' combined mine-transmission line alternatives would reduce the risk to wildlife from contaminant uptake from storage of mine, adit, and tailings water. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to moose. Tailings water quality would have lower metal concentrations than in Alternative 2B;

the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in section 3.13, *Water Quality*, p. 712.

Although the local moose population in the Crazy PSU may be affected by the loss of habitat, the combined mine-transmission line alternatives would not likely affect the viability of the moose population in HD 105 because considerable moose winter range habitat is available in the analysis area (Figure 96), construction timing restrictions would reduce transmission line disturbance effects and habitat may be improved through land acquisition associated with grizzly bear mitigation.

Cumulative Effects

Past Actions and the Existing Condition

Past actions, including detailed descriptions of previous vegetation and road management activities, are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E.

Forest management practices and other human activities have had influential cumulative impacts on moose habitat. Harvest has occurred in the analysis area since the 1950s and resulting in a diversity of age classes and successional stages which provide forage and cover for moose and other big game species. Historically, wildfire would create a mosaic of successional stages and result in vegetative diversity in this area. Since the mid-1990s, there has also been a greater use of intermediate harvest methods which results in both hiding cover and foraging opportunities occurring in close proximity. Although more recent logging and prescribed burning has helped cycle forest cover through successional communities, fire suppression and past timber management has resulted in a trend toward homogenous stand composition and structure consisting of high density stands of shade-tolerant species (see section 3.22, *Vegetation*) that reduce the presence and productivity of understory forage species.

New roads can increase the risk of mortality from vehicle collisions and stress levels of resident species. Activities affecting moose habitat have changed in recent years, with a trend toward reduced motorized access as a result of decisions intended to facilitate grizzly bear recovery. This in turn has benefited moose.

Development of private lands within the analysis area, including commercial timber harvest, land clearing, home construction, and road construction has contributed to increased disturbance of moose and a loss or reduction in quality of foraging and winter habitat, and is expected to continue.

Areas previously impacted by special use permits such as mineral material sites (pits quarries, borrow, roadsides), water developments, utility corridors, private land access routes, and outfitter/guide trails/camps, would continue to be used. The ground disturbance on resources such as moose winter range and cover is described previously for the affected environment and would have no additional impacts. Other public uses such as wildlife viewing, berry picking, firewood gathering, camping, snowmobiling, etc. have negligible impacts on moose given their limited scope (time and space). Infra-structure, such as roads and campgrounds, that facilitate these activities have already been accounted in the description of the affected environment.

Effects of Current and Reasonably Foreseeable Actions

Reasonably foreseeable actions and current actions are described in section 3.3, *Reasonably Foreseeable Future Actions or Conditions* and section 3.2, *Past and Current Actions* and shown on Figure 50.

The Miller-West Fisher Vegetation Management Project will occur entirely in the Silverfish PSU and will include intermediate harvest of 1,206 acres, regeneration harvest of about 692 acres, precommercial thinning of 351 acres, and prescribed burning of 2,830 acres of National Forest System lands in the Silverfish PSU. The Coyote Improvement Vegetation Management Project is in the planning stages and would take place within the Crazy PSU. The project would harvest 240 acres to increase stand resiliency to mountain pine beetles. Silverbutte Bugs timber sale is in the Silverfish PSU and would be a small project like Coyote. Other reasonably foreseeable actions located in the Crazy and Silverfish PSUs include the Libby Creek Venture Drilling Plan, the Poker Hill Rock Quarry, the Bear Lakes Access Project, the Wayup Mine/Fourth of July Road Access Project, and Plum Creek activities.

Surface impacts from reasonably foreseeable actions would be minimal, and would not result in any measurable changes in habitat composition. Road management actions such as road maintenance and administrative use associated with permit administration, data collection and monitoring of National Forest System lands are not likely to affect moose habitat because they generally do not result in vegetation removal. Moose and other large ungulates will typically simply avoid the disturbance area until human activities terminate, which usually comprises of a few hours. Although water restoration projects may temporarily displace moose and other wildlife from a localized area, they typically benefit wildlife in the long-term by providing pulses of foraging when seeded or by stabilizing soils where certain habitat components can remain available.

With population growth and development, it is reasonable to assume that some corresponding increase in human use of National Forest System lands is likely to occur. Recreational activities such as sightseeing, hiking, cross-country skiing, camping, snowmobiling, fishing, and firewood cutting are ongoing and expected to increase over the next 10 years. This increase is likely to be gradual and incremental and tend to be focused on areas along or near roads open to motorized traffic. Moose may, over time, experience more frequent disruption of their daily activities if they are in proximity to roads.

Activities on private land, such as timber harvest, land clearing, home construction, road construction, and livestock grazing, are likely to continue on private lands within the Crazy and Silverfish PSUs and would likely slightly impact moose winter range habitat. Potential effects depend on the magnitude, type, and location of developments and include the loss of habitat and localized disturbance on moose and other big game species. Private lands occupy 10 percent of the Crazy PSU and 12 percent of the Silverfish PSU and are intermixed with public and corporate/State land. Because the proportion of moose habitat in the Crazy and Silverfish PSUs on private lands is small, development of private lands is expected to have minor cumulative impacts on moose and other big game species within the analysis area over the next 10 years.

No Action Alternative

The Montanore Project No Action alternatives (Alternative 1 and Alternative A) would not contribute to cumulative impacts on moose.

Combined Mine-Transmission Line Action Alternatives

All combined mine-transmission line action alternatives, in combination with other reasonably foreseeable actions, especially the Miller-West Fisher Vegetation Management Project, would result in cumulative impacts on moose winter range on all lands in the analysis area.

The combined mine-transmission line action alternatives, in combination with timber harvest or residential development on Plum Creek land, would result in cumulative disturbance to moose on private lands in the analysis area, and could displace of elk away from areas of disturbance. Cumulative disturbance to moose on private lands are expected to be minimal because private lands are generally heavily roaded and moose in these areas may be habituated to higher levels of disturbance than on National Forest System lands.

Regulatory/Forest Plan Consistency

Organic Administration Act and Forest Service Locatable Minerals Regulations

36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on National Forest surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat that may be affected by the operations. Mine Alternative 2 and Transmission Line Alternative B would not fully comply with 36 CFR 228.8. In the Proposed Action, MMC did not propose to implement feasible measures to minimize effects on the moose or all practicable measures to maintain and protect wildlife habitat. The agencies' alternatives (Mine Alternatives 3 and 4 and Transmission Line Alternatives C-R, D-R, and E-R) would comply with 36 CFR 228.8. The agencies' alternatives would incorporate additional feasible and practicable measures to minimize adverse environmental impacts on wildlife habitat that benefit moose, including minimizing disturbance in moose winter range, implementing a wetland mitigation plan more likely to provide moose habitat, increasing land acquisition requirements that would likely provide protection of moose habitat, and revising water management to reduce the potential for contaminant uptake.

National Forest Management Act/Kootenai Forest Plan

Consistency with 2015 KFP direction is described below.

2015 KFP Habitat Direction

FW-DC-WL-08: The Montanore Project is not managing vegetation for ungulate habitat. The alternatives would contribute in a minor way to progress toward this desired condition. The transmission line alternatives would contribute toward the creation of forage for big game. The mine alternatives would do so in a minor way as well, although it would not occur until after reclamation and revegetation occurred. Big game habitat would remain available and well-distributed across the landscape to provide prey for carnivores.

FW-DC-WL-16: The Montanore Project is not managing vegetation for ungulate habitat. Analysis of all mine and transmission line alternatives used information provided by the State (*e.g.,* winter range GIS layers). All alternatives would be neutral with regard to progress toward achieving this desired condition.

FW-DC-WL-19: The mine alternatives would be neutral to this desired condition or would contribute to early seral habitats in the long-term after reclamation and revegetation was completed. The transmission line alternatives would create openings and early seral habitats, which would contribute to progress toward this desired condition.

FW-GDL-WL-08 and FS-GDL-WL-09: All action alternatives would remove moose winter range habitat through construction of mine or transmission line facilities. All transmission line alternatives would avoid disturbance of moose winter range between December 1 and April 30 through timing restrictions. In all action mine alternatives, MMC would operate mine facilities and disturb moose winter range between December 1 and April 30. The Bear Creek Road that traverses through moose winter range would be opened year-round. The agencies' mine alternatives would minimize disturbance of moose winter range. All transmission line alternatives would be designed in accordance with guidelines (FW-GDL-WL-08 and 09) for big game winter range.

None of the mine alternatives would be designed in accordance with guidelines (FW-GDL-WL-08 and 09) for big game winter range. Section 2.12, *Forest Plan Amendment* describes the project-specific amendment to the 2015 KFP that the KNF would adopt in all mine alternatives. The amendment would allow all mine facilities to operate year-round in moose winter range and during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage for the life of the project. Design features cannot be applied to the project to achieve compliance with the guideline. The amendment would apply to National Forest System lands affected by the Montanore Project facilities, and would not apply to State or private lands. A significance determination of the amendments will be in the ROD and is available in the project record.

FW-GDL-WL-11: In the agencies' alternatives, impacts to moose birthing/parturition areas would be minimized through timing restrictions during the construction phase (blasting) when disturbance was most likely. The agencies' alternatives would be designed in accordance with this guideline.

2015 KFP Habitat Connectivity Direction

FW-DC-WL-17: The mine and transmission line alternatives would not create barriers to movement and would be neutral toward this desired condition.

FW-GDL-WL-12: Reconstruction of the Bear Creek Road, a high-use forest road, is not expected to create a connectivity or movement barrier. No crossing features would be warranted as mitigation. The agencies' mitigation, such a limiting vehicular traffic, and monitoring and removal of roadkill, is designed to minimize movement barriers. All action alternatives would be designed and implemented in accordance with this guideline.

FW-GDL-WL-13: There are no existing crossing features or any crossing features under development. All action alternatives would be designed and implemented in accordance with this guideline.

GA-DC-WL-FSH-01: No moose movement areas have been identified in the analysis area and connectivity would not be impacted. All action alternatives would be designed and implemented in accordance with this guideline.

GA-DC-WL-LIB-04: The alternatives are not expected to impact moose connectivity Cabinet Mountains and the Fisher River or north-south through the Cabinet Mountains. All alternatives would be neutral to progressing toward achieving this desired condition.

State Requirements

Alternatives 3 and 4 would comply with the MMRA regarding disturbed lands being reclaimed to a post-mining land use with stability and utility comparable to that of the pre-mining landscape. Draft findings regarding compliance with MFSA requirements are discussed in the Summary, beginning on p. S-53. Moose and other ungulate populations are managed by FWP. The Proposed Action would not prevent the state from continuing to manage these species as harvestable populations.

3.25.7.2 State Species of Concern

3.25.7.2.1 Analysis Area and Methods

FWP and MNHP define Montana Species of Concern as “native animals breeding in the state that are considered “at risk” due to declining population trends, threats to their habitats, and/or restricted distribution” (MNHP and FWP 2014). State species of concern potentially impacted by the Montanore Project were determined according to their geographic and elevational range and habitat, as described in FWP and MNHP’s Animal Field Guide (MNHP and FWP 2014). Impacts on state species of concern were evaluated based on effects on broad vegetation communities described in 3.22, *Vegetation*. For species that are associated with rock or scree fields, effects were evaluated based on impacts to non-vegetated habitat described in section 3.25.6, *Migratory Birds*. Potential impacts to state species of concern that are designated as Forest-Sensitive or listed as threatened or endangered species under the ESA are addressed in section 3.25.4 *Forest-Sensitive Species* and section 3.25.5, *Threatened and Endangered Species*. The northern goshawk was removed from the list of Forest Service sensitive species in 2007 (McAllister 2007), but is listed as a state species of concern. All bird species of concern potentially impacted by the Montanore Project, namely the brown creeper, Cassin’s finch, Clark’s nutcracker, great gray owl, Lewis’ woodpeckers, northern goshawk, Pacific wren (the western population of the winter wren, according to the American Ornithologist’s Union), and veery, are described in section 3.25.6, *Migratory Birds* and are not discussed further under state species of concern. This section addresses impacts on the remaining terrestrial state species of concern potentially occurring in the analysis area. Impacts on aquatic species of concern are addressed in section 3.6, *Aquatic Life and Fisheries*. Vertebrate state species of concern potentially impacted by the Montanore Project are shown in Table 254.

Table 254. State Species of Concern Potentially Impacted by the Montanore Project.

Common Name	Scientific Name	State Rank	Habitat	Habitat Used for Impacts Analysis
Mammals				
Fringed Myotis	*Myotis thysanodes*	S3	Riparian and dry mixed conifer forest. Roosts and nursery colonies include caves and mines.	Wetland/riparian and mature coniferous forest
Hoary Bat[1]	*Lasiurus cinereus*	S3	Coniferous and mixed forests, riparian corridors	Wetland/riparian and mature coniferous forest
Little Brown Myotis	*Myotis lucifugus*	S3	Found in a wide variety of habitats. Forages over water. Hibernacula include caves and mines.	Mature coniferous forest, previously harvested coniferous forest, and wetland/riparian habitat
Reptiles				
Western Skink	*Plestiodon skiltonianus*	S3	Open ponderosa pine woodland and open areas in or near talus	Previously harvested coniferous forest and rock or scree
Northern Alligator Lizard	*Elgaria coerulea*	S3	Talus slopes/rock outcrops	Rock or scree
Invertebrates				
Gillette's Checkerspot	*Euphydryas gillettii*	S2	Wet meadows and clearcut areas	Wetland/ riparian habitat and previously harvested coniferous forest
Magnum Mantleslug	*Magnipelta mycophaga*	S1S3	Moist coniferous forest	Mature coniferous forest
Pygmy Slug	*Kootenai burkei*	S1S2	Moist coniferous forest	Mature coniferous forest
Robust Lancetooth	*Haplotrema vancouvernese*	S1S2	Moist coniferous forest	Mature coniferous forest
Sheathed Slug	*Zacoleus idahoensis*	S2S3	Mesic/moist coniferous forest	Mature coniferous forest
Smoky Taildropper	*Prophysaon humile*	S1S3	Moist coniferous forest	Mature coniferous forest
A millipede	*Taiyutyla curvata*	S1S3	Moist mixed coniferous forest	Mature coniferous forest

Key to State ranking codes:
S1-At high risk because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making it highly vulnerable to extirpation in the state.
S2-At risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state.
S3-Potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.
[1]Summer resident only in Montana
State sensitive species based on MNHP and FWP (2014).

The analysis area for project impacts on individuals and their habitat in the KNF consists of the Crazy and Silverfish PSUs. To evaluate potential direct and indirect impacts of the transmission line on state species of concern, the analysis area includes all land within a corridor 1 mile on each side of the alternative transmission line alignments. The analysis area for cumulative effects is the Crazy and Silverfish PSUs and all land within a corridor 1 mile on each side of the alternative transmission line alignments.

3.25.7.2.2 Affected Environment

Detailed descriptions of physical characteristics, life history, habitat requirements, and distribution of state sensitive species are available in the project record. General vegetation types providing sensitive species habitat are described in section 3.22, *Vegetation* and shown on Figure 85.

3.25.7.2.3 Environmental Consequences

State sensitive species habitat potentially affected by the mine and transmission line alternatives is shown in Table 255 and Table 256 and described in the following subsections.

Alternative 1 – No Mine

Alternative 1 would have no direct impacts on state species of concern or their habitat. Over time, with continued fire suppression and lack of active forest management, indirect effects of this alternative would include a continued trend toward later successional habitats, which would favor species associated with mature forest habitats, such as fringed myotis, hoary bat, and little brown myotis, magnum mantleslug, pygmy slug, robust lancetooth, sheathed slug, smoky taildropper, and the millipede *Taiyutyla curvata*.

Alternative 2 – MMC's Proposed Mine

Species of concern most affected by Alternative 2 would be those associated with mature coniferous forest, followed by species associated with previously harvested coniferous forest (Table 255). Acquisition of 2,758 acres of private land associated with grizzly bear habitat mitigation would protect and improve bat habitat if it were present on the acquired parcels. Alternative 2 would not affect caves, mines, tunnels, or lakes in the analysis area.

About 40 acres of wetland and riparian areas providing potential habitat for species of concern would be affected by Alternative 2. Impacts of Alternative 2 on wetland and riparian habitat may be reduced through implementation of MMC's proposed Wetland Mitigation Plan. The feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC's plan is conceptual and would continue to be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. Section 3.23, *Wetlands and other Waters of the U.S.* discusses proposed wetland mitigation in more detail.

If state sensitive bats or lizards drank from mine, adit, or tailings water or foraged on insects with increased metal loading, they could risk ingesting toxins and heavy metals, which may result in reduced reproductive ability or increased mortality (O'Shea *et al.* 2000). The metals in the water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). Concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section).

Noise and other disturbances, such as blasting, construction of the plant and adit sites, road construction and use, and plant and adit operations may cause bats to avoid nearby habitat, at least temporarily. Disturbance impacts would likely be greatest during the Construction Phase, but may persist through mine operations.

Alternative 2 would affect more mature coniferous forest, previously harvested coniferous forest, and wetland and riparian areas than the other mine alternatives. At mine closure, disturbed habitat would be reclaimed, and habitat would return to pre-mine conditions in the long term. For forested habitat, this would take several decades. Vegetation types shown in Table 257 were not mapped for the entire analysis area. Old growth, described in section 3.22.2, *Old Growth Ecosystems*, was mapped for the analysis area and would include mature coniferous forest. Snag habitat described in section 3.25.2, *Key Habitats*, and various forest types described in section 3.25.6, *Migratory Birds*, were also mapped for the analysis area and would include both mature and previously harvested coniferous forest. As described in section 3.22.2, *Old Growth Ecosystems*, section 3.25.2, *Key Habitats*, and section 3.25.6, *Migratory Birds*, the Alternative 2 disturbance area is small relative to habitat available in the analysis area. Although Alternative 2 could affect individuals, given the availability of remaining habitat and Alternative 2 mitigation, it would not likely result in population declines for state species of concern.

Table 255. Potential Impacts on State Sensitive Species Habitat in the Analysis Area by Mine Alternative.

Habitat Type	[1] No Mine/ Existing Conditions	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment	[4] Agency Mitigated Little Cherry Creek Impoundment
Mature Coniferous Forest (acres)	0	1,617	865	1,143
Previously Harvested Coniferous Forest (acres)	0	925	683	740
Wetland/Riparian Habitat (acres)	0	40	17	41
Rock or scree	0	15	19	15
Total for all habitat types	0	2,597	1,584	1,939

Species associations are shown in Table 254.
Source: GIS analysis by ERO Resources Corp. using KNF data and vegetation mapping in Westech 2005d and MMI 2005b and KNF analysis of non-vegetated habitat.

Alternative 3 – Agency Mitigated Poorman Impoundment Alternative

In general, impacts on state species of concern from Alternative 3 would be similar to Alternative 2. State species of concern associated with mature coniferous and previously harvested coniferous forests would be least affected by Alternative 3 (Table 255). Alternative 3 would affect the least wetland and riparian habitat (about 17 acres).

Impacts on state species of concern would be minimized through implementation of mitigation measures. In Alternative 3, all wetlands affected would be replaced with wetlands with similar functions and values. MMC would leave snags within the Alternative 3 disturbance area, unless required to be removed for safety or operational reasons. This mitigation would be incorporated into the Vegetation Removal and Disposition Plan (section 2.5.3.3.1, *Vegetation Removal and Disposition*). The agencies' land acquisition requirement of 6,167 acres of private land (section 2.5.7.3.1, *Grizzly Bear*) would likely be more effective at improving habitat because more land would be protected. In comparison to Alternative 2, Alternative 3 would result in 1,013 acres less total habitat lost than Alternative 2 because the tailings impoundment would be smaller and the plant site would be located in the same drainage as the adits (Table 255). At mine closure, disturbed habitat would be reclaimed, and habitat would potentially be restored to pre-mine conditions in the long term. For mature coniferous forest, this would likely take centuries.

Bats would be at less risk of contaminant uptake from storage of mine, adit, and tailings water in Alternative 3. All mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. The LAD Areas would not be used and the surge ponds would not pose a risk to sensitive species. Tailings water quality would have lower metal concentrations than in Alternative 2; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in the *Water Quality* section, p.712. Alternative 3 could result in disturbance to state bat species of concern, due to noise and human presence associated with construction and operations. Disturbance effects may cause some species to move to less disturbed areas. Alternative 3 would not impact key roosting habitat or potential hibernacula such as caves or mines.

Although Alternative 3 could affect individuals, given the availability of remaining habitat and Alternative 3 mitigation, it would not likely result in population declines for state species of concern.

Alternative 4 – Agency Mitigated Little Cherry Creek Impoundment Alternative

Impacts to state species of concern from Alternative 4 would the same as Alternative 3 except that more mature coniferous forest, previously harvested coniferous forest, and riparian and wetland habitat would be lost (Table 255). In comparison to Alternative 2, total habitat losses resulting from Alternative 4 would be 658 acres less because the plant site would be located in the same drainage as the adits. Although Alternative 4 could affect individuals, given the availability of remaining habitat and Alternative 4 mitigation, it would not likely result in population declines for state species of concern.

Alternative A – No Transmission Line

Alternative A would not affect state species of concern habitat.

Table 256. Potential Impacts on State Sensitive Species Habitat in the Analysis Area by Transmission Line Alternative.

Habitat Type	[A] No Trans-mission Line	[B] North Miller Creek	[C-R] Modified North Miller Creek	[D-R] Miller Creek	[E-R] West Fisher Creek
Mature Coniferous Forest (acres)	0	136	166	182	93
Previously Harvested Coniferous Forest (acres)	0	133	136	131	235
Wetland/Riparian Habitat (acres)	0	28	15	18	35
Rock or scree	0	0	0	0	0
Total of all habitat types	0	297	317	331	363

Impacts based on a 150-foot clearing width for monopoles (Alternative B) and 200-foot width for H-frame structures (other alternatives except for a short segment of the West Fisher Creek Alternative that has monopoles). Actual acreage cleared would be less than listed and would depend on tree height, slope, and line clearance above the ground.
Species associations are shown in Table 254.
Source: GIS analysis by ERO Resources Corp. using KNF data and vegetation mapping in Westech 2005d and MMI 2005b and KNF analysis of non-vegetated habitat.

Alternative B – MMC's Proposed Transmission Line (North Miller Creek Alternative)

Overall, Alternative B would affect the least amount of potential species of concern habitat compared to the other transmission line alternatives, due to a narrower clearing width (Table 256). Alternative B would affect about the same amount of mature coniferous forest and previously harvested coniferous forest habitat. The clearing area for Alternative B would include 28 acres of wetland and riparian habitat. Direct effects to wetlands would be mostly avoided by placement and location of transmission line facilities and roads outside of wetlands and waters of the U.S. No rock or scree habitat would be affected by Alternative B. Acquisition of 2,758 acres of private land associated with grizzly bear habitat mitigation would protect and improve bat habitat if it were present on the acquired parcels.

Noise from helicopters during line stringing and from other construction-related activities may cause state sensitive species, especially bats, to avoid nearby habitat, at least temporarily. Disturbance impacts would be short-term and, with the exception of line maintenance activities, would cease after transmission line construction. None of the transmission line alternatives would affect key roosting habitat or hibernacula such as caves or mines in the analysis area.

As described in section 3.22.2, *Old Growth Ecosystems*, section 3.25.2, *Key Habitats*, and section 3.25.6, *Migratory Birds*, the Alternative B clearing area is small relative to habitat available in the analysis area. Although Alternative B could affect individuals, given the availability of remaining habitat, it would not likely result in population declines for state species of concern.

Alternative C-R – Modified North Miller Creek Transmission Line Alternative

Alternative C-R would impact slightly more mature coniferous forest and slightly less previously harvested forest habitat than Alternative B (Table 256). The clearing area for Alternative C-R would include 15 acres of wetland and riparian habitat. Direct effects to wetlands would be mostly avoided by placement and location of transmission line facilities and roads outside of wetlands and waters of the U.S. No rock or scree habitat would be affected by Alternative C-R. Disturbance impacts on state species of concern from Alternative C-R would be similar to Alternative B.

MMC would leave snags within the Alternative C-R clearing area, unless required to be removed for safety or operational reasons. This mitigation would be incorporated into the Vegetation Removal and Disposition Plan (section 2.5.3.3.1, *Vegetation Removal and Disposition*). The agencies' land acquisition requirement of 6,167 acres of private land (section 2.5.7.3.1, *Grizzly Bear*) would likely be more effective at improving habitat because more land would be protected.

As described in section 3.22.2, *Old Growth Ecosystems*, section 3.25.2, *Key Habitats*, and section 3.25.6, *Migratory Birds*, the Alternative C-R clearing area is small relative to habitat available in the analysis area. Although Alternative C-R could affect individuals, given the availability of remaining habitat, it would not likely result in population declines for state species of concern.

Alternative D-R – Miller Creek Transmission Line Alternative

Impacts of Alternative D-R on state species of concern would be the same as Alternative C-R, except that more mature coniferous forest and less previously harvested coniferous forest would be affected (Table 256).

Alternative E-R – West Fisher Creek Transmission Line Alternative

Because Alternative E-R is the longest, overall it would have the greatest impacts on potential species of concern habitat of all the transmission line alternatives (Table 256). Impacts from Alternative E-R would be the greatest for previously harvested coniferous forest, affecting 235 acres. Other impacts on state species of concern from Alternative E-R would be the same as Alternative C-R.

Combined Mine-Transmission Line Effects

Impacts on state species of concern are shown in Table 257 and discussed in the following paragraphs.

Alternative 2B would impact the most state sensitive species habitat because the tailings impoundment would be larger than in other alternatives, it would include LAD areas, and the plant site would be located in a separate drainage as the adits. Alternative 2B would impact the most mature coniferous forest (1,746 acres), while Alternative 3E-R would impact the least (960 acres). Previously harvested coniferous forest would also be most affected by Alternative 2B (1,062 acres). In all combined mine-transmission line alternatives, disturbed habitat would be reclaimed at mine closure, and habitat would potentially be restored to pre-mine conditions in the long term. For mature coniferous forest, this would likely take centuries.

In all combined mine-transmission line action alternatives, direct effects to wetlands from the transmission line would be mostly avoided by placement and location of transmission line facilities and roads outside of wetlands and waters of the U.S., and all wetlands affected by the mine would be replaced with wetlands. In Alternative 2B, the feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC's plan is conceptual and would continue to be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. In the agencies' combined mine-transmission line

Table 257. Potential Impacts on State Sensitive Species Habitat in the Analysis Area by Combined Mine-Transmission Line Alternative.

Habitat Type	[2] MMC's Proposed Mine	[3] Agency Mitigated Poorman Impoundment Alternative			[4] Agency Mitigated Little Cherry Creek Impoundment Alternative		
	TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Mature Coniferous Forest (acres)	1,746	1,033	1,050	960	1,311	1,328	1,238
Previously Harvested Coniferous Forest (acres)	1,062	816	811	916	873	873	973
Wetland/Riparian Habitat (acres)	69	32	35	52	56	58	75
Rock or scree	15	19	19	19	15	15	15
Total	2,892	1,900	1,915	1,947	2,255	2,274	2,301

Impacts based on a 150-foot clearing width for monopoles (Alternative B) and 200-foot width for H-frame structures (other alternatives except for a short segment of the West Fisher Creek Alternative that has monopoles). Actual acreage cleared would be less than listed and would depend on tree height, slope, and line clearance above the ground.
Species associations are shown in Table 254.
Source: GIS analysis by ERO Resources Corp. using KNF data and vegetation mapping in Westech 2005d and MMI 2005b and KNF analysis of non-vegetated habitat.

alternatives all wetlands affected would be replaced with wetlands with similar functions and values. Section 3.23, *Wetlands and other Waters of the U.S.* discusses proposed wetland mitigation in more detail.

In the Agencies' combined mine-transmission line alternatives, MMC would leave snags within the Alternative C-R clearing area, unless required to be removed for safety or operational reasons. This mitigation would be incorporated into the Vegetation Removal and Disposition Plan (section 2.5.3.3.1, *Vegetation Removal and Disposition*).

In Alternative 2B, acquisition of 2,758 acres of private land associated with grizzly bear habitat mitigation would protect and improve bat habitat if it were present on the acquired parcels. The agencies' land acquisition requirement of 6,167 acres of private land (section 2.5.7.3.1, *Grizzly Bear*) would likely be more effective at improving habitat because more land would be protected.

All combined action alternatives could result in disturbance to some state species of concern, in particular the bat species, due to noise and human presence associated with construction and operations. Disturbance effects could cause some species to move to less disturbed areas. None of the combined mine-transmission line alternatives would affect key roosting habitat or potential hibernacula such as caves or mines in the analysis area.

If state sensitive bats or lizards drank from mine, adit, or tailings water or foraged on insects with increased metal loading, they could risk ingesting toxins and heavy metals, which may result in reduced reproductive ability or increased mortality (O'Shea *et al.* 2000). In Alternative 2B, the metals in the water would be similar to what is found at the Troy Mine decant ponds (see Table 122 in the *Water Quality* section), where adverse effects on wildlife have not been observed (USDA Forest Service and DEQ 2012). In Alternative 2B, concentrations of metals in mine and adit water, which would be stored in mine/yard pond at the Ramsey Plant Site and in a surge pond at the LAD Areas, would be lower than tailings water (see Table 122 in the *Water Quality* section). Bats would be at less risk of contaminant uptake from storage of mine, adit, and tailings water in the agencies' combined mine-transmission line alternatives because all mine and adit water would be treated and discharged at the Libby Adit Water Treatment Plant and not stored in ponds. Also, the LAD Areas would not be used in the agencies' combined mine-transmission line alternatives and the surge ponds would not pose a risk to bats. Tailings water quality in the agencies' combined mine-transmission line alternatives would have lower metal concentrations than in Alternative 2B; the factors leading to lower metal concentrations in tailings water quality in Alternatives 3 and 4 are discussed in the *Water Quality* section, p. 712.

Vegetation types shown in Table 257 were not mapped for the entire analysis area. Old growth, described in section 3.22.2, *Old Growth Ecosystems*, was mapped for the analysis area and would include mature coniferous forest. Snag habitat described in section 3.25.2, *Key Habitats*, and various forest types described in section 3.25.6, *Migratory Birds*, were also mapped for the analysis area and would include both mature and previously harvested coniferous forest. As described in section 3.22.2, *Old Growth Ecosystems*, section 3.25.2, *Key Habitats*, and section 3.25.6, *Migratory Birds*, the combined mine-transmission line alternative disturbance areas are small relative to habitat available in the analysis area. Although all the combined mine-transmission line alternatives could affect individuals, given the availability of remaining habitat and both MMC and the agencies' mitigation, they would not likely result in population declines for state species of concern.

3.25.7.2.4 Cumulative Effects

Past Actions and the Existing Condition

Past actions are described in section 3.2, *Past and Current Actions*, shown on Figure 50, and listed in Appendix E.

Past actions, particularly timber harvest, road construction, and fire-suppression activities, have altered the old growth ecosystems in the analysis area, resulting in a reduction in early and late succession habitats; conditions favoring shade-tolerant, fire-intolerant species; loss of large snags and down wood; and increases in tree density and a shift to a largely mid-seral structural stage (USDA Forest Service 2003b). Past forest management has also improved forest habitat. Logging and prescribed burning have worked successfully to cycle forest cover through the many periods of succession. Harvest has occurred in the project area since the 1950s and resulted in a diversity of age classes and successional stages. In unharvested areas, natural disturbances such as wildfire would have resulted in a mosaic of vegetation successional stages providing a diversity of forage or cover habitat. Fire suppression since the early 1900s in some areas has allowed relatively uninterrupted succession to occur resulting in more homogenous stands with greater canopy closure.

Areas previously impacted by special use permits such as mineral material sites (pits quarries, borrow, roadsides), water developments, utility corridors, private land access routes, and outfitter/guide trails/camps, would continue to be present and used. Effects of these activities on habitat supporting state species of concern are included in the affected environment and would have no additional impacts. Other public uses such as wildlife viewing, berry picking, firewood gathering, camping, snowmobiling, etc. have negligible impacts on state species of concern given their limited scope (time and space). Infra-structure, such as roads and campgrounds, that facilitate these activities have already been accounted in the description of the affected environment.

Effects of Current and Reasonably Foreseeable Actions

Reasonably foreseeable actions are described in section 3.3, *Reasonably Foreseeable Future Action*. Current actions are described in section 3.2, *Past and Current Actions* and shown on Figure 50.

The Miller-West Fisher Vegetation Management Project will occur entirely in the Silverfish PSU and will include intermediate harvest of approximately 1,206 acres, regeneration harvest of about 692 acres, precommercial thinning of 351 acres, and prescribed burning of 2,830 acres of National Forest System lands in the Silverfish PSU. Timber harvest and other clearing activities planned for the Miller-West Fisher Vegetation Management Project will contribute to cumulative losses of coniferous forest habitat and snags and down wood. Prescribed burns associated with the Miller-West Fisher Vegetation Management Project will create habitat for the western skink and Gillette's checkerspot found in open habitats. Surface disturbance from other reasonably foreseeable actions in the analysis area will be minimal.

Continuing development of private lands, including timber harvest, home construction, and land clearing would contribute to losses of habitat, especially forest habitat, supporting state species of concern in the analysis area. Potential effects depend on the magnitude, type, and location of developments and include the loss of habitat and localized disturbance. Private lands occupy 12 percent of the Silverfish PSU and are intermixed with public and corporate/state land. Most recommended guidelines (with the exception of FW-GDL-WL-09) are met on National Forest System lands within the Silverfish PSU (see section 3.25.3.2.7), and development of private lands would be expected to have minor cumulative impacts on state species of concern.

No Action Alternative

The Montanore Project No Action alternatives (Alternative 1 and Alternative A) would not contribute to cumulative impacts on state species of concern.

Combined Mine-Transmission Line Action Alternatives

All combined mine-transmission line action alternatives, in combination with the Wayup Mine/Fourth of July Road Access Project, Plum Creek activities, the Miller-West Fisher Vegetation Management Project, and other reasonably foreseeable actions, would result in cumulative losses of habitat, especially forest habitat, supporting state species of concern in the analysis area. The combined action alternatives, in combination with other reasonably foreseeable actions could result in cumulative noise and other human-caused disturbance to state species of concern, particularly the bats and lizards, causing them to move to less disturbed areas. Cumulative disturbance to vertebrate state species of concern on private lands are expected to be minimal because species occurring on private land may be habituated to higher levels of disturbance than on National Forest System lands.

3.25.7.2.5 Regulatory/Forest Plan Consistency

The action alternatives could impact individuals and/or their habitat, but would not likely contribute to a trend toward federal listing for state species of concern. Mature coniferous forest, previously harvested coniferous forest, wetland and riparian habitat, and rock and scree habitat potentially supporting state species of concern would be disturbed, but a small proportion of available habitat would be impacted. As described in section 3.22.2, *Old Growth Ecosystems*, section 3.25.2, *Key Habitats*, and section 3.25.6, *Migratory Birds*, sufficient habitat within the in the analysis area would remain to support existing populations of state species of concern.

3.25.8 Other Required Disclosures

3.25.8.1 Unavoidable Adverse Environmental Effects

In the preceding wildlife analysis subsections, the direct, indirect, and cumulative environmental effects of the alternatives are discussed in detail. Impacts that cannot be avoided are summarized below. Depending upon the action alternative and species affected, the severity of the effects would be minimized by adhering to the required mitigation, including mitigation measures for vegetation removal, compensatory wetland mitigation, road access changes, and habitat acquisition. Other features of the alternatives, such as adhering to BMPs and other KFP standards and guidelines also would minimize effects. If the project was implemented, some effects cannot be avoided. The preceding wildlife subsections provide a detailed analysis of effects and description of these impacts. For the wildlife subsections, short-term effects were considered to be 2 to 5 years, while long-term effects would last for the life of the mine (30 years) or longer.

The action alternatives would impact a range of wildlife habitat throughout the analysis area during both construction and operations. The wildlife resources would be impacted by direct surface disturbance, noise, vibration, light, dust, increased human activity, and increased traffic. Unavoidable adverse impacts on wildlife habitat would vary by the acres of habitat removed or affected by each action alternative. Activities would include construction of mine facilities and associated roads, the transmission line and associated new roads, and Sedlak Park Substation and loop line. Adverse impacts that cannot be avoided include changes in available habitat within an individual animal’s home range, physical removal of habitat such as wetlands or winter range habitat resulting in permanent displacement, changes in cover, changes in foraging efficiency and success, changes in reproductive success, changes in survival or growth rates of young, changes in predator-prey relationships, increased habitat fragmentation and disruption of dispersal and movement patterns for species. Some long-term unavoidable adverse effects on wildlife populations would potentially occur as a result of mortalities during construction and operation activities. Areas successfully reclaimed would provide wildlife habitat post-mining over time.

3.25.8.2 Short-term Uses and the Long-term Productivity

The intensity and duration of the effects described for the wildlife resource would vary by alternative. Refer to the wildlife subsections for detailed analysis of effects and description of these short- and long-term impacts. Impacts to wildlife and wildlife habitat would include removal of habitat for mine and facility construction, disturbance from mining and associated activities, and direct mortality from increased mine related traffic. Most impacts to wildlife resources would initially result from construction activities, including losses of cover and increases in disturbance and displacement. Physical removal and losses of habitat, including winter range or calving habitat for big game, wetlands, or snags and downed wood due to mine associated activities would be long-term, lasting until reclamation or beyond. Mine associated disturbance resulting in long-term displacement (lasting the life of the mine, or longer) of a species from the area may result in a post-reclamation delay in the reestablishment of use. Other disturbances associated with human activity may be short term and temporary in duration, such as displacement from helicopter use associated with the transmission lines, or blasting associated with the underground development.

Disturbance and any direct mortality would cease when mine closure occurred and reclamation would eventually allow wildlife habitat to re-establish through vegetation succession. However, this could take decades or longer, and considering cumulative impacts of climate change and human population increase, it is not certain that current habitat conditions on the affected lands would be re-established. Depending upon the alternative, incorporated mitigation would reduce the total amount of roads in the analysis area over time, providing for long-term benefits for many species.

3.25.8.3 Irreversible or Irretrievable Commitments

Specific impacts of the proposed alternatives are described in the various preceding wildlife subsections. Habitat for some species, such as snags and downed wood, would be lost at project facility locations and not re-established until forest communities re-established and matured, a process that could require more than 100 years following disturbance for those species. This also includes old growth, which provides habitat components used by certain species, including pileated woodpecker.

Protected and general wildlife species within the analysis area may be subject to irretrievable commitment of resources with regard to the following types of disturbance associated with the action alternatives: disquieting and excessive noise, increased human disturbance, physical habitat loss to habitat such as winter range or calving habitat used by big game such as moose, wetlands, riparian, old growth, general forest, disruption of movement patterns, habitat fragmentation, and increased roads and vehicle traffic, for the life of the action alternatives. Recovery of habitat loss would not occur after mine closure and reclamation, whereas recovery of other habitat features affected by the transmission line could occur after construction. The disturbance associated with the action alternatives can cause species to avoid nearby habitat, resulting in both short term and long-term displacement effects. For example, some cavity-nesting species could avoid nearby habitat, or species sensitive to human disturbance such as mountain goats may be displaced for the duration of the disturbance.

Areas successfully reclaimed would provide wildlife habitat post-mining over time, but success may vary between alternatives.

3.26 Other Required Disclosures

3.26.1 Environmental Justice

Executive Order 12898, Environmental Justice requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations when implementing their respective programs, including American Indian programs. The lead agencies' analysis of Environmental Justice follows the Council on Environmental Quality's guidance on Environmental Justice, (Council on Environmental Quality 1997), the EPA's guidance on Environmental Justice (EPA 1998, 1999) and the U.S. Department of Agriculture's regulation on Environmental Justice (USDA 1997b). These documents suggest a step-wise evaluation of Environmental Justice: identification of minority and low-income populations; assessment of effects and determination if the effects would be disproportionately high and adverse, and mitigation. The U.S. Department of Agriculture's regulation indicates an effect on a minority or a low-income population is disproportionately high and adverse if the adverse effect is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

Minority or low-income populations would not be disproportionately affected by the Montanore Project. American Indians are a minority population, and although the proposed mine is not located within or adjacent to any tribal reservations, it is located within the boundaries of land covered by the Hell Gate Treaty (see section 3.5, *American Indian*). All action alternatives would restrict access to mine facility sites to all members of the public, including tribal members. Proposed mitigations in all action alternatives would reduce the effects of access restrictions. The access restrictions would not be disproportionately high and adverse on any minority and low-income population.

3.26.2 Important Farmland

The Farmland Protection Policy Act and USDA Departmental Regulation No. 9500-3 provide protection for important farmland. The USDA regulation, 7 CFR 658, implements the Farmland Protection Policy Act. None of the alternatives analyzed in detail would affect any important farmland.

3.26.3 Energy Requirements and Conservation Potential

Alternatives requiring the most construction would have the least potential for conserving energy. The maximum annual energy consumed by all alternatives is estimated at 406,000 megawatts, using a peak demand of 50 megawatts. The amount of energy required to implement any of the action alternatives, in terms of petroleum products, would be insignificant when viewed in light of the production costs and effects of the national and worldwide petroleum reserves.

3.26.4 Urban Quality and the Design of the Built Environment

Implementation of any of the action alternatives would not affect urban quality. No buildings or other forms of man-made structures would be affected by any of the alternatives.

3.26.5 Intentional Destructive Acts

Intentional destructive acts, that is, acts of sabotage, terrorism, vandalism, and theft, sometimes occur at power facilities, including transmission lines and substations. Vandalism and thefts are most common, especially theft of metal and other materials that can be sold. BPA has seen a significant increase in metal theft from its facilities over the past few years. Thefts increase when the price of metal is high on the salvage market. In the last 10 years, BPA has experienced over 200 thefts or burglaries. BPA estimates that the average monetary damage for each crime is $150,000, but the actual amount is likely much higher since this number does not factor in all the labor-related costs associated with repairing the damage.

The impacts to the transmission system from vandalism and theft, though expensive, have not generally caused service disruptions to BPA's service area. Stealing equipment from electrical substations, however, can be extremely dangerous. Nationwide, many thieves have been electrocuted while attempting to steal equipment from energized facilities. Recent examples include the July 2011 electrocution death of a man attempting to steal copper from a Duke Energy substation in South Carolina, the August 2011 electrocution death of a man attempting to steal copper from an Entergy substation in Louisiana, the August 2011 severe burning of a woman attempting to steal copper from a Puget Sound Energy substation in Washington, the October 2011 electrocution death of a man attempting to steal copper from a Duke Energy substation in North Carolina, and the December 2011 electrocution death of a man attempting to steal copper from a Memphis Light Gas & Water substation in Tennessee.

Federal and other utilities use physical deterrents such as fencing, cameras, warning signs, rewards, etc., to help deter theft, vandalism, and unauthorized access to facilities. BPA also is in the process of replacing much of its solid copper wire with copper-coated steel wire, posting signage that indicates a trade has been made, and installing surveillance cameras to deter future break-ins. Transmission towers and overhead transmission conductors, however, are mostly on unfenced utility rights-of-way. Although towers are constructed on footings in the ground and are difficult to dislodge, they remain vulnerable to potential vandalism. In an effort to help prevent intentional destructive acts, BPA established a Crime Witness Program that offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at 1-800-437-2744. The hotline is confidential, and rewards are issued in such a way that the caller remains anonymous.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. In the past, these acts generally focused on attempts to destroy large steel transmission line towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon, was toppled. In June 2011, at BPA's Alvey Substation near Eugene, Oregon, almost $1 million in damages was incurred when unknown individuals were able to breach a security fence and damage equipment in the substation yard during an attempt to disrupt transmission service.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and other end-users. The effects of these acts would be as varied as those from the occasional sudden storm, accident or blackout, and would depend on the particular configuration of the transmission system in the area. For example, when a storm affects transmission lines, residential customers can lose power for heating, cooking, refrigeration, lighting, etc. and can experience impacts related to those functions unless they have backup generators. Similarly, commercial, industrial and municipal customers can experience impacts when infrastructure such as machinery, traffic signals, light rail, or elevators stops functioning.

In some situations intentional destructive acts would have no noticeable effect on electrical service as power can be rerouted around an area because of redundancies built into the transmission system. In other situations, service could be disrupted in the local area, or, if an intentional destructive act caused damage to a major piece of transmission system equipment or a large part of the transmission system, a much greater area could be left without power. During scoping, the agencies received comments about the increased risk of terrorism to the transmission system and to nearby landowners if a new line and substation was built next to an existing line or lines. The agencies also received comments about the increased risk to landowners if a new line is built on new right-of-way in areas where no lines exist now.

It is difficult to predict the likelihood of, and increased risk for, terrorist or sabotage acts from building the project near, next to, or far from existing transmission system facilities. New transmission towers, overhead conductor, and new substation facilities would increase the risk incrementally on BPA's 15,000 circuit-mile transmission system. Placing a new line next to an existing line may increase the risk more than building the line far from existing facilities. However, given the extensive security measures that BPA, public and private utilities, energy resource developers, and federal agencies such as the U.S. Department of Homeland Security have and are continuing to implement to help prevent such acts and protect their facilities, along with the inherent difficulty in significantly affecting such large and well-constructed facilities as transmission towers and substation sites, it is considered extremely remote and unlikely that a significant terrorist or sabotage act would occur. Accordingly, the incremental increase in risk to landowners from the presence of the proposed transmission line and substation would be minimal. If such acts did occur, the problem area would be isolated quickly and electricity rerouted as much as possible to keep the system functioning. In addition, it is expected that federal, state, and local agencies would respond quickly if any such act posing any human or natural resource risks occurs.

3.26.6 Evaluation of Restrictions on Private Property

The MEPA requires state agencies to evaluate, in their MEPA documents, any regulatory restrictions proposed to be imposed on private property rights (75-1-201(1)(b)(iv)(D), MCA). MMC's use of its private property is subject to this requirement. MMC's private properties evaluated in this analysis are at the Libby Adit Site and the Little Cherry Creek Impoundment Site.

The Proposed Action evaluated in this EIS would allow MMC to mine on lands owned privately by MMC as well as on public lands owned by the United States. Federal and state laws that would regulate MMC's activities associated with the Montanore Project are described in section 1.6, *Agency Roles, Responsibilities, and Decisions.* The No Action Alternative would not allow MMC to mine. The agencies' action alternatives would allow mining with numerous modifications and mitigations that have been developed as part of this EIS. These alternatives would alter and restrict the way mining and reclamation would be conducted on private and public lands at the proposed mine site to protect environmental, cultural, and social resources.

Alternatives comprised of modifications and mitigation measures designed to make the project meet minimum environmental standards specifically required by federal or state laws and regulations are not required to be evaluated if the agencies are required to impose them in a certain manner. Those alternatives and mitigations are considered to be nondiscretionary. If the agencies are not required to impose them or have discretion as to the manner in which the purpose of the modifications and mitigations are to be achieved, then the modifications or mitigations are considered discretionary and must be analyzed for regulatory restrictions. Components of the alternatives that are taken from permits, such as the MPDES permit, are not considered discretionary. Once a permit is approved, the various components (modifications and mitigations) comprising the permit conditions then become mandatory for compliance purposes under both state and federal regulations. No such restrictions are placed on federal agencies. The agencies developed the cost estimates in Table 258 in cooperation with MMC.

Analyzed in this section are the costs of various components or mitigations measures that would be increased costs from MMC's proposal (Alternatives 2 and B). The action alternatives evaluated with their modifications and mitigation measures would not prohibit development of the proposed project, but could require MMC to spend additional funds. The higher the costs associated with regulatory compliance, the less the economic benefit gained from the use of the property, and the more restrictive the regulatory action is to the use of private property.

The agencies have determined that each of the modifications and mitigations would be the least restrictive means of accomplishing the purpose of the modifications and mitigations. Due to changes in state law in 2001, the state may no longer condition a permit based on alternatives developed through the MEPA/NEPA impact analysis process unless they also are required under state laws. The modifications and mitigations allowed by state law will be specified in the state's ROD should DEQ decide to approve revisions to the already approved operating permit and issue a transmission line certificate under the Major Facility Siting Act; generally excluded are those mitigating impacts on wildlife, aesthetics (visual and sound), fisheries, and threatened and endangered species.

The No Action Alternative would prohibit development of the proposed Montanore Mine. The benefits of this alternative would be the elimination of predicted impacts caused by implementation of mine development and construction. The costs include a possible decrease in MMC's property value, a potential decrease in the value of the company's stock, and a loss of potential economic benefits. This alternative would restrict MMC's private property rights. The agencies identified a number of modifications and mitigations that would eliminate or reduce impacts in a less restrictive manner. These modifications and mitigations are analyzed in Table 258. The costs cited are those that are necessary to comply with discretionary restrictions over and above the costs of the Proposed Action.

None of the transmission line alternatives would affect MMC's private land and are therefore not included in this analysis.

Table 258. Estimated Costs of Discretionary Restrictions.

Project Facility or Mitigation	Alternative 2 MMC's Proposed Mine	Alternative 3 Agency Mitigated Poorman Impoundment Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment	Estimated Costs Associated with Implementation
Above-ground conveyor	1,200 feet long between Ramsey Adit portal and mill	6,000 and 7,500 feet long (depending on the option) between Libby Adit Site and Libby Plant Site mill; 1,400 feet on MMC's private land.	Same as Alternative 3	1,400 feet on MMC property * $702/ft (Mine and Quarry Engineering Services, Inc. 2011, Table 18-5) = $983,000
New adits: length, grade, and portal elevation	Ramsey Adits: 16,000 feet long, 8% decline; Elevation: 4,400 feet Rock Lake Ventilation Adit: Elevation: 5,560 feet	Upper Libby Adit: 13,700 feet long, 7% decline; Elevation: 4,100 feet New Libby Adit: 17,000 to 18,500 feet long, depending on option; 5% decline; Elevation: 3,960 feet Rock Lake Ventilation Adit	Same as Alternative 3	Libby conveyor adit portal on MMC property 17,207 feet (Mine and Quarry Engineering Services, Inc. 2011, Table 18-5) – 16,000 feet = 1,207 feet * $702/ft (Mine and Quarry Engineering Services, Inc. 2011, Table 18-5) = $847,314
Scenery	Not specified	Develop final regrading plans for each facility to reduce visual impacts of reclaimed mine facilities	Same as Alternative 3	Total cost = $12,000 Alt. 3: 1% of disturbed area is MMC land = $120 Alt. 4: 14% of disturbed area is MMC land = $1,680
Sound	Not specified	Adjust intake and exhaust ventilation fans in the Libby Adits so that they generate sounds less than 85 dBA measured 50 feet downwind of the portal	Same as Alternative 3	Total cost = $130,000 One portal is on MMC land = $65,000

Project Facility or Mitigation	Alternative 2 MMC's Proposed Mine	Alternative 3 Agency Mitigated Poorman Impoundment Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment	Estimated Costs Associated with Implementation
Vegetation Removal and Disposition	As proposed in Plan of Operations	Prepare a Vegetation Removal and Disposition Plan for lead agencies' approval	Same as Alternative 3	Total cost = $6,000 Alt. 3: 1% of disturbed area is MMC land = $60 Alt. 4: 14% of disturbed area is MMC land = $840
Revegetation Seed Mixtures	Native and introduced species	Native species only, to the extent they were commercially available	Same as Alternative 3	Total cost = $333,450 Alt. 3: 1% of disturbed area is MMC land = $3,335 Alt. 4: 14% of disturbed area is MMC land = $46,683
Tree and Shrub Density After 15 Years	283 trees/acre (assumes a 65 percent survival rate of 435 trees/acre planted) Unspecified (200 shrubs/acre planted)	400 trees/acre 200 shrubs/acre	Same as Alternative 3	Total cost = $712,500 Alt. 3: 1% of disturbed area is MMC land = $71,250 Alt. 4: 14% of disturbed area is MMC land = $99,750
Wildlife Forest Sensitive Birds and State Bird Species of Concern	Not specified	Complete surveys to locate active nests in appropriate habitat and avoid during nesting, or not remove vegetation in the nesting season	Same as Alternative 3	Total cost = $12,750 Alt. 3: 1% of disturbed area is MMC land = $128 Alt. 4: 14% of disturbed area is MMC land = $1,785

Chapter 4. Consultation and Coordination

4.1 Preparers and Contributors

4.1.1 Forest Service

Name	Responsibilities	Education	Experience
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Name/Firm	Responsibilities	Education	Experience
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Mangle, Bill ERO Resources Corp.	Land Use, Recreation, Wilderness, and Inventoried Roadless Areas (2007 to present)	M.S., Natural Resource Policy and Planning B.S., History/Political Science	17
Olmsted, Brian ERO Resources Corp.	Hydrology/ Geochemistry	M.S., Geochemistry B.S., Geology	12
Poulter, Don Glasgow Engineering Group, Inc.	Geotechnical (2005-2013)	M.S.C.E., Geotechnical Engineering B.S., Civil Engineering	34
Rouse, Leigh ERO Resources Corp.	Wetlands and Vegetation (2009 to present)	M.S., Botany B.A., Biology	18

Name/Firm	Responsibilities	Education	Experience
Sheppard, Asher Asher Sheppard Consulting	Electric and Magnetic Fields	Ph.D., Physics M.S., Physics B.A., Science	35
Smith, Garth ERO Resources Corp.	Geographic Information Systems	M.A., Geography B.S., Geography	19
Stanwood, Mike ERO Resources Corp.	Socioeconomics	M.S., Mineral Economics B.A., Psychology	33
Trenholme, Richard ERO Resources Corp.	Project Management	B.S., Agronomy	35
Trujillo, Cindy ERO Resources Corp.	Wetlands and Vegetation (2005-2008)	B.S., Biology	13
Vandergrift, Tom Agapito and Associates, Inc.	Mine Engineering	M.S., Mining Engineering B.S., Mining Engineering	25
Wall, Kay ERO Resources Corp.	Technical Editor (2009 to present)	B.A., Behavioral Science	34
Worah, Moneka	Project Assistant (2011 to present)	B.A., Environmental Science	9

The Forest Service and DEQ consulted the following individuals, federal, state, and local agencies and agency personnel during the development of this EIS.

4.1.4 Other Federal, Tribal, State, and Local Agencies

Name/Agency or Tribe	Responsibilities
Diaz, Angelique Environmental Protection Agency	NEPA (2015 to present)
Brown, Jerry Montana Fish, Wildlife, and Parks	Wildlife
Clark, Dick Environmental Protection Agency	Wetlands and 404 Permit
Conard, Ben U.S. Fish and Wildlife Service	Wildlife and Threatened & Endangered Species
Hafferman, Kurt Montana Department of Natural Resources and Conservation	Water Rights
Hanley, Jim Environmental Protection Agency	Mine Engineering
Kasworm, Wayne U.S. Fish and Wildlife Service	Wildlife and Threatened & Endangered Species
Konzen, John Lincoln County Commissioner	Document Review
LaForest, Joe Montana Department of Commerce, Hard Rock Mining Impact Board	Hard Rock Impact Plan Socioeconomics
Laidlaw, Tina Environmental Protection Agency	Water Quality
Lynard, Gene Bonneville Power Administration	Sedlak Park Substation and Loop Line
Pierce, Maggie Environmental Protection Agency	NEPA (2011 to 2015)
Peter, Chandler U.S. Army Corps of Engineers	Wetlands and 404 Permit (2005-2009)

Name/Agency or Tribe	Responsibilities
Pierce, Kathy Bonneville Power Administration	Sedlak Park Substation and Loop Line (2014)
Pittman, Marc Montana Department of Natural Resources and Conservation	Water Rights
Potts, Steve Environmental Protection Agency	NEPA (2009 to 2013)
Riley, Jean Montana Department of Transportation	State Highways
Roose, Marianne Lincoln County Commissioner	Document Review
Russell, Carol Environmental Protection Agency	Water Quality
Sandman, Robert Department of Natural Resources and Conservation	Trust Lands
Schroeder, Christina Army Corps of Engineers	Wetlands and 404 Permit (2009 to present)
Steg, Ron Environmental Protection Agency	Water Quality
Strobel, Phil Environmental Protection Agency	NEPA (2015 to present)
Steinle, Allan U.S. Army Corps of Engineers	Wetlands
Svoboda, Larry Environmental Protection Agency	NEPA (2009 to 2012)
Tillinger, Todd Army Corps of Engineers	Wetlands and 404 Permit
Williams, Jim Montana Fish, Wildlife, and Parks	Wildlife
Wilson, Mark USDI Fish and Wildlife Service	Wildlife and Threatened & Endangered Species
Windom, Rita Lincoln County Commissioner	Document Review
Winters, Jim Army Corps of Engineers	Wetlands and 404 Permit (2009 to 2012)
Wireman, Mike Environmental Protection Agency	Hydrology (2009 to 2013)

4.2 List of Agencies, Organizations, and Persons to Whom Copies of the Final EIS Have Been Distributed

This EIS or its Summary has been distributed to individuals who specifically requested a copy of the document either in hard or electronic copy. In addition, copies have been sent to the federal agencies, tribal governments, state and local governments, and organizations representing a wide range of views regarding the proposed Montanore Project. The mailing list was compiled using the names and addresses of the following:

- Parties who participated in public meetings or who submitted written comments
- Parties who have requested copies of the EIS

- Agencies, governments, tribes, and companies potentially affected by the proposed operation
- Agencies and groups consulted during the EIS preparation

A copy of this Final EIS can be reviewed at the following locations or via the Internet on the Forest Service web page (http://www.fs.fed.us/r1/kootenai/projects/projects/montanore/index.shtml) or the DEQ web page (http://www.deq.state.mt.us/eis.asp):

- Supervisor's Office, Kootenai National Forest, Libby, MT
- Libby Ranger Station, Libby, MT
- Montana Department of Environmental Quality, Helena, MT
- Montana State Library
- Mansfield Library, University of Montana, Missoula, MT
- Lincoln County Library, Libby, MT
- Thompson Falls Public Library, Thompson Falls, MT
- Laurie Hill Library, Heron, MT

Copies of this document are also available on request from:

Kootenai National Forest
31374 U.S. 2 West
Libby, MT 59923-3022
(406) 293-6211

Montana Department of Environmental Quality
PO Box 200901
Helena, MT 59620-0901
(406) 444-1760

Bonneville Power Administration
PO Box 3621
Portland, OR 97208-3621
(503) 230-7334

The following agencies, organizations, and individuals received a copy of the EIS or summary:

4.2.1 Federal, State, and Local Agencies

Advisory Council on Historic Preservation
Army Corps of Engineers
Bonneville Power Administration
Boundary County Commissioner
British Columbia Ministry of Energy, Mines and Petroleum Resources
British Columbia Ministry of Environment
City of Libby
Coeur D'Alene Tribe
Confederated Salish and Kootenai Tribes of the Flathead Nation
Consulate General of Canada
Environmental Protection Agency
Environmental Protection Agency Region 10
Environmental Protection Agency Region 8
Federal Aviation Administration
Federal Energy Regulatory Commission
Federal Highway Administration
Federal Railroad Administration
Forest Service Governors Office
ID Dept of Agriculture
ID Dept of Environmental Quality
ID Dept of Fish and Game
ID Dept of Lands
ID Office of Species Conservation
ID State Historic Preservation Office
Kalispel Natural Resources
Kalispel Tribe of Indians Natural Resources
Kootenai National Wildlife Refuge
Kootenai Tribe of Idaho
Legislative Consumer Council
Libby City Council
Lincoln County Weed and Rodent Program
Mineral County Board of Commissioners
Montana Fish Wildlife & Parks
MT Dept of Agriculture
MT Dept of Commerce
MT Dept of Revenue
MT Dept of Transportation
MT Fish Wildlife and Parks
MT Governor Steve Bullock
MT St Representative Jerry Bennett
MT St Representative Mike Cuffe

MT State Historic Preservation Office
National Agricultural Library
Natural Resources Conservation Service
Northwest Indian Fisheries Commission
Office of NEPA Policy and Compliance
Public Service Commission
Sanders County Board of Commissioners
U.S. Army Corps of Engineers
U.S. Dept. of Agriculture
U.S. Dept. of Labor
U.S. Dept. of the Interior
U.S. Dept. of Transportation
U.S. Coast Guard
U.S. Senator Jim Risch
U.S. Senator Jon Tester
USDA APHIS PPD/EAD
USDA Forest Service
USDA Natural Resources Conservation Service
USDI Fish and Wildlife Service
USDI Office of Environmental Policy and Compliance
WA Dept of CTED
WA Dept of Natural Resources

4.2.2 Organizations and Businesses

Organizations

Alliance for the Wild Rockies
Alliance for Wild Rockies
Alternative One, Inc.
American Forest and Paper Assn
American Sportfishing Assn
Avery Area Property Owners Assn
Back Country Houndsmen
Backcountry ATV
Backcountry Horsemen
Backcountry Hunters and Anglers
BlueRibbon Coalition
Boone and Crockett Club
Boundary Backpackers - Idaho Conservation League
Bull River Watershed Council
Cabinet Back Country Horsemen
Cabinet Mountains Pika Club
Cabinet Resource Group
Capital Trail Vehicle Assn
Center For Justice
Center for Science in Public Participation
Clark Fork Coalition
Clark Fork Pend Oreille Conservancy
Colorado St University Libraries
Committee For Idahos High Desert
Concerned About Grizzlies
Cottonwood Env. Law Center
Cutthroat Trout Foundation Inc.
Defenders of Wildlife
Earthworks
Elk Unlimited
Estuary Corporation
Eureka Dune Runners
Five Valleys Audubon Society
Flathead Lutheran Bible Camp
Flathead Wildlife, Inc.
Foundation For N American Wild Sheep
Friends of Clearwater
Friends of Scotchmans Pk Wldrns
Friends of the Clearwater
Gonzaga Spokane Mountaineers
Great Bear Foundation
Great Burn Study Group
Great Old Broads For Wilderness
Healthy Communities Initiative
High Mountain ATV Assn
Idaho Conservation Data Center
Idaho Conservation League
Idaho Environmental Council
Idaho Forest Owners Assn
Idaho Forest Owners Association
Idaho Outfitters and Guides Licensing Board
Idaho Rivers United
Idaho State Snowmobile Assn
Idaho Trout Unlimited
Idaho Women In Timber
Independent Forest Products Assn
International Assn of Fish and Wildlife Agencies
International Mountain Bicycling Association
Kettle Range Conservation Group
Klamath Alliance For Resources and Environment
Kootenai Environmental Alliance
Kootenai Ridge Riders ATV
Kootenai River Development Council
Kootenai River Network
Kootenay Lake Forest District
Libby Area Chamber of Commerce
Libby Rod and Gun Club
Libby Tomorrow
Libby Video Club
Libby Volunteer Fire Department
Lincoln County Recreation Assn & Troy Snowmobile Club
Lincoln County Sno Kats
Lincoln County Sno-Kats
Lower Clark Fork Watershed Group
Marion Co Humane Society Inc.
Militia of MT
Missoula Bicycle Club
Montana Env. Info. Center
Montanans for Multiple Use
MT Chapter American Fisheries Society
MT Conservation Corps
MT Native Plant Society
MT Petroleum Assn
MT Pilots Assn
MT Snowmobile Assn
MT Trail Vehicle Riders Assn
MT Wilderness Assn
MT Wilderness Association
MT Wildlife Federation
MT Wood Products Assn
N ID Backcountry Horsemen
N ID Trailblazers
National Audubon Society
National Resources Defense Council
National Rifle Assn

National Wild Turkey Federation
National Wildlife Federation
Nitha
North Fork Forestry
Northwest Access Alliance
Northwest Coalition for Alt To Pesticides
Northwest Environmental Defense Center
Northwest Mining Association
Northwest Power Planning Council
Oregon State Snowmobile Assn
Pacific Legal Foundation
Pacific Rivers Council
Pantra
People For Wyoming
Pilik Ridge RUA
Predator Conservation Alliance
Priest Lake Groomer Committee
Priest Lake Trails and Outdoor Rec Assn
Priest River Valley Back Country Horseman
Public Lands Foundation
Recreational Boating and Fishing Foundation
Rock Cr Subdivision RUA
Rock Creek Alliance
Rocky Mountain Elk Foundation
Sanders County Winter Recreation
Sandpoint Winter Riders
Save our Cabinets
Sci First For Hunters
Selkirk Conservation Alliance
Sierra Club
Sierra Club-Montana
Smoky Mountains Hiking Club
Snow Riders
Snowmobile Alliance of Western States
Society of American Foresters
Spokane Mountaineers Conservation Committee
St Joe Cycle Club City of St Maries Council
St Joe Snow Riders
Stenros Brothers Outdoor Adventures
Ten Lakes Snowmobile Club
The Lands Council
The Nature Conservancy
The Wilderness Society
Theodore Roosevelt Conservation Partnership
Tobacco Valley Resource Group
Tobacco Valley Study Group
Trout Unlimited
Troy & Libby Snowmobile Clubs
Vital Ground Foundation
Western Mining Action Project
Western MT Bldg and Construction Trades Council
Western MT Building Trades
Wilderness Watch
Wildlands CPR
Winter Riders Inc.
Winter Wildlands Alliance
Wyoming Wilderness Assn
Yaak Valley Forest Council

Businesses

10 Lakes Forestry and Excavation
1st Natl. Bank
Ameritech
Associated Logging Contractors, Inc.
Avista Corp.
Big Sky Lumber Supply
BKS Environmental Associates, Inc.
Boliden Resources, Inc.
C&D Pest Control
Cabinet Mountain Chevrolet-Pontiac
CalPro Promotional Products
Calvert Ranch
Camp, Dresser & McKee, Inc.
Canavan Logging
Carter Lake Consulting, LLC
CBS News 60 Minutes
Cecil Goff Clipping
Chalkstream Capital Group
Charlie Carvey Logging
Citizens Telecom of MT
CityService Valcon
Columbia Helicopters Inc.
Cominco American Resources Inc.
Conservation Research and Management Consulting Services
Daily Interlake
Diversified House Logs Inc.
ECO Star Energy Systems
Edlund and Hayes
Environmental Strategies Inc.
Environomics Inc.
Erickson Air Crane Inc.
Eureka Rural Dev Partners
FH Stoltze Land and Lumber Co.
Flathead Electric Cooperative, Inc.
Franklin and Associates
Gaetz, Madden & Dunn
Genesis Inc.
Golden Sunlight Mines
Granite Concrete Co., Inc.
Harding Lakes Ranch
Hecla Mining Co.
Highland Logging
Hollingsworth Ranch LLC
Holme Roberts & Owen
Hydra Project
Kovar Properties LLC
Lance and Posten
Land Letter
Libby Creek Ventures, LLC
Libby Placer Mining Company
Libby Volunteer Ambulance Service, Inc.
Lightning Excavating
Lincoln County Board of Realtors
Line Layers Inc
Lisa Bay Planning and Resource Mgmt.
Little Bitterroot Special Services, Inc.
Mines Management Inc.
Molly Montana Real Estate
Montana Machine and Fabrication
Morrison Motl & Sherwood
Mountain View Productions
N.A. Degerstrom, Inc.
Napa Auto Parts
Nerco Exploration Co.
Noranda Inc Falconbridge Ltd.
Northern Lights, Inc.

Owens and Hurst Lumber Co Inc.
Payne Machinery, Inc.
Plum Creek Timber Co.
Poore, Roth, & Robinson
PRC Environmental Management, Inc.
Raviv & Patricio Associates, Inc.
Revett Silver Company
Riley Creek Lumber
RLK Hydro
Rosauers Supermarket
Rovig Minerals, Inc.
Rusher Air Conditioning
Sanders County Ledger
Sherry Guzzi Architect
Silver Bow Outfitters
Silver Butte Ranch Corp.
Solar/Wind Energy Conversion and Mental Seminaries
St. John's Lutheran Hospital
Stimson Lumber Co.
T B C Timber Inc.
T I M B E R
Tetra Tech
The Missoulian
The Montanian
The Western News
Thomas J. Wood Insurance Agency
Timber Tech, Inc.
Timberline Auto Center, Inc.
Tungsten Holdings Inc
Westech, Inc.
Western News
Western Woods
W-I Forest Products
William Faulkner and Associates

4.2.3 Individuals

The names of individuals are available upon request from the KNF or the DEQ.

Chapter 5. Index

Chapter 6. List of Acronyms

Acronym	Acronym Description
ABA	Acid-Base Accounting
ABP	Acid-Base Potential
ACSR	Aluminum Core Steel Reinforced
AERMOD	American Meteorological Society/Environmental Protection Agency Model
ALS	Aquatic Life Standard
ANC	Acid-Neutralizing Capability
AP	Acid Potential
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
AQB	Montana Air Quality Bureau
AQRV	Air Quality Related Values
ARD	Acid Rock Drainage
ARM	Administrative Rules of Montana
BA	Biological Assessment
BACT	Best Available Control Technology
BCF	Bioconcentration factor
BCI	Biotic Community Index
BCR	Bird Conservation Region
BDL	Below detection limit
BE	Biological Evaluation
BFW	Bank full width
BHES	Board of Health and Environmental Sciences
BLM	Bureau of Land Management
BMP	Best Management Practice
BMU	Bear Management Unit
BORZ	(Grizzly) Bear Outside the Recovery Zone
BPA	Bonneville Power Administration
CEM	Cumulative effects model
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMP	Corrugated metal pipe
CMW	Cabinet Mountains Wilderness
CO	Carbon Monoxide
Corps	U.S. Army Corps of Engineers
CSKT	Confederated Salish and Kootenai Tribes
CWD	Coarse woody debris
CYE	Cabinet-Yaak Ecosystem
CYRZ	Cabinet-Yaak Ecosystem Recovery Zone
dB	decibel
DBH	diameter at breast height
dBmV/m	decibel-microvolts per meter
DCF	Discounted cash flow
DEQ	Montana Department of Environmental Quality
DHES	Montana Department of Health and Environmental Sciences (now DEQ)

DNRC	Montana Department of Natural Resources and Conservation
DOC	Montana Department of Commerce
DPS	Distinct Population Segment
Draft EIS	Draft Environmental Impact Statement
DSL	Montana Department of State Lands (now DEQ)
EA	Environmental Assessment
Eagle Act	Bald and Golden Eagle Protection Act
ECA	Equivalent Clearcut Acres
ECAC	Equivalent Clearcut Acres Calculator
EIS	Environmental Impact Statement
ELGs	Effluent Limitations Guidelines
EMF	Electric Field and Magnetic Field
EMU	Elk Management Unit
EPA	Environmental Protection Agency
EPT	Ephemeroptera, Plecoptera, and Trichoptera
ER	Enrichment Ratio
ESA	Endangered Species Act
FACTS	Forest Activity Tracking System
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
Final EIS	Final Environmental Impact Statement
FLAG	Federal Land Managers' Air Quality Related Values Workgroup
FLM	Federal Land Managers
FMEA	Failure Modes and Effects Analysis
FOS	Factors of Safety
FSH	Forest Service Handbook
FSM	Forest Service Manual
FWP	Montana Fish, Wildlife, and Parks
FY	Fiscal Year
GDE	Groundwater Dependent Ecosystem
GHGs	Greenhouse gas emissions
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
H&H	Hydraulic and Hydrologic
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HAP	Hazardous Air Pollutant
HCP	Habitat Conservation Plan
HD	Hunting District
HDPE	high density polyethylene
HR	Hayes Ridge
HRMIB	Hard Rock Mining Impact Board
HU	Habitat Unit
HUC	Hydrologic Unit Code
Hz	hertz
IGBC	Interagency Grizzly Bear Committee
IMBCR	Integrated Monitoring in Bird Conservation Regions
Impact Plan	Hard-Rock Mining Impact Plan

INFS	Inland Native Fish Strategy
IRA	Inventoried Roadless Area
IRIS	Integrated Risk Information System
KFP	Kootenai Forest Plan
KIPZ	Kootenai-Idaho Panhandle Plan Revision Zone
KNF	Kootenai National Forest
KOP	Key Observation Point
KTOI	Kootenai Tribe of Idaho
kV	kilovolt
kV/m	1,000 volts per meter
kw	kilowatt
kwh	kilowatt-hour
LAD	Land application disposal
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment and Strategy
LOS	Level of Service
LWD	Large woody debris
M bcy	million bank cubic yards
MA	Management Area
MAAQS	Montana Ambient Air Quality Standards
MAC	Mineral Activity Coordination
MAC Report	Mineral Activity Coordination Report
MAGIC	Model of Acidification of Groundwater in Catchments
MAQP	Montana Air Quality Permit
MBBR	Moving bed biofilm reactor
MBEMP	Montana Bald Eagle Management Plan
MBEWG	Montana Bald Eagle Working Group
MBTA	Migratory Bird Treaty Act
MCA	Montana Code Annotated
MCE	Maximum Credible Earthquake
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFISH	Montana Fisheries Information System
MFSA	Montana Major Facility Siting Act
mG	milligauss
MIS	Management Indicator Species
mmbf	million board feet
MMC	Montanore Minerals Corporation
MMI	Mines Management, Inc.
MMRA	Metal Mine Reclamation Act
MNHP	Montana Natural Heritage Program
MOU	Memorandum of Understanding
MP	Milepost
MPDES	Montana Pollutant Discharge Elimination System
mph	miles per hour
MS	Management situation
MSMLS	multistory late successional
MT	Million tons
N	Nitrogen

NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NC	Not counted
NCDE	Northern Continental Divide Ecosystem
ND	No data
NEPA	National Environmental Policy Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NM	No measurement
NMC	Noranda Minerals Corporation
NO_2	Nitrogen dioxide
NOI	Notice of Intent
NP	Neutralization potential
NPS	National Park Service
NPV	Net present value
NRHP	National Register of Historic Places
NRIS	Natural Resource Information System
NRLMD	Northern Rocky Lynx Management Direction
NS	Not suspected
NTU	Nephelometric turbidity unit
NWLO	Northwest Land Office
OG	Effective old growth
OHV	Off Highway Vehicle
OLM	Ozone Limiting Method
OMRD	Open Motorized Route Density
pcf	Pounds per cubic foot
PGA	Peak Ground Acceleration
PHABSIM	Physical Habitat Simulation System
PIF	Partners in Flight
Plum Creek	Plum Creek Timber Company
PM_{10} and $PM_{2.5}$	particulate matter less than or equal to 10 and 2.5 microns, respectively
PMOA	1997 Programmatic Memorandum of Agreement
PMP	Probable maximum precipitation
PPL	Potential Population Level
PRISM	Parameter-elevation Regressions on Independent Slopes Model
PSD	Prevention of Significant Deterioration
PSU	Planning Sub-Unit
QA	Quality assurance
QC	Quality control
RCR	RC Resources, Inc.
RHCA	Riparian Habitat Conservation Area
RMO	Riparian Management Objective
ROD	Record of Decision
ROG	Replacement old growth
ROS	Recreation Opportunity Spectrum
SAG	Semi-autogenous grinding
SC	specific conductance
SCORP	State Comprehensive Outdoor Recreation Plan
SCYE	Selkirk Cabinet Yaak Ecosystem

SHPO	State Historic Preservation Office
SOX	Sulfur oxides
SPLP	Synthetic Precipitation Leaching Procedure
SPT	Standard Penetration Test
SSH	Snowshoe Hare
SWPPP	Stormwater Pollution Prevention Plan
TAG	Technical Advisory Group
TBEL	Technology-Based Effluent Limit
TCLP	Toxicity Characteristics Leaching Procedure
TCP	Traditional Cultural Property
TDS	Total Dissolved Solid
TIN	Total inorganic nitrogen
TMDL	Total Maximum Daily Load
TMRD	Total Motorized Route Density
TN	Total nitrogen
tpd	Tons per day
tpy	Tons per year
TSMRS	Timber Stand Management Record System
TSP	Total suspended particulate
TSS	Total suspended solid
TWSC	Two-Way, Stop Controlled
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	USDI Fish and Wildlife Service
USGS	U.S. Geological Survey
V/m	Volt per meter
VRU	Vegetation Response Units
WEPP	Water Erosion Prediction Project
WMA	Wildlife Management Area
WQBEL	Water Quality-Based Effluent Limit

Chapter 7. Glossary

acid-base potential	A laboratory method to determine the acid-generating potential of sulfide minerals.
adit	A nearly horizontal passage, driven from the surface, by which a mine may be entered, ventilated, and dewatered.
alluvium	Soil and rock that is deposited by flowing water.
altered waste zones	Zones of changed mineralogy that occur around the ore deposit, containing chalcopyrite-calcite, pyrite-calcite, and galena-calcite mineralization.
ambient	Surrounding, existing.
appropriation	To divert, impound, or withdraw, including by stock for stock water, a quantity of water for a beneficial use. Appropriations by the FWP and USDA Forest Service has slightly different meaning.
aquifer	Rock or sediment which is saturated with water and sufficiently permeable to transmit quantities of water.
area of potential effect (APE)	The geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist.
baseflow	The contribution of near-channel alluvial groundwater and deeper bedrock groundwater to a stream channel. Does not include any direct runoff from rainfall or snowmelt into the stream.
bear management unit (BMU)	Land area containing sufficient quantity and quality of all seasonal habitat components to support a female grizzly.
Bears Outside Recovery Zone (BORZ)	Delineated areas outside of the Grizzly Bear Recovery Zone where recurring grizzly bear use has been documented.
Best Management Practices (BMPs)	Practice or set of practices that enable a planned activity to occur while still protecting the resource managed, normally implemented and applied during the activity rather than after the activity.
Best Management Practices (BMPs) (Watershed)	A practice or a combination of practices, that is determined by the state (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing, or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.
bioavailable	The state of a toxicant such that there is increased physicochemical access to the toxicant by an organism. The less the bioavailability of a toxicant, the less its toxic effect on an organism.
bioconcentration	Chemicals that increase in living organisms resulting in concentrations greater than those found in the environment.
biodiversity	A term that describes the variety of lifeforms, the ecological role they perform, and the genetic diversity they contain.
blasting	To remove, open, or form by or as if by an explosive.

borrow materials	Soil or rock dug from one location to provide fill at another location.
broadcast seeding	A means of planting where seed is distributed on the ground surface mechanically or by hand.
carbonate	A sedimentary rock composed chiefly of carbonate minerals (*e.g.*, limestone and dolomite).
carcinogenic parameters	Parameters listed as carcinogens in DEQ Circular WQB-7.
carrying capacity	The maximum number of animals that can be sustained over the long term on a specified land area.
catchment	A geographic area that collects rain or snowfall.
clastic	Consisting of fragments of rocks that have been removed individually from their places of origin.
Coarse Woody Debris (CWD)	Coarse woody debris consists of dead woody material larger than 3 inches in diameter and derived from tree limbs, boles, and roots.
colluvial	Rock detritus and soil accumulated at the foot of a slope.
colluvium	Fragments of rock carried and deposited by gravity.
complexation	The formation of complex chemical species.
concentrate	To make less dilute.
confluence	The point where two streams meet.
Corridor (development)	A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries. (36 CFR 219.3).
Corridors (wildlife)	Avenues along which wide ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas.
Cretaceous	The third and latest of the periods included in the Mesozoic Era. Also, the system of strata deposited in the Cretaceous period and related most commonly to the age of the dinosaurs.
critical habitat	The specific area within the geographic area, occupied by a listed species at the time it is listed, on which are found those physical or biological features essential to conserve the species and that may require special management considerations or protection; and specific areas outside the geographic area occupied by the species at the time it is listed upon a determination that such areas are essential to conserve the species.
Cumulative Effects Model	Vegetation mapping for the KNF based on 1992 satellite imagery and updated for harvest activities through 1995.
cutoff	A clay-filled trench beneath a dam to cut off water seeping beneath the dam.
cyclone	Centrifugal classifying device.
dBA or decibels A scale	A logarithmic unit for measuring sound intensity, using the decibel A weighted scale, which approximates the sound levels heard by the human ear at moderate sound levels, with a 10 decibel increase being a doubling in sound loudness.
deep rip	Breaking up compacted soil or overburden, to a depth below normal tillage.

degradation	A process by which the quality of water in the natural environment is lowered.
dendritic	The branching of natural drainage systems.
deposition analysis threshold	The additional amount of nitrogen or sulfur deposition within an FLM area, below which estimated impacts from a proposed new or modified source are considered negligible.
dilatant	Increasing in viscosity and setting to a solid as a result of deformation by expansion, pressure, or agitation.
dilution	A process in which the chemical concentration of constituents in a stream decreases as a result of mixing with cleaner water.
dispersal	The movement, usually one way, and on any time scale, of plants or animals from their point of origin to another location where they subsequently produce offspring.
dispersed recreation	Recreation that occurs outside of developed sites in the unroaded and roaded environment (*e.g.*, hunting, backpacking, and berry picking).
downgradient	A direction characterized by lower fluid potential or hydraulic head.
drift	A nearly horizontal mine passageway driven on or parallel to the course of a vein or rock stratum.
drill seeding	A mechanical method for planting seed in soil.
drilling	To bore or drive a hole in.
edge effects	The boundary, or interface, between two biological communities or between different landscape elements. Edges exist, for instance, where older forested patches border newly harvested units. The intensity of edge microclimatic gradients, or the edge contrast, depends on how sharply the two adjacent habitats differ. Edge effects, broadly defined, are the influences of one patch type on a neighboring patch type. Edge effects on organisms are both positive and negative; they cause some species to increase and others to decrease.
effluent	Waste water discharge.
embeddedness	The degree to which rocks are covered up by the substrate material (sand, clay, silt, etc.).
endangered	Any species, plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.
ephemeral stream	A stream that flows only as a direct response to rainfall or snowmelt events; having no baseflow from groundwater.
evaporation	The physical separation of a liquid from a dissolved or suspended solid. Energy is applied to the system to volatize the liquid leaving the solids behind.
evapotranspiration	The water lost from an area through the combined effects of evaporation from the ground surface and transpiration from the vegetation.
face	The part of an adit or mine that is actively being excavated; the end of the adit being excavated.

facies	A distinctive group of characteristics within part of a rock body (such as composition, grain size, or fossil assemblages) that differ as a group from those found elsewhere in the same rock unit.
factor-of-safety	Forces causing sliding divided by forces resisting sliding; for example, at a factor-of-safety of 1.0, the forces causing sliding are the same as those resisting sliding.
fault	A fracture or fracture zone where there has been displacement of the sides relative to one another.
flotation	A mineral recovery process where individual mineral grains are selectively floated and skimmed off the top of an agitated water/chemical bath.
forb	Any herbaceous plant, usually broadleaved, that is not a grass or grass-like plant.
fragmentation	A condition in which a continuous area is reduced and divided into smaller sections. Habitat can be fragmented by natural events or development activities.
freeboard	The height above the recorded high-water mark of a structure (as a dam) associated with the water.
gangue	The commercially worthless mineral matter associated with economically valuable metallic minerals in a deposit.
genus	A group of related species used in the classification of organisms (plural = genera).
glacial moraine	Mounds and ridges of broken rock and soil particles deposited by glacial action.
glaciofluvial	Pertaining to the meltwater streams flowing from wasting glacier ice and especially to the deposits and landforms produced by such streams.
glaciolacustrine	Refers to sediments or processes involving a lake that received meltwater from glacial ice.
granodiorite	A rock roughly equivalent to granite, which is formed deep within the earth at high temperatures and pressures.
Grizzly Bear Core Habitat	An area of secure habitat within a BMU that contains no motorized travel routes or high use non-motorized trails during the non-denning season and is more than 0.31 miles (500 meters) from a drivable road. Core areas do not include any gated roads but may contain roads that are impassible due to vegetation or constructed barriers. Core areas strive to contain the full range of seasonal habitats that are available in the BMU.
guideline (as used in the 2015 KFP)	Operational practice and procedure that is applied to project and activity decision-making to achieve goals, desired conditions, and objectives
habitat displacement	The avoidance or reduction in use of suitable habitat due to disturbance from human activities.
habituate	Become accustomed to.
hardness	A measure of the amount of calcium, magnesium, and iron dissolved in the water.
harmful parameters	Parameters listed as harmful in DEQ Circular WQB-7.

Hard Rock Mining Impact Plan	An impact plan that identifies the local government services and facilities that will be needed as a result of the mineral development. The developer of each proposed new large-scale hard rock mine in Montana is required to prepare an impact plan.
heavy metals	Metallic elements with high molecular weights, generally toxic in low concentrations to plants and animals.
home range	An area in which an individual animal spends most of its time doing normal activities.
hydraulic conductivity	A measure of the ease with which water moves through soil or rock; permeability.
hydric soil	A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic (water loving) vegetation. Hydric soils that occur in areas having positive indicators of hydrophytic vegetation and wetland hydrology are wetland soils.
hydrophytic	A plant that grows either partly or totally submerged in water.
hydrostratigraphic	A body of rock having considerable lateral extent and composing a geologic framework for a reasonably distinct hydrologic system.
interfinger (intertongue(ing))	A boundary that forms distinctive wedges, fingers or tongues between two different rock types
interim reclamation	Reclamation conducted during operations to reduce erosion, sedimentation, noxious weed invasion, and visual impacts. The reclamation may or may not be redisturbed at mine closure.
intermittent stored service	A Forest Service designation for roads that are closed to motorized traffic and pose little risk when not maintained; typically require some work to return them to a drivable condition.
intermittent stream	A stream that flows for several weeks or months in response to precipitation; the source is direct runoff and groundwater discharge.
intervisible	Mutually visible, or in sight, the one from the other, as stations.
intervisible turnout	An area designed to allow vehicles to pass and so spaced to provide visibility between the turnouts.
inventoried roadless area	Areas identified in a set of inventoried roadless area maps, contained in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000, and any subsequent update or revision of those maps through the land management planning process.
joint	Fracture in rock, generally more or less vertical or transverse.
kilovolt	One kilovolt equals 1,000 volts
kilowatt	One kilowatt equals 1,000 watts
kilowatt-hour	One kilowatt of power supplied to or taken from an electrical circuit for one hour
land application disposal	A method of disposing of waste water that relies on sprinkler application over a large area and/or percolation ponds. Disposed water may evaporate, be used by vegetation, or infiltrate to the groundwater system.

leachate	A solution obtained by leaching, as in the downward percolation of water through tailings materials, and containing soluble substances.
liquefaction	When an earthquake occurs, energy released by rupturing in the earth's crust causes cyclic waves to travel through the rock and soil mass. Saturated soils can then experience enough pressure between the individual grains that the soil loses its cohesion (shear strength) and behaves as a liquid.
lithologic (lithology)	The character of a rock formation.
loading	Pertaining to the contribution of material or chemicals to a receiving stream.
loess	Windblown soil deposits.
long term	A period greater than the life of the mine (*i.e.*, post closure).
macroinvertebrate	Small animals without backbones that are visible without a microscope, for example, insects, small crustaceans, and worms.
macrophytes	Plants visible to the unaided eye. In terms of plants found in wetlands, macrophytes are the conspicuous multicellular plants.
mainstem	The primary channel in a stream or river.
make-up water	Additional water required to supplement water lost during the milling process.
management area (as used in the 2015 KFP)	A land area identified within a planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous (36 CFR 219.19).
management indicator species	Each forest plan developed under the 1982 Planning Rule for the National Forest Management Act was required to identify certain vertebrate and/or invertebrate species as Management Indicator Species, or MIS, as one of various elements to address the **National Forest Management Act** requirements related to diversity of plant and animal communities (36 CFR 219.19(a), 1982). The direction for MIS is related to forest plan development, forest project implementation, and forest plan monitoring. Management indicator species for the 2015 KFP are elk, a specific landbird assemblage, and a specific macroinvertebrate assemblage. These MIS were chosen to compare alternatives in the 2015 KFP FEIS. Elk are a commonly hunted species and secure elk habitat is an issue of public concern. Land bird assemblage (insectivores) are expected to respond to progress made toward desired conditions for vegetation. Given the restoration emphasis of the 2015 KFP, use of the macroinvertebrate assemblage to evaluate water quality trends across the entire planning area will validate the assumptions of plan implementation or help to change management strategies in the event that water quality benefits are not realized. None of the 2015 KFP MIS were chosen due viability concerns and viability of these MIS are not analyzed at the project level.

management situations	Areas of grizzly bear or mountain goat habitat that due to their characteristics, have specific Forest Service management goals and directions.
mean	The average number of a set of values.
median	A numerical value in the midpoint of a range of values with half the value points above and half the points below.
mesic	Intermediate or moderate moisture or temperature; or reference to organisms adapted to moderate climates.
mesothelioma	Form of cancer that is almost always caused by previous exposure to asbestos.
metapopulation	Multiple populations of an organism within an area in which interbreeding could occur, but does not due to geographic barriers.
metasedimentary	A rock type that is composed of formerly small-sized particles (sedimentary, like the grains of sands on lakeshores) that are then exposed to high pressures and temperatures and become compacted into solid stone and are altered chemically.
metric	A value calculated from existing data and used for summarization purposes.
microseismic	A feeble rhythmically and persistently recurring earth tremor.
mitigation	An action to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.
mixing zone	An area established in a permit or final decision on nondegradation issued by the DEQ where water quality standards may be exceeded, subject to conditions that are imposed by the DEQ and that are consistent with the rules adopted by the Board of Environmental Review and a limited area of a surface water body or a portion of an aquifer, where initial dilution of a discharge takes place and where water quality changes may occur and where certain water quality standards may be exceeded.
montane	Pertaining to mountainous regions.
monzonite	An intermediate igneous intrusive rock composed of about equal amounts of sodic to feldspars
moving windows	A technique for measuring road densities on a landscape using a computerized Geographic Information System (GIS). The results are displayed as a percent of the analysis area in relevant route density classes.
mucking	To move or load muck.
mycorrhizae	Fungus root and the association, usually symbiotic, of specific fungi with the roots of higher plants.
nitrification/denitrification	A biological process for the conversion of ammonia compounds to nitrogen gas. The process is carried out in two steps. In the first step, nitrification, the ammonia compound is aerobically converted to nitrate by bacteria. In the second step, denitrification, nitrate is aerobically converted to nitrogen gas.

noxious weeds	Any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment.
old growth	Old growth stands are defined as those that meet the definitions in Green *et al*. 1992 (errata corrected 12/11).
old growth ecosystems	Old growth ecosystems can be defined by elements of structure, function, and composition. Structure includes large live and dead old-growth trees, and fallen dead trees on land and in streams. Function refers to the mechanisms and rates of ecological processes, including high primary productivity (photosynthesis), high respiratory rates relative to younger stands, a shifting-mosaic steady state of living biomass, and large accumulations of dead organic matter. Composition refers to the species of plants and animals present in old growth ecosystems, including old growth dependent or associated species.
ore	A naturally occurring mineral containing a valuable constituent for which it is mined and worked.
overburden	Geologic material of any nature that overlies a deposit of ore or coal.
palustrine system wetland	Palustrine system wetlands are traditionally called marshes, swamps, bogs, or fens. They include all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 percent.
patio	The level area immediately outside the adit portal, built of fill to provide a work area, and access to the mine area.
peak flow	The greatest attained water flow in a specified period of time.
perennial stream	A stream that flows from source to mouth throughout the year; the source is groundwater and surface runoff.
periphyton	Organisms (as some algae) that live attached to underwater surfaces.
permeable	Allowing the passage of fluids.
phreatic surface	The boundary between saturated and unsaturated soil zone in an aquifer.
physiography	A branch of geography that deals with the exterior features and changes of the earth.
piezometer	A small well used to locate the groundwater surface.
pillar	A column of rock retained for structural support in a mine.
piping	Creation of tunnels or cavities from the movement of water in soil.
planning sub-unit	An analysis area based on watersheds to be used for certain wildlife species in the Forest Plan and NEPA analysis.
planning unit	A geographic area based on sub-basins or fourth level hydrologic units, as recognized by the U.S. Geological Survey, used by the Forest Service for natural resources planning.

Pleistocene	The first epoch of the Quaternary Period in the Cenozoic Era with respect to the age of the earth. Characterized by the spreading and recession of the ice sheets, and by the appearance of modern man.
pluton	A body of intrusive igneous rock that crystallized from magma slowly cooling below the Earth's surface
population	A collection of individuals that share a common gene pool. In this document, local population refers to those breeding individuals within the analysis area.
portal	Surface entrance to a mine, particularly to a tunnel or adit.
potentiometric surface	An imaginary surface representing the total head of groundwater in a confined (often bedrock) aquifer that is defined by the level to which water will rise in a well.
Precambrian	All rocks formed before Cambrian time.
probable maximum flood	The flood resulting from Probable Maximum Precipitation; the largest flood event theoretically possible.
proposed species	Any species of fish, wildlife, or plant that is proposed by the Secretary of the Interior in the Federal Register to be listed under Section 4 of the Endangered Species Act.
quartzite	A rock that has formed as a result of the hardening of sediments by pressure and heat. A granular metamorphic rock consisting essentially of sand-sized particles and quartz.
rain-on-snow event	A meteorological occurrence in the months of December through February during which the heat contained in rainfall melts the existing snow cover producing large amounts of runoff and high streamflow in a short time frame.
raise	A vertical underground tunnel.
raise	Incremental increases in the height of a dam.
reach	An extended portion of river with uniform characteristics.
reagents	A substance used (as in detecting or measuring a component, in preparing a product, or in developing photographs) because of its chemical or biological activity.
reclamation	The concept of reclamation of land has been defined as including all desirable and practical methods for: (a) designing and conducting a surface disturbance in a manner that minimizes the effect of the disturbance and enhances the reclamation potential of the disturbed lands; (b) handling surficial material in a manner that ensures a root zone that is conducive to the support of plant growth where required for future use; and contouring the surface to minimize hazardous conditions, to ensure stability, and to protect the surface against wind or water erosion.
redd	A fish spawning nest.
regeneration	Regrowth of a tree crop, or other vegetation, whether by natural or artificial means.
regeneration harvest	Removal of an existing stand to prepare the site for regeneration. Clearcut, shelterwood and seed tree harvests are examples of regeneration treatments.

Recruitment Potential Old Growth	Forest stands that do not meet the definition of old growth in Green *et al*. 1992 (errata corrected 12/11) but are being managed with the goal of meeting that definition in the future.
reporting values	Values listed as reporting values in DEQ Circular WQB-7, and are the detection levels that must be achieved in reporting ambient monitoring results to the department unless otherwise specified in a permit, approval or authorization issued by DEQ.
resistivity	The thermal resistance of unit area of a material of unit thickness to heat flow caused by a temperature difference across the material. (m^2K/W)
riparian	Areas with distinct resource values and characteristics that are comprised of an aquatic ecosystem, and adjacent upland areas that have direct relationships with the aquatic system. This includes floodplains, wetlands, and lake shores.
ripped	To tear, split apart, or open.
riprap	A foundation or sustaining wall of stones or chunks of concrete thrown together without order to prevent erosion.
rock fragment	Rock that is larger than 2 millimeters (about 1/16 inch) in diameter.
salmonid	Member of the fish family Salmonidae; includes salmon and trout.
Scenic Integrity	The highest scenic integrity ratings are given to those landscapes where the valued landscape attributes appear complete and little or no visible deviations are evident. Scenic Integrity is used to describe both existing (Existing Scenic Integrity) and desired (Scenic Integrity Objective) conditions. Very High: Landscape is intact with only minor changes from the valued landscape character associated with significant scenic landscapes. This SIO Scenic Integrity Objective is typically (but not exclusively) associated with specially designated areas such as wilderness or other designations that imply the landscape is natural appearing. High: Management activities are unnoticed and the landscape character appears unaltered. Moderate: Management activities are noticeable but are subordinate to the landscape character. The landscape appears slightly altered. Low: Management activities are evident and sometimes dominate the landscape but are designed to blend with surroundings by repeating line, form, color, and texture of valued landscape character attributes. The landscape appears altered. Very Low: Management activities create a “heavily altered landscape”. Changes may strongly dominate the landscape. Note: This SIO is not a goal or objective.

scree	An accumulation of broken rock fragments lying on a slope or at the base of a hill or cliff.
Security Habitat	An area with low levels of human disturbance. This general definition covers most uses of the term security habitat, except for elk, which has a specific definition.
Security Habitat (elk)	Generally timbered stands on National Forest System lands at least 250 acres in size greater than 0.5 mile away from open motorized routes during the hunting season. Security is calculated for individual planning subunits. Roads not open to the public for motorized uses during the hunting season are not included in this calculation. The effects of non-motorized use and/or administrative motorized use of closed or temporary roads during the hunting season are not included in this calculation and would instead be analyzed separately at the project level.
sedge	A grass-like plant, often associated with moist or wet environments.
seepage collection system	The system of drains, ponds, and pumps to collect and return tailings dam embankment seepage.
segregation	The separation of water from sources of contamination in a mine.
seismic	Of, or produced by, earthquakes.
sensitive species	Those species, plant and animal identified by the Regional Forester for which population viability is a concern, as evidenced by: 1) significant current or predicted downwards trend in population numbers or density or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.
short term	A period of time less than 35 (*i.e.*, operational period).
side slope	The slope of an embankment or waste dump.
siltite	A hard, metamorphic rock, intermediate between shale and slate, was originally silts.
slurry	A mixture of fine-grained solid material and water used to allow pumping as a way to transport the solid material over long distances.
soil erodibility	A measure of the inherent susceptibility of a soil to erosion, without regard to topography, vegetation cover, management, or weather conditions.
sorb	Remove solutes from the fluid phase and concentrate them on the solid phase of a medium either by absorption or adsorption.
stability	The ability of a population to remain at about the same population size over time through stable natality and mortality rates.
standard (as used in the 2015 KFP)	Limitation or requirement that is applied to project and activity decision-making to help achieve goals and objectives
stem exclusion structural stage	Habitat where trees initially grow fast and quickly occupy all of the growing space, creating a closed canopy. Because little light reaches the forest floor, many understory plants grow more slowly or become dormant and species requiring full sunlight die.
starter dam	Earthen dams built of borrow material to initiate construction of the tailings impoundment.

stope	Step-like underground excavation for removal of ore in successive layers.
stratabound	A mineral deposit confined to a single stratigraphic unit.
stratigraphy	The arrangement of strata.
stratum	A section of a formation that consists of primarily the same rock type.
stream order	A method of numbering streams as part of a drainage basin network. The smallest unbranched tributary is a first order stream, the stream receiving that tributary is a second order stream, and so on, with the main stream always of the highest order.
subpopulation	A well-defined set of interacting individuals that comprise a portion of a larger, interbreeding population.
subsidence	The sudden sinking or gradual downward settling of the earth's surface with little or no horizontal motion.
sustainability	The ability of a population to maintain a relatively stable population size over time.
syncline	A sharply arched fold of stratified rock from whose central axis the strata slope upward in opposite directions: opposed to anticline.
tackifier	An agent that binds seed, fertilizer, and mulch to a site, often used when seeding slopes.
taxon	Any formal taxonomic group such as genus, species, or variety.
Tertiary	The earlier of two geologic periods comprised in the Cenozoic Era, in the classification generally used. Also, the system of strata deposited during that time period.
threatened species	Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, as identified by the Secretary of the Interior.
trigger value	Values listed as trigger values in DEQ Circular WQB-7 for parameters categorized as toxic, and are used to determine if proposed activities will cause degradation
total suspended solids	Undissolved particles suspended in liquid.
toxic parameter	Parameters listed as toxins in DEQ Circular WQB-7
transect	A line, strip, or series of plots from which biological samples, such as vegetation, are taken.
unconsolidated	Loose or soft.
upgradient	A direction characterized by higher fluid potential or hydraulic head.
unroaded area	Lands that are unroaded and are contiguous to inventoried roadless areas (IRAs).
viability	Ability of a population to maintain sufficient size so that it persists over time in spite of normal fluctuations in numbers; usually expressed as a probability of maintaining a specific population for a specific period.
viewshed	The portion of the surrounding landscape that is visible from a single observation point or set of points.

visual absorption level	A classification used in the Forest Service Scenery Management System to denote the relative ability of a landscape to accept human alterations without loss of character of scenic quality.
visual quality objective	A desired level of scenic quality based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.
waste rock	Rock that does not contain a valuable constituent at concentrations suitable for mining.
waterbars	A shallow ditch dug across a road at an angle to prevent excessive flow down the road surface and erosion of road surface materials.
waters of the U.S.	Waters that include the following: all interstate waters; intrastate waters used in interstate and/or foreign commerce; tributaries of the above; territorial seas at the cyclical high tide mark; and wetlands adjacent to all the above.
Wetlands Corps' definition of a wetland (33 CFR 328.3(b))	Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
Wetlands **2015 KFP definition**	Those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, peatlands, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.
wetted area	The area at a stream cross section that contains streamflow.

Chapter 8. References

Note: The firm Geomatrix Consultants, Inc. prepared a number of reports on behalf of Mines Management, Inc. and Montanore Minerals Corp. In 2008, AMEC plc acquired Geomatrix Consultants, and after the acquisition, prepared reports with the name AMEC Geomatrix on them. All reports prepared by Geomatrix Consultants or AMEC Geomatrix are cited as Geomatrix to assist in a consistent project record.

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