CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

Chapter 3 discusses the environmental effects that would occur with implementation of the alternatives described in Chapter 2 and forms the scientific and analytical basis for comparing the environmental effects of each alternative. The direct, indirect, and cumulative effects of each alternative are presented by issue. Also included are discussions of past, present, and reasonably foreseeable future activities that were considered in the cumulative effects analysis for the various issues.

The impacts discussed in this chapter are for those issues considered to be factors in formulating the decisions. For each key issue, or issue that drove an alternative, this chapter addresses and describes in full: a) the affected environment; b) direct and indirect effects; and c) cumulative effects. Chapter 3 includes a summary of effects for those analysis issues that were not considered to be key factors in making a decision, did not drive an alternative, or could be effectively mitigated and dismissed. The specialist reports (Project Record) contain the complete discussion/analysis regarding these issues and can be obtained upon request. Additional information regarding resource issues can also be found in the Project Record. A discussion of the various alternatives; compliance with the Gallatin National Forest Management Plan of 1987 (Forest Plan) and applicable laws, regulations, policies; and other direction is provided for all issues and alternatives in Chapter 3.

Some of the effects discussed in this chapter are complex and not easily quantified. In regard to this, it should be kept in mind that many of the values presented are based on professional analysis or are modeled predictions of the effects. The actual effects may not occur exactly to the degree presented. More important than the exact effects, is the comparison of effects between the alternatives, the current condition Alternative 1 (No Action), Alternative 2, Alternative 3, and Alternative 4, as predicted by models and analytic projections.

3.1.1 General Description of the Area

The Jack Rabbit to Big Sky Meadow Village project area is located in the Gallatin River Canyon between Four Corners and Big Sky. The proposed transmission line alternatives parallel United States Highway 191 (US Hwy 191) and the Gallatin River for most of their length.

US Hwy 191 provides a major route for interstate and intrastate travel, including tourism and commercial routes to North Yellowstone and Big Sky from United States Interstate 90 (I-90). Montana State Highway 64 (MT Hwy 64) is an east-west state highway, which intersects with US Hwy 191 in the southern part of the project area, and provides access to the Big Sky area, including two ski resorts. MT Hwy 64 extends to the west beyond the analysis area into Madison County.

United States Forest Service (Forest Service or USFS) roads provide public access to and across lands managed by the Gallatin National Forest (GNF). These roads are primarily accessed from US Hwy 191 and MT Hwy 64 and are typically kept open on a seasonal basis.

Private residences are dispersed throughout the Gallatin Canyon, with access along US Hwy 191, as well as near the terminus of the project near Big Sky. These are located in either the North Gallatin Canyon or Gallatin Canyon / Big Sky Zoning Districts, and not within the surrounding GNF. These residences are mostly single-family detached dwellings.

There are several recreation residences on the GNF. They are not permanently occupied and are considered a seasonal use. Recreation residences are privately-owned recreation residences authorized by special use permits (SUPs) that last 20 years.

There are some private commercial land uses within the project area, predominantly along US Hwy 191 and MT Hwy 64. These uses include lodging facilities and recreational guide companies for fishing, rafting, hiking, and zip-lining.

The project area includes several types of unique recreational opportunities provided by the GNF. Recreational opportunities include hiking, rock climbing, river activities, camping, hunting and fishing. Facilities located in the GNF facilitate recreational activities and include developed campgrounds, boat and raft launches, developed trailheads, and hiking trails. The Gallatin Canyon area is also an important gateway for tourists visiting Yellowstone National Park and Big Sky. The GNF serves many public uses, and recreation is one of the most important uses provided by the forest.

The Madison and Gallatin Fringe Inventoried Roadless Areas (IRA) are located within or near the project area. IRAs are special management areas unique to the Forest Service. As such, they are only located on National Forest System (NFS) lands. The definition of a roadless area for the 2001 Roadless Rule (36 Code of Federal Regulations [CFR] 294) included: undeveloped areas typically exceeding 5,000 acres that met the minimum criteria for wilderness consideration under the Wilderness Act and that were inventoried during the Forest Service's Roadless Area Review and Evaluation process, subsequent assessments, or forest planning. The Lee Metcalf Wilderness Area is adjacent to the western boundary of the Project Area. The Hyalite-Porcupine-Buffalo Horn Wilderness Study Area is located approximately two miles east of the Project Area. Several established campgrounds and trailheads are also located within the Gallatin canyon.

3.2 Past, Present, and Reasonably Foreseeable Activities That May Contribute to Cumulative Effects

Consistent with the Council on Environmental Quality (CEQ) guidance (CFR 1508), this Final Environmental Impact Statement (FEIS) considers the effects of, past, present, and reasonably foreseeable activities and connected actions for each resource area relative to the specific potential future effects of the proposal.

The proposed overall 37-mile transmission line involves construction across 16 miles of NFS lands and across 21 miles of other land ownerships. When a portion of a proposed transmission line corridor is located on non-federal lands, federal assessment of cumulative impacts and connected actions under the National Environmental Policy Act (NEPA) can require consideration of the transmission line impacts on those non-federal portions (40 CFR 1508.25(a)(1)). This FEIS considers cumulative effects of other past, present and reasonably foreseeable future actions, as well as connected actions. Connected actions are those that:

automatically trigger other actions which may require Environmental Impact Statements (EIS),

cannot proceed unless other actions are taken previously or simultaneously, or

are interdependent parts of a larger action and depend on the larger action for their justification.

For transmission projects, these requirements mean that even if only a relatively small segment will cross federal lands, federal land management agencies can still be compelled to consider in some detail the impacts associated with the entire transmission project (Wagner and Schaumberg 2013).

For each of the key issues discussed in this chapter, cumulative effects that pertain to the issue are presented. Because the project's direct and indirect effects vary in time and space, each resource issue has a defined specific cumulative effects analysis area (spatial boundary) and timeframe (temporal boundary) that is pertinent to the specific resource and issue being considered. The resource discussions evaluate the degree to which past, present, and future actions influence or will influence the affected environment. Cumulative effects for each of the "other" issues are summarized in Chapter 3 and fully addressed in the specialist reports and cumulative effects worksheets (Project Record).

The activities described below occur on lands in and around the project area and may contribute to cumulative effects. These are activities that have occurred in the past, present, or may occur in the foreseeable future. Future activities, including planned projects, may or may not occur. Not all activities pertain to every resource issue, so they will not all be addressed in the effects analysis for every issue.

3.2.1 Historic Activity and Uses

Past activities in the Project Area include recreational activities, personal use firewood cutting, road construction and maintenance, fuels reduction, timber sales, development on private property and forest fires.

Fire history data provided by the GNF show that three large fires (greater than 50 acres in size) occurred within one mile of the analysis area during 1940-2007 (Pioneer Lakes-approximately 0.5 mile northeast of the project area, 128 acres; Coyote PNF-approximately 0.8 acre east of the project area, 4,283 acres; Greek Creek-north and west of the project area with the southern edge of the fire overlapping the project corridor, 75 acres); however, the Greek Creek Fire of 1982 is the only fire that burned within a portion of the Project Area.

NorthWestern Energy (NorthWestern) has been completing Phase 1 of the transmission line upgrade on private lands. Under Phase 1, approximately 13,000 feet (2.46 miles) of temporary landings and roads were constructed in the fall of 2012. All landings and roads were located on private lands and consisted of plowing a landing or road to support line trucks, cranes and other equipment to dig and set poles as well as access the structure for stringing purposes (i.e., connecting conductor to the insulators). All landings were around 20-feet wide near the base of a pole and all roads are about 12-feet wide. NorthWestern will reclaim and restore all landings and roads to their existing condition except for the area of Dave Anderson (Section 9, T3S, R4E. along Shadoan Ditch Road between Cottontail Road and Gateway Foothills Road), in which case the road will be left as is but the area will be reseeded. NorthWestern anticipates having their line contractor move the fill back to the original location in the spring of 2013. The reclamation

crews will follow the line contractor and will "fine-tune" all contours and reseed the disturbed areas.

3.2.2 Current Activity and Uses

NorthWestern has constructed the northern portion of the Jackrabbit to Big Sky 161 kV transmission line project located on private land. The northern portion (Phase 1) consists of approximately 15 miles of 161 kV transmission line within existing NorthWestern right-of-way (ROW) from the Jackrabbit substation in the Four Corners community west of Bozeman south to approximately the Spanish Creek area. The GNF boundary is just south of the area where Phase 1 terminates and the 16-mile transmission line section that is being evaluated in this FEIS.

The Project Area is a highly used recreation area. The Recreation and Recreational Value discussion (see section 3.4.1) describes the existing recreation areas in the Project Area. Recreational use from developed trailheads or campgrounds as well as dispersed recreational use including hiking, hunting, fishing and rafting will continue.

The Montana Department of Transportation (MDT) is making improvements to US Hwy 191 through Gallatin Canyon in order to enhance public safety. Gallatin Canyon Safety Improvements such as slope flattening, reconstruction of Gallatin and Swan Creek bridges, additions of left turn lanes, widening of roadway and addition of two-way turn lane in the Big Sky area are currently under construction. Left turn lane additions on US Hwy 191 at Greek Creek and Moose Creek are tentatively scheduled to occur in 2015.

The GNF has several current and on-going activities in the Project Area. These activities include fuels reduction, recreation home project requests including septic system upgrades and noxious weed spraying along the highway corridor, trailheads and trails.

Other on-going activities occur on private in-holdings including home occupancy, maintenance and limited home construction. Commercial uses include rafting, hiking, zip lining and youth camps.

3.2.3 Reasonably Foreseeable Activities and Uses

Current activities listed above will likely continue at similar levels. Current and future projects within the Jack Rabbit to Big Sky Meadow Village 161 kV Transmission Line Upgrade Project (JRBS Project) vicinity are listed in Table 3.2.3-1.

TABLE 3.2.3-1 CURRENT AND FUTURE PROJECTS WITHIN THE JRBS PROJECT VICINITY

PROJECT	DESCRIPTION	DATES OF CONSTRUCTION
US Hwy 191	Gallatin Canyon Improvements: left turn lane additions at Greek Creek and Moose Creek, slope flattening	Tentatively 2013
US Hwy 191	Gallatin Canyon Safety Improvements: slope flattening, reconstruction of Gallatin and Swan Creek bridges, additions of left turn lanes, widening of roadway and addition of two-way turn lane in the Big Sky area	Complete
Montana Opticom	Proposal to bury fiber optic line from Four Corners to Big Sky	Scheduled 2013

PROJECT	DESCRIPTION	DATES OF CONSTRUCTION
GNF Fuels Reductions	Projects between Gallatin River and Lee Metcalf Wilderness Area. Approximately 15 to 20 acres of commercial thinning.	Based on opportunity for appropriate conditions
GNF Recreation Homes	Project requests for septic system upgrades and other maintenance requests	Yearly
GNF Timber Sale	Jack Smith Bridge. 454 acres of harvest.	Complete
GNF Noxious Weed Spraying	Along highway corridor, trailheads, and some trails	Yearly
GNF Rebuild of Fishing Platform	Moose Creek Flat Campground	Future project - Not scheduled

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3.3 Key Issues

The key issues identified during scoping included scenery impacts, historic and archaeological resources, transportation and traffic, and access to National Forest System (NFS) lands. These issues generated alternatives development.

3.3.1 Scenery

Description of Issue

The viewshed of Gallatin Canyon consists of high quality scenery that is highly valued by both local residents and visitors to the area. The existing transmission line from Jack Rabbit to Meadow Village was constructed in the early 1970s and utilized portions of an existing transmission line corridor from the 1950s. The existing transmission line has affected scenery in the canyon by lowering the quality as a result of the presence of transmission structures and conductor wires and vegetation clearing for the right-of-way (ROW).

Potential impacts to scenery were identified as an issue by Gallatin National Forest (GNF) staff and during initial agency and public scoping. Related to this issue were the following concerns:

Disruption of scenic views, especially along the United States Highway 191 (US Hwy 191) corridor;

Degradation of the scenery of the Gallatin Canyon; and

Impacts to the scenery viewed from recreation residences.

Rebuilding the line, which would include installing taller, larger diameter transmission structures, larger hardware, larger diameter conductors, and additional ROW clearing could affect the scenic values of the area. Some specific segments of the transmission line or specific transmission structure locations may be highly visible to sensitive viewers. Project alternatives combined with planned highway improvements by the Montana Department of Transportation (MDT) may contribute to cumulative effects to scenic values.

Indicator

The indicators for measuring potential effects to scenic values are the degree to which each of the alternatives complies with the assigned Gallatin National Forest Management Plan of 1987 (Forest Plan) standards for visual quality (Visual Quality Objective [VQO]), and the Forest Plan standard for management of eligible Wild and Scenic Rivers. This is discussed in detail in the section on Applicable Laws, Regulations, Policy and Forest Plan Direction.

Scale of Analysis

The spatial boundary for evaluating the direct and indirect effects of this project, as well as the cumulative effects of past or reasonably foreseeable actions on scenic resources is a study corridor that extends approximately 0.25 mile on either side of the existing transmission line. This distance captures all sensitive viewpoints with the potential for immediate foreground and foreground views of the alternatives. This is discussed in more detail in the Landscape Visibility discussion below.

For the purposes of determining whether the Proposed Project would meet the Forest Plan standards for scenery, the temporal boundary for this analysis would be the time frame of one year, following the completion of construction and all work specified as part of this project. This time frame of one year is consistent with the Forest Service Visual Quality Management System's time frame for meeting the VQO of Partial Retention (USFS 1974). The time frame used to consider cumulative impacts is longer term due to the permanent nature of the transmission line.

Affected Environment

The analysis area is located in the Gallatin River Canyon. This area includes popular recreation areas and facilities; the Gallatin River, which is eligible for potential classification and inclusion in the Wild and Scenic Rivers system as a Recreation River; and US Hwy 191, which is a high use road for both local and regional traffic, and for recreationists and visitors. Owners of recreation residences on NFS lands and private residences within the analysis area place a high value on the scenery of the area, as do local residents who visit the area frequently. The discussion of the affected environment for the scenery resource involves three elements: 1) Landscape Character; 2) Existing Visual Condition/Scenic Integrity; and 3) Landscape Visibility.

Landscape Character

The landscape character is the overall visual and cultural impression of a geographic area that includes its natural scenic attributes, in combination with the land use patterns that have become accepted over time as contributing to the area's sense of place and character. The landscape character description usually includes both private and public land, since the combination of both forms the overall visual image. The scenery is compared to other landscapes in the region to determine how visually unique it is, based upon its variety and harmony in terms of the line, form, color and texture of its visual components.

The Gallatin Canyon landscape is rich in visual variety. The canyon is hemmed in by mountain slopes and ridges that are generally conifer covered. The tree cover is broken by patches of meadow that dapple the slopes and sometimes extend down to join the lower open grass-deciduous shrub-tree band. Rock forms are a dominant element of the canyon and include sheer faces, sculpted forms, boulders and scree slopes that break up the tree cover. The Canyon occasionally widens into small meadows, allowing more expansive views of the surrounding slopes from within the canyon. The Gallatin River runs through the bottom of the canyon. Its tumbling waters add an element of motion to the landscape. Historic features of the canyon include recreation residences on NFS land. These recreation residences formally evaluated by an architectural historian from POWER Engineers, Inc. (POWER) on behalf of the GNF in October 2011 for their eligibility to the National Register of Historic Places (National Register). Two of the 69 residences within the visual resources study area have been determined by the GNF to be individually eligible for the National Register. For a more detailed discussion, refer to Section 3.3.2 – Historic and Archaeological Sites. Other cultural and historic features include residences on private land; GNF facilities (Shenango helicopter/fire base and historic Civilian Conservation Corps [CCC] camp) and campgrounds; a few commercial facilities such as rafting companies; roads and bridges; the existing transmission line; electrical distribution lines; and parking areas. Compared with other scenery typical to the Northern Rocky Mountains, specifically the "Yellowstone Rockies Subregion" (Character Type) (USFS n.d.), the Gallatin Canyon would fall in the "distinctive" category (highest class of three).

Landscape Visibility

Landscape visibility refers to the viewing context, or in other words, who sees the analysis area, where the analysis area is seen from, what viewers are doing when they view the scenery, what importance the viewers place on the scenery, and how long the scenery is viewed.

Viewers of the landscape of Gallatin Canyon may be residing in it, recreating in it, or traveling through it. Viewers residing in the Canyon are generally static (viewing the Canyon from one location or area with long view duration) and observe the same view or views repeatedly. Residential observers include recreation residences on NFS land and residences on private land. Residential observers place a high value on scenery.

Recreation observers also place a high value on scenery. Recreation observers that are generally static include individuals using campgrounds, fishing, and climbing. These viewers have a long view duration, but are transient (stay for a short time). Moving recreation observers include individuals using trails (hikers and equestrian riders) and floating the Gallatin River. Trail users view the landscape as a sequence of views but are slow moving. Recreationists floating the Gallatin River also view the landscape as a sequence of views but move faster and have shorter view duration. Because moving viewers may sometimes be focused on their activity, attention paid to viewing scenery may vary.

Observers traveling through the Canyon use US Hwy 191. Value placed on scenery varies for highway users. Generally, commercial travelers place the lowest value on scenery, commuters and non-recreation regional travelers focused on reaching their destination place a moderate value on scenery, and recreation travelers, including pleasure drivers and observers traveling to a recreation destination such as nearby National Parks or ski areas, place the highest value on scenery. These observers have short view duration and move at rapid speeds.

The highway often parallels the Gallatin River and shares the same general viewshed. The twists and turns of US Hwy 191, which is often sandwiched between the Gallatin River and a steep slope, generally require the attention of drivers and limit observation of scenery in some locations. Straighter stretches of the highway allow longer view duration and more detailed observation of scenery. The orientation of drivers in a moving vehicle to the road limits attention for other viewing angles and reduces scenery observation, although passengers are likely to look around and view the surrounding landscape. Turn outs along the highway provide static locations for travelers to stop and view the scenery. Views from the river vary depending on the activity of the observer. Fishermen are static or slowly moving and have long duration views. They typically access the river at locations where parking is available. Paddlers have static views at parking and river access points. Because the Gallatin River is a whitewater river with numerous rapids, once paddlers are on the river they are usually focused on the water and are not observing the scenery in detail. In areas where the water is calmer and in locations where paddlers may eddy out, they may be more aware of the surrounding scenery. Recreation viewers on or in the river have a limited view of the existing transmission line where it parallels the river due to vegetation screening along the river and focus on their activities, but have unobstructed views of the transmission line in locations where it crosses the river.

Existing Visual Condition

Visual resources in the GNF are currently managed under the Forest Service Visual Management System (VMS). The term existing visual condition, according to the VMS, is the current state of the landscape, considering previous human alterations (USFS 1995). The landscape of the canyon overall exhibits a high level of existing visual condition and an established sense of place because the elements that detract from the visual condition are generally subordinate to the natural elements of the characteristic landscape. The sense of enclosure within the canyon created by the expanses of coniferous forest, steep slopes and ridges, and exposed rock faces and sculptured formations that loom above the river and the canyon floor has not been altered. The picturesque river with whitewater and massive boulders liberally scattered along its length and the frequent streams that drain from the mountain slopes into the river run freely and without alteration, other

than the occasion bridge, adding the element of water and motion to the landscape. The periodic meadows that provide openings and opportunities for more expansive views of the surrounding landscape and on NFS land are mostly free of structures or alterations other than US Hwy 191 and the existing transmission line. The overall visual condition is one of a natural landscape with strong elements of form and line and a great diversity of color and texture.

Cultural or man-made features present in the Canyon both add and detract from the Existing Visual Condition (EVC). They are generally located at the bottom of the canyon or low on its side slopes. Linear man-made features within the canyon include US Hwy 191 and the existing 69 kilovolt (kV) transmission line. Although the highway is the observation corridor from which many viewers observe the landscape, it disrupts the natural landscape of the Canyon and the existing visual condition when viewed from other observation points and corridors including recreation and private residences, campgrounds, trailheads and trails, and the Gallatin River. The highway winds through the canyon, generally following the toe of the slope at the bottom of the canyon but disrupting the natural terrain in some locations and crossing the river twice within the analysis area. Elements associated with the highway that disrupt the natural landscape include road signs and safety barriers, which are often reflective and contrast with the natural setting. Periodic parking and pullout areas increase the width of paved or cleared area.

Features on NFS land, including recreation residences, campground facilities, and United States Forest Service (Forest Service or USFS) facilities are typically clustered together and tucked into the trees, and are constructed with natural finish materials such as stone and wood that are non-reflective and blend into the color palette and texture of the surrounding landscape. The recreation residences and the historic CCC camp at the Shenango helicopter/fire base add a sense of history and place to their surroundings. These features are generally subordinate to their natural landscape setting and have a neutral or positive effect on the existing visual condition.

Residential and commercial development is located on private lands at the bottom of the canyon. Because these structures are located on parcels owned by various individuals, they are generally spaced apart from each other in expansive cleared areas. Private development is concentrated in the Beckman Flat area, where residences, commercial facilities and a billboard are scattered throughout a cleared area that borders US Hwy 191, and in the Karst Ranch area where a large grouping of private residences that extends south to Tamphery Creek is located. Private development is scattered along the highway from the Dudley Creek area to the Montana State Highway 64 (MT Hwy 64) intersection, where more concentrated residential and commercial development occurs. A grouping of private residences is located near the end of the Project on the outskirts of Big Sky. The materials and finishes used for these structures vary. Use of natural, non-reflective materials reduces visual contrast with the color and texture of the surrounding scenery while artificial or reflective materials or contrasting colors increase visual contrast. Many of the developments on private lands are visually dominant due to their location in open clearings where they are highly visible. Although development on private land is not subject to Forest Plan standards, it generally has a negative cumulative visual effect on the natural setting of the Gallatin Canyon. However, a majority of the development on private land existed in the Canyon for decades.

The existing transmission line ROW is located in Management Area (MA) 25. MA 25 "*consists of electrical transmission lines and pipelines, climatic and snow measuring sites, and electronic sites.*" The MMA 25 Forest Plan Standard for visual quality states "*The visual quality objective of the adjacent management area will be considered. Carefully evaluate for corridors and electronic sites for their effects on visual quality. Take appropriate measures to mitigate adverse affects.*" The management areas adjacent to the existing transmission line ROW (MA 25) have Retention and Partial Retention VQO, which are defined below.

Based on how the existing power line appears today, the VQOs of adjacent management areas were considered. Although the line follows the general route of the Gallatin River and US Hwy 191 through the canyon, in many locations it blends into its surrounding or is screened from view. In some areas the line is located part-way up the side slope, where it is often not viewed by travelers on US Hwy 191 whose views are confined by the steep topography. In many areas the line is screened by trees and/or topography from views from the canyon bottom, either by preserving a narrow band of trees between the highway and the line, or by the line being located further up the slope where it is screened by heavy forest. In some areas where private residences abut the highway, the line is located in the edge of the forest behind the private parcels and away from the highway, rather than between the highway and the residences.

Open views of the existing transmission line occur in numerous locations throughout the canyon and are especially noticeable in areas where the highway is straight, and a sequence of multiple transmission structures are visible. In many areas the current alignment is screened from the highway and the river by vegetation. Some trees that provide screening are thinning and dying due to insects and disease, such as in the Shenango helicopter/fire base area. An additional factor that alters the visibility of the transmission line from the highway is its elevation near the highway or high above it. In locations where the transmission structures are located well above the road elevation, they are often not visible to viewers moving along the highway. Elevation has less of an effect on visibility from pullouts where viewers are static and from the river. Visibility of the existing line based on vegetation screening and transmission structure elevation was observed from the highway during the field visit in August 2010. Existing transmission structure base elevations in relationship to the highway was mapped using a geographic information system (GIS). Typically, transmission structure locations that are close to the elevation of the highway are visible to travelers moving along the road, while transmission structures located high above the roadway are often not seen from the road.

Because the wood transmission structures of the transmission line are often weathered and the conductors have aged and are no longer reflective in most areas, the color and texture of the line often blend into the background in areas of trees or talus slopes. The ROW width of the existing line is 40 feet. In forested areas, low brush and small trees that leave adequate safety clearance for the existing transmission line have been allowed to grow and branches from adjacent trees have encroached into the ROW, reducing its visual contrast with the surrounding forest and perceived width. In many areas the transmission line is visually subordinate and blends well into the surrounding landscape. In these areas the existing line is fully or partially compatible with the VQOs of adjacent management areas. In some areas the transmission line is unscreened and stands out in the surrounding landscape. In these areas the transmission line is a dominant element of the landscape and degrades the existing visual condition. The line is especially dominant in areas where a sequence of transmission structures is visible from a single observation point and at highway and river crossings.

The existing transmission line crosses US Hwy 191 eleven times and the Gallatin River eight times. The existing line is visually dominant at crossings because viewers have longer view duration as they approach the crossing and the transmission line extends across their view perpendicular to the direction of travel. The transmission line conductors at a crossing and any transmission structures that are visible are highly dominant visual elements. Three crossings occur around the 35 mile per hour (mph) bridge, Lava Lake Trailhead and Cascade Creek Recreation Residence Tract. One crossing is located approximately 1,000 feet north of the 35 mph bridge, one crossing is located at the Lava Lake Trailhead area south of the bridge, and one crossing is located approximately 0.7 mile further south across from the south edge of the Cascade Creek recreation residence tract. The middle crossing (at the Lava Lake Trailhead) is

visually dominant because it occurs in a open area where no trees are located between the river and the road, and is wide and visible because the river widens in this area and the parking/pull out area is also crossed. Although the north and south crossings occur in forested areas where the visible conductor span is relatively short, the three crossings occur close together in a series, increasing the reduction of visual condition for travelers on the highway. Two crossings occur in the Deer Creek Trail area. One is located approximately 0.2 mile north of the access bridge across the Gallatin River and one is located approximately 0.5 mile south. The north crossing of US Hwy 191 and the river is in a forested area. Although tree screening would make the segment of visible conductors of the upgraded transmission line shorter, the line would be visible from an approximately 0.25 mile long straight stretch of highway for southbound travelers. The south crossing occurs in an open meadow where an approximately 0.4 mile segment of the transmission line is very visible.

The sections of the existing transmission line that are most visually dominant and extensive and thus the most noticeable to observers from the highway and river corridor are summarized below:

> Open views of the transmission line occur around the GNF entry sign and the Indian Ridge Trailhead at the north end of the analysis area. The transmission line is located on GNF land along the road for approximately 0.3 of a mile in the sign area and 0.4 mile near the trailhead. Axial views of the line occur along these segments of the highway.
>
> A sequence of transmission structures is visible north of the Cave Creek recreation residence tract that would be viewed both from the road and from several pullouts. The pullout in the House Rock Area is frequently used by travelers to enjoy the Canyon scenery, view the river, and watch rafters and kayakers. The view orientation from the pullout is generally away from the transmission line alignment on the opposite side of the road, however the transmission line would be visible because it is unscreened and crosses a small talus slope in this area.
>
> From south of the Cascade Creek recreation residence tract to the Kitchen Rock recreation residence tract a one mile segment of the transmission line is visible. This area is viewed sequentially rather than as one view because it follows a series of curves. Two pullouts located southeast of the Egyptian Creek recreation residence tract have views of a long sequence of transmission structures that is highly visible. A pull out located just west of the Kitchen Rock recreation residence tract has views of a section upslope on the east side of the road and river.
>
> A sequence of transmission structures with a few sections screened by vegetation is visible from Greek Creek Campground to the Karst area. This segment is approximately 2.6 miles long. A few sections within this stretch are screened by trees or would be located up slope where travelers would typically not see them from the roadway. This section is highly visible from a turnout located along the river where travelers may stop to view the scenery.
>
> A sequence of transmission structures is visible for approximately 0.3 mile between Tamphery Creek Road and Portal Creek Road.
>
> The transmission line is visible on GNF land for approximately 0.8 mile from near the US Hwy 191/Big Sky Road intersection to where the alignment leaves GNF land. This section is not screened by vegetation and is highly visible from the roadway.

Alternatives 3 and 4, described in the Effects Analysis in this section, were developed, in part, to address these existing visual conditions at Cave Creek and Cascade Creek.

Applicable Laws, Regulations, Forest Plan Direction

Gallatin National Forest Land Management Plan (1987)

Forest-Wide Standards related to visual quality/scenery include the following:

4. Visual Quality (page II-16)

1. *The GNF has developed visual quality objectives (VQOs), defined in the glossary (Chapter VI), which provide guidance for all landscape altering activities. Reference maps of VQOs are at the Supervisor's Office and each Ranger District for use in designing projects and for public inspection.*

2. *Environmental analysis and project designs will detail how the range of visual quality objectives identified for each Management Area in Chapter III will be utilized. If the VQO cannot be met the Forest Supervisor must approve the exemption in the decision notice.*

Visual Quality Objectives

The existing transmission line ROW is located in MA 25, for which there are no VQOs specified. Instead, the MA 25 Forest Plan standard for visual quality states: "*The visual quality objective of the adjacent management area will be considered. Carefully evaluate application for corridors and electronic sites for their effects on visual quality. Take appropriate measures to mitigate adverse effects.*"

The management areas adjacent to MA 25 within the analysis area have Retention and Partial Retention VQOs.

> *The definitions of these VQOs, as shown on page VI-44 of the Forest Plan, are as follows:*
>
> *Retention: Human activities are not evident to the casual Forest visitor. The landscape character should "appear" intact. Deviations may be present but must repeat the form, line, color, texture and pattern common to the landscape character so completely and at such scale that they are not evident.*
>
> *Partial Retention: Human activities may be evident. The landscape character may "appear slightly altered." Noticeable deviations must remain subordinate to the landscape character being viewed.*
>
> *16. Wild and Scenic Rivers (page II-28, 29)*
>
> *Segments of four streams meet the eligibility criteria for potential classification as Recreation Rivers. These river segments are:*
>
> > *Gallatin River from the National Forest boundary to Yellowstone National Park.*

The following management standards will be applied to NFS lands one fourth of a mile from each stream bank to provide protection of eligible river segment areas until future suitability studies are completed and decisions are made on possible designation.

> *g. New transmission lines, gas lines, etc. are discouraged. Where no new reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-*

way. Where new ROWs are indicated, the scenic, recreational, and fish and wildlife values must be evaluated in the selection of the site.

This Forest-wide Standard was amended by Amendment #12, Wild and Scenic River Amendment in the GNF Summary of Forest Plan Amendments (2009):

Amendment #12, Wild and Scenic River Amendment.
Forest Plan pgs. II-2, II-29, II-28, and J-1, amended 7/2/93.

This amendment added to and modified Forest Plan direction applicable to eligible Wild and Scenic Rivers. More specifically it:

Added a new management standard (FP, page II-29) stating that "management activities will comply with the standards for Wild and Scenic Rivers from Chapter 8 of Forest Service Handbook (FSH) 1909.12."

Forest Service Handbook Standards 1909.12 Chapter 80 Wild and Scenic Rivers (2006)

FSH pgs.14-15.

Section 82.14 – Outstandingly Remarkable Values

In order to be assessed as outstandingly remarkable, a river-related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. A river-related value would be a conspicuous example of that value from among a number of similar examples that are themselves uncommon or extraordinary.

While the spectrum of resources that may be considered is broad, all features considered should be directly river-related. That is, they should:

Be located in the river or on its immediate shorelands (within 0.25 mile on either side of the river;

Contribute substantially to the functioning of the river ecosystem; and/or

Owe their location or existence to the presence of the river.

Section 82.14a – Eligibility Criteria

The following eligibility criteria are offered to foster greater consistency within the agency and with other federal river-administering agencies. They are intended to set minimum thresholds to establish outstandingly remarkable values and are illustrative and not all-inclusive. These criteria may be modified to make them more meaningful in the area of comparison, and additional criteria may be included.

Scenery. The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed, may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

Refer to Section 3.4.2 – Wild and Scenic Rivers for additional information about the laws, regulations and Forest Plan standards related the Gallatin River.

Management Areas

The GNF has been divided into 26 management areas, each with different management goals, resource potentials, and limitations. Chapter III of the Forest Plan describes each management area and lists the goals, management standards, schedule of management practices, and monitoring requirements for each area.

The existing 69 kV transmission line ROW is within MA 25. MA 25 *"consists of electrical transmission lines and pipelines, climatic and snow measuring sites, and electronic sites. The Management Goal for Management Area 25 is: Establish and manage facilities consistent with adjacent management area goals.*"

The MA 25 Forest Plan standard for visual quality states "*The visual quality objective of the adjacent management area will be considered. Carefully evaluate application for corridors and electronic sites for their effects on visual quality. Take appropriate measures to mitigate adverse effects."*

The other management areas located within the analysis area and the standards for each related to landscape aesthetics are as follows:

Management Area 1

MA 1 includes all developed campgrounds, picnic areas, boat ramps, and visitor information sites plus potential developed sites. The Forest Plan Standard for visual quality states that the VQOs of these areas range from partial retention to modification.

Management Area 5

MA 5 includes areas that are travel corridors that receive heavy recreation use. The Forest Plan Standard for visual quality states that the VQOs of this these areas would be retention or partial retention.

Management Area 7

MA 7 consists of riparian management areas including streambanks and wetlands. The Forest Plan Standard for visual quality states that the VQOs of these areas range from retention to modification.

Management Area 8

MA 8 consists of lands which are suitable for timber management. The Forest Plan Standard for visual quality states that the VQOs range from partial retention to maximum modification.

Management Area 9

MA 9 includes areas consisting of suitable timber lands which have high dispersed recreation value and are visually sensitive. The Forest Plan Standard for visual quality states that the VQOs of these areas range from retention to partial retention.

Management Area 11

MA 11 consists of forested big game habitat, as well as timber clearing lands. The Forest Plan Standard for visual quality states that the VQOs range from partial retention to modification.

Management Area 12
MA 12 includes areas that provide important habitat for summer or winter wildlife use in a variety of terrain and vegetation types and also offer dispersed recreation opportunities. The Forest Plan Standard for visual quality states that the VQOs of these areas range from retention to partial retention.

Management Area 17
MA 17 consists of grasslands or forestlands that are suitable for livestock grazing and big game habitat. The Forest Plan Standard for visual quality states that the VQO is partial retention.

Management Area 23
MA 23 includes the existing and proposed National Recreation and Scenic Trails on the GNF. The Gallatin River National Recreation Trail, which is part of MA 23, is paralleled by the existing 69 kV transmission line. The Management Goal for MA 23 is to protect the integrity of the trail and provide the traveler with a wide variety of visual experiences. The Forest Plan Standard for visual quality states that the VQO along the trail would be the same as standards assigned to the management area through which the trail passes.

Management Area 26
MA 26 consists of Forest Service ranger stations, work centers, and other administrative sites. The Shenango helicopter/fire base is located within the analysis area. The Forest Plan Standard for visual quality states that the VQO is partial retention.

Methodology for Analysis

The following steps were used for analyzing the effects to the scenery resource.

1. Identification of Observation Points and Corridors

Observations points and corridors within the analysis area were identified and then reviewed in the field to assess the visibility of the Proposed Project and to identify locations that were most important to focus on.

Potentially sensitive observation points and corridors were initially identified from GIS shapefiles of recreation facilities and residences, aerial photo interpretation, and land use data. Observation points and corridors (roads, rivers and trails) considered include recreation residences and private residences, developed recreation areas, and transportation corridors. Viewing context was assessed using the criteria of concern level (expectations for maintaining the existing visual condition), duration of view (static, fixed views or short duration views), and use volume (number of individual viewers). Observation points and corridors that were determined to be highly sensitive to scenery alterations included recreation residences, private residences, US Hwy 191, trailheads and trails (including the Gallatin River National Recreation Trail), campgrounds, the Gallatin River (eligible for potential classification and inclusion in the Wild and Scenic Rivers system as a Recreation River), and river accesses.

2. Visibility Assessment

Visibility of the project and distance zones (0 to 300 feet immediate foreground distance zone and 300 feet - 0.5 mile foreground distance zone) were mapped using ESRI ArcView GIS software. These distance zones have been established by the National Forest Landscape Management handbook (USFS 1974).

The spatial boundary for evaluating the direct and indirect effects of this project is a study corridor that extends approximately 0.25 mile on either side of the existing transmission line. The study corridor is relatively narrow because of the steep topography, the width of the Gallatin Canyon and the dense forest present in many areas. Because the proposed transmission line is a linear feature that would extend through the Gallatin Canyon, sensitive viewpoints may have views of the proposed transmission line where it is located geographically closest to them or may view portions of the proposed transmission line up or down the canyon at greater distances. Thus, while the study corridor extends 0.25 mile on either side of the centerline, visibility was mapped to a distance of 0.5 mile to capture all foreground views from sensitive viewpoints within the study corridor.

The observation points and corridors were reviewed during field investigation to assess the visibility of the project and to identify locations that were most important to focus on. Observation points or segments of corridors that were determined to be important included locations where the project would be visually dominant in the landscape. The National Forest Landscape Management handbook defines dominant as *"ruling; governing; predominant; exercising great influence"* (USFS 1974). The National Forest Scenery Management System handbook defines dominant human alterations as *"In scenery management, dominant human alterations override the natural character of the landscape and are very noticeable"* (USFS 1995). Areas where the proposed transmission line would be a dominant visual alteration include locations where the proposed transmission line would be viewed in close proximity both from static or moving viewpoints, where axial views (down the center of a linear feature) of the ROW occur, and where many power transmission structures are visible within a single view.

Vegetation may screen the Proposed Project from sensitive viewpoints. For those viewpoints for which vegetation screening was not reviewed during the field visit, aerial photography was reviewed. While view screening by topography is generally permanent, vegetation screening may be reduced over time due to fire, disease or insect damage or may increase due to growth or increased vegetation density. Thus while vegetation screening was considered in the analysis of impacts, it is a factor that may change over time.

3. Visual Contrast Assessment

The visual contrast of the Proposed Project was assessed to determine its effect on the existing scenic integrity levels and on views from observation points and corridors:

The National Forest Landscape Management handbook defines contrast as *"A. Diversity of adjacent parts, as in color, tone, or emotions. B. The closer the juxtaposition of two dissimilar perceptions, in time or space, the more powerful the appeal to attention"* (USFS 1974). The Forest Service Scenery Management Handbook defines contrast as *"Diversity or distinction of adjacent parts. (The)(e)ffect of striking differences in form, line, color, or texture of a landscape,"* and states that *"In general a specific scenic integrity level can be achieved by decreasing the contrast of the deviation being viewed. Usually the most effective way is to repeat form, line, color, texture, pattern and scale common to the valued landscape character being viewed"* (USFS 1995).

Visual contrast assessment included three components: contrast in color, shape and slope with the landscape due to exposed soil and grading (landform contrast); the contrast of tree clearing in the

ROW and any clearing for construction with the surrounding vegetation (vegetation contrast); and the change to the visual setting caused by replacement of the existing transmission line with larger transmission structures and components or construction of the project in areas where no transmission line previously existed (structure contrast). Three levels (weak, moderate, and strong) are used to describe the potential visual contrasts that would result from the construction and operation of the proposed transmission line.

Landform contrast was determined by the degree of ground disturbance due to access roads and construction. Access road categories for the Project are as follows:

> **Level 1 -** use existing road, assumed 20-feet wide, (no additional disturbance required).
>
> **Level 2 -** upgrade existing access roads to accommodate construction equipment (increase two-track type trail/roads from assumed 10-foot width to 20-foot width).
>
> **Level 3 -** no access roads, access would be pedestrian or helicopter and result in an assumed five-foot wide path from foot traffic.

All access road categories would result in weak landform contrast levels, with the exception of talus slope areas. Talus slopes were considered separately. Exposed faces of loose rock in talus slopes are generally a different color than the unexposed faces. When the top layer of rock is removed or disturbed, previously unexposed rock faces may be exposed, resulting in a visual contrast with undisturbed areas. Construction in talus slope areas would result in weak to moderate landform contrast levels.

Vegetation contrast is determined by the diversity, complexity, and density of vegetation types and the vegetation clearing required. Weak vegetation contrast levels occur in areas where vegetation cover is lacking or is sparse, has a high level of recoverability, is visually compatible with transmission lines, and where little vegetation clearing is required. Changes to overstory (forest) vegetation types would result in strong to weak vegetation contrast levels depending on the amount of ROW clearing. Clearing of new ROW would result in strong contrast levels, while increases in width of clearing of existing cleared ROW would result in moderate to weak contrast levels.

Structure contrast examines the compatibility of transmission facilities with the existing landscape. For the most part, structure contrast in the study corridor is determined by the presence or absence of the existing 69 kV transmission line. Single wood transmission structures were used to determine structure contrast because specific locations for guyed transmission structures and alternate structure types (weathered steel transmission structures, wood laminate transmission structures and H-frame structures) have not been identified during pre-engineering along the 16 mile segment on NFS lands. Alternate structure types would create stronger structure contrast levels than single wood transmission structures or guyed wood transmission structures.

Construction of the transmission line in areas where no existing transmission lines are located would result in strong structure contrast levels while construction of the transmission line within the existing ROW where the existing 69 kV transmission line is located would result in a moderate structure contrast level that would add to the existing contrast created by the existing transmission line.

Visual Impact Assessment

Based on the results of the visual contrast assessment, visual impact levels were assessed for the alternatives. Using ESRI ArcView GIS software, the visual contrast of the Proposed Project and

alternatives was overlaid with the visibility and distance zone mapping for the observation points and corridors. The impact levels were recorded along the centerline of each alternative for each of the following categories:

Recreation Residences

Private Residences (with views of the Project on NFS land)

Recreation Sites (campgrounds, trailheads and trails)

Gallatin River

US Hwy 191

Impact maps were then derived. Potential impacts for each category were recorded into a data table for each impact level change along the length of each segment.

Photo Simulations

Photo simulations were developed to evaluate the accuracy of the predicted visual impacts of the project on the characteristic landscape and to illustrate the expected impacts to the concerned agencies and the public. A total of 11 viewpoints for photo simulations were identified in the study corridor. The photo simulations are for demonstration purposes only. New transmission structures, conductors, and the transmission line alignment are depicted for the alternatives noted on each photo simulation. Transmission structure locations may vary and may be offset from the existing alignment. Vegetation clearing of the ROW has not been delineated and is not illustrated for all photo simulations. Transmission structure type and final designs may change pending review and engineering. See Appendix E for photo simulations and mapping of photo simulation viewpoint locations.

The process of photo simulation began with taking field photographs, documenting viewpoint locations (coordinates) and weather conditions, and matching those photographs with Proposed Project terrain models developed using Microstation. Computer models of the transmission line were introduced into the terrain model based on preliminary layouts developed in ArcView. The final image is a composite of the 3-dimentional transmission structure modeling and the original photograph. The process ensured that spatial relationships, perspective, proportions, and similar visual attributes were accurate and matched existing landscape conditions.

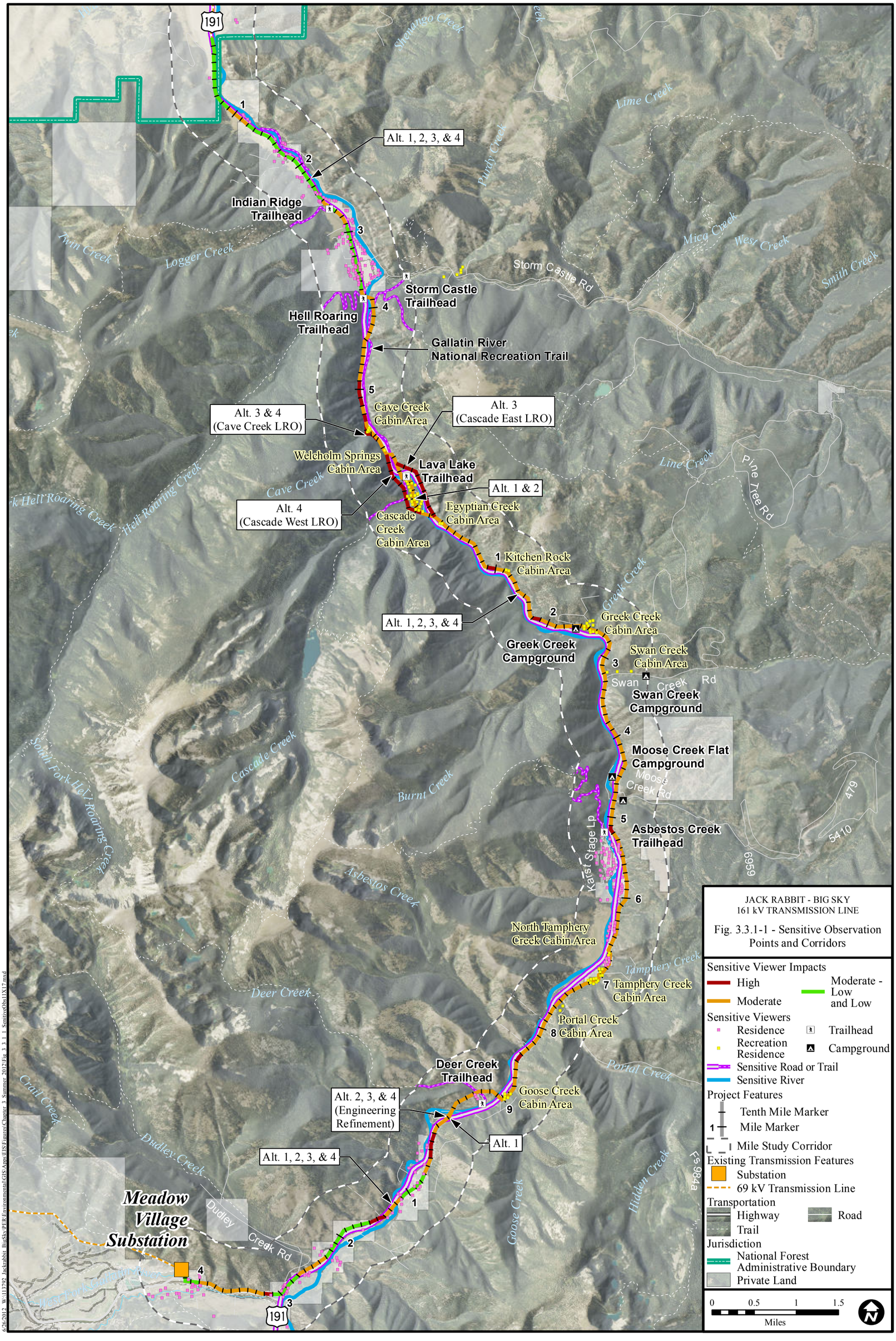
The photographs were taken by a Canon DSLR Rebel XSI 12 megapixel digital camera with an 18 millimeter (mm)-55 mm zoom lens. The camera was hand held at eye-level (approximately five feet, six inches high). The date, time of day, global positioning system (GPS) coordinate (latitude/longitude), and weather conditions were documented.

The proposed transmission structures (transmission structure type and dimensions, hardware configurations, sag of conductor wires) were modeled based on engineering input from NorthWestern Energy (NorthWestern). Engineering on the transmission line has not been completed so actual transmission structure locations, types and configurations may deviate from the simulations if and when the project is actually implemented.

Effects Analysis

Refer to Figure 3.3.1-1 for a map of impacts to sensitive observation points and corridors, including recreation residences. Refer to Figure 3.3.1-2 for an illustration of the Alternative

alignments in the Cascade Creek area. Refer to Figure 3.3.1-3 for a map of the Cave Creek local routing option (LRO), which is part of both Alternative 3 and Alternative 4 and to Figure 3.3.1-4 for a map of the Cascade East LRO (Alternative 3) and the Cascade West LRO (Alternative 4). A summary of impacts to sensitive observation points and corridors (recreation sites, the Gallatin River, US Hwy 191 and private residences) for Alternative 1 (No Action) and action alternatives is provided in Table 3.3.1-1. A summary of impacts to recreation residences for each alternative is provided in Table 3.3.1-2.


JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE
Fig. 3.3.1-1 - Sensitive Observation Points and Corridors
Sensitive Viewer Impacts
High
Moderate
Moderate - Low and Low
Sensitive Viewers
Residence
Recreation Residence
Trailhead
Campground
Sensitive Road or Trail
Sensitive River
Project Features
Tenth Mile Marker
Mile Marker
Mile Study Corridor
Existing Transmission Features
Substation
69 kV Transmission Line
Transportation
Highway
Road
Trail
Jurisdiction
National Forest Administrative Boundary
Private Land
0 0.5 1 1.5
Miles
Alt. 1, 2, 3, & 4
Indian Ridge Trailhead
Storm Castle Trailhead
Hell Roaring Trailhead
Gallatin River National Recreation Trail
Alt. 3 & 4 (Cave Creek LRO)
Cave Creek Cabin Area
Alt. 3 (Cascade East LRO)
Welcholm Springs Cabin Area
Lava Lake Trailhead
Alt. 1 & 2
Alt. 4 (Cascade West LRO)
Egyptian Creek Cabin Area
Cascade Creek Cabin Area
Kitchen Rock Cabin Area
Greek Creek Cabin Area
Greek Creek Campground
Swan Creek Cabin Area
Swan Creek Campground
Moose Creek Flat Campground
Asbestos Creek Trailhead
North Tamphery Creek Cabin Area
Tamphery Creek Cabin Area
Portal Creek Cabin Area
Deer Creek Trailhead
Goose Creek Cabin Area
Alt. 2, 3, & 4 (Engineering Refinement)
Alt. 1
Meadow Village Substation
Storm Castle Rd
Swan Creek Rd
Moose Creek Rd
Karst Stage Lp
Dudley Creek Rd
Pine Tree Rd
Lime Creek
Purdy Creek
Micg Creek
West Creek
Smith Creek
Twin Creek
Logger Creek
Hell Roaring Creek
Cave Creek
Line Creek
Greek Creek
Cascade Creek
Burnt Creek
South Fork Hell Roaring Creek
Asbestos Creek
Tamphery Creek
Deer Creek
Portal Creek
Crail Creek
Dudley Creek
Goose Creek
Hidden Creek
Shenango Creek
191
479
5410
6969
FS 984a

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JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Fig. 3.3.1-2 - Cascade Creek Area Illustration

- Existing Line / Alt 1 / Alt 2
- Cascade West LRO (Alt 4)
- Cascade East LRO (Alt 3)
- Cave Creek LRO (Alt 3 & 4)
- Cascade Creek Recreation Residence Tract

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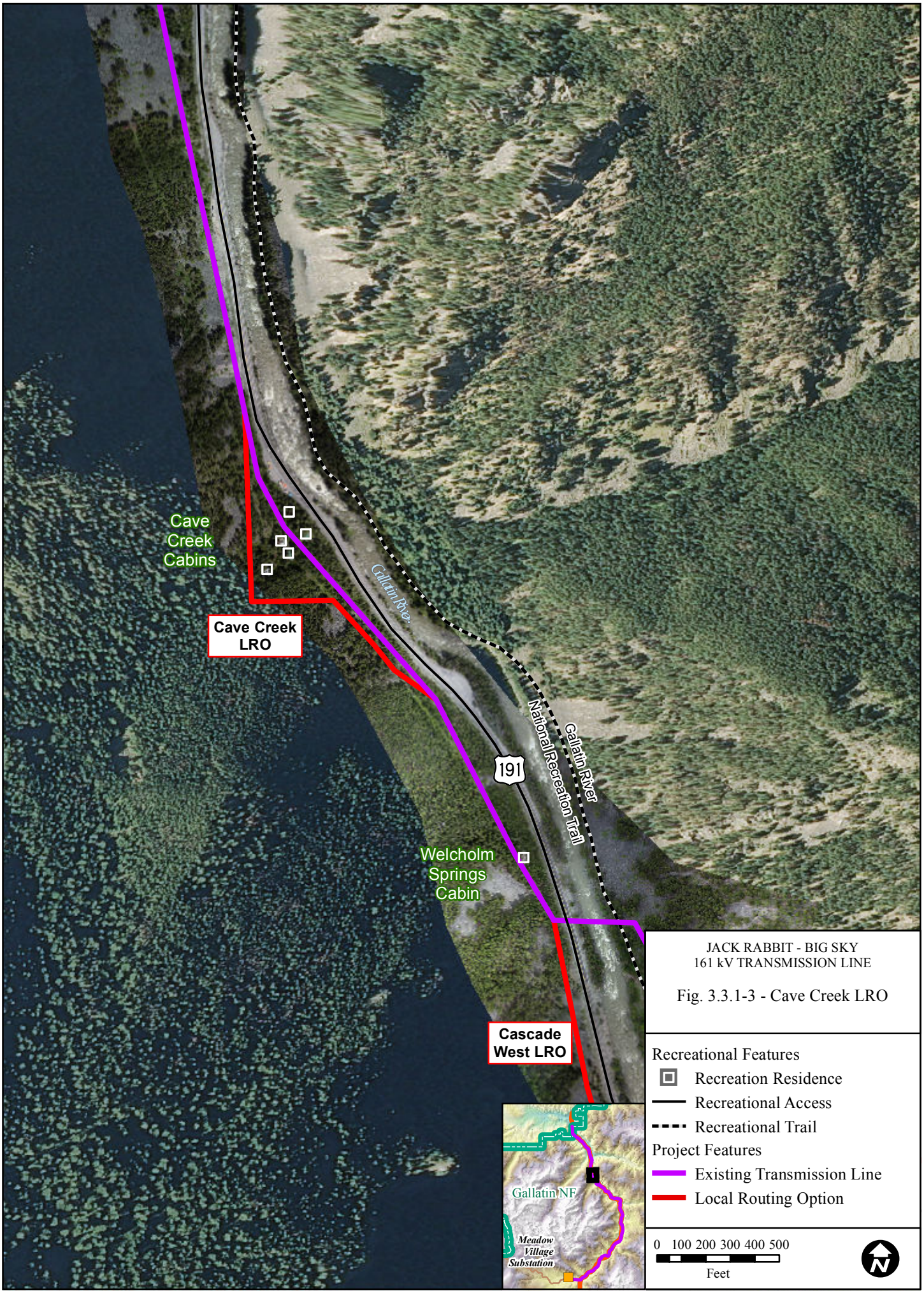

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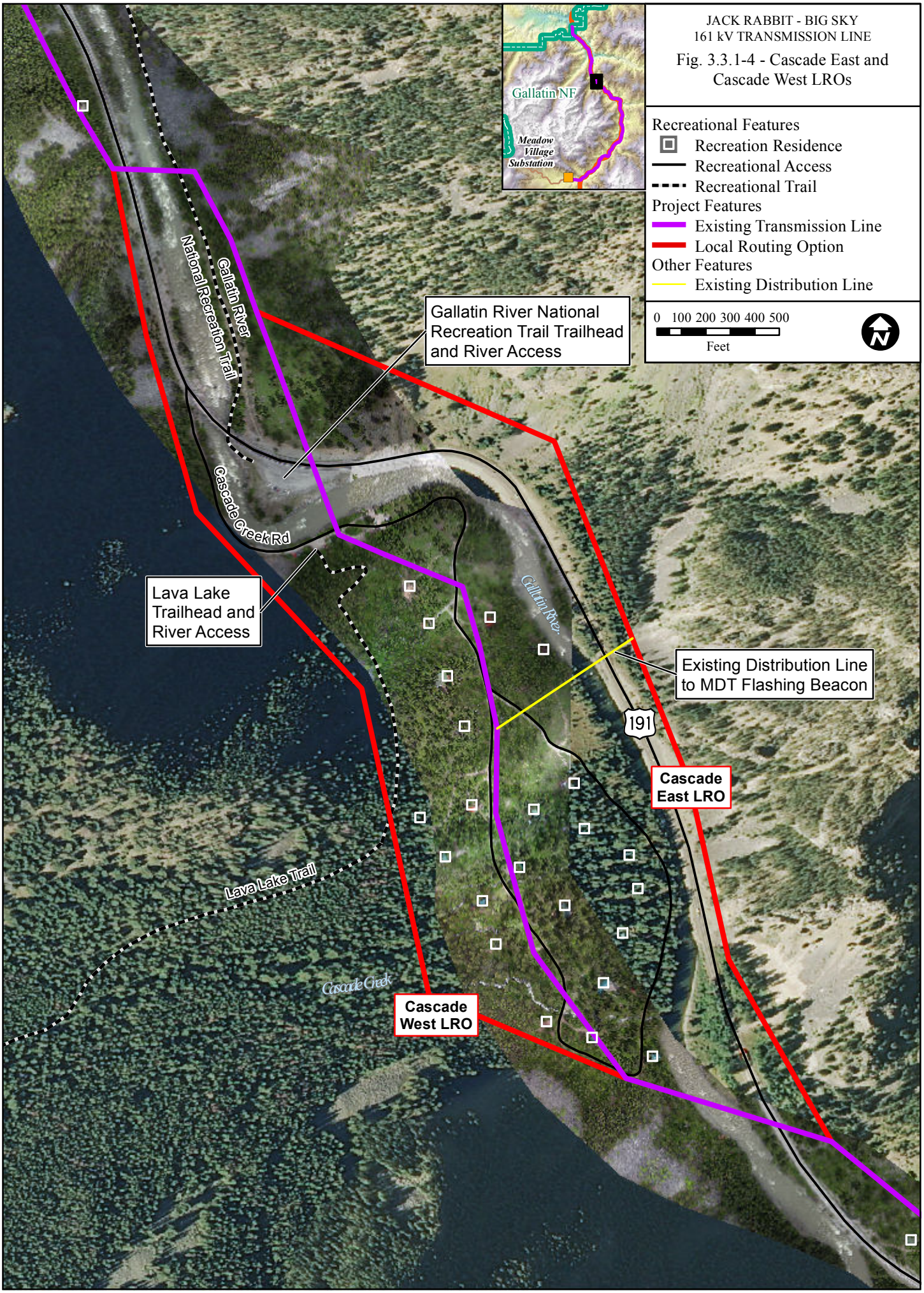

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TABLE 3.3.1-1 IMPACTS ON VIEWS FROM OBSERVATION POINTS AND CORRIDORS RESULTING FROM CHANGES TO THE EVC

ALTERNATIVE	MILES OF HIGH IMPACTS[1]	MILES OF HIGH-MODERATE IMPACTS[2]	MILES OF MODERATE IMPACTS[3]	MILES OF MODERATE-LOW IMPACTS[4]	MILES OF LOW IMPACTS[5]	TOTAL MILES
Recreation Sites						
1	NA	NA	NA	NA	NA	NA
2	0	0.1	0	2.0 (0.5)*	0.5	2.7
3	0.3 *(0.3)**	0.1	0	1.7 *(0.2)**	0.5	2.7
4	0.7 *(0.7)**	0.1	0	1.6	0.5	2.9
Gallatin River						
1	NA	NA	NA	NA	NA	NA
2	0	0.8	0.2	7.4 *(0.8)**	3.5	11.8
3	0.8 *(0.8)**	0.8	0.2	6.8 *(0.2)**	3.5	12.1
4	0.4 *(0.4)**	0.8	0.2	6.8 *(0.2)**	3.5	11.7
US Hwy 191						
1	NA	NA	NA	NA	NA	NA
2	0	0.6	0.1	6.4 *(0.4)**	0.5	7.6
3	0.8 *(0.8)**	0.6	0.1	6.1 *(0.1)**	0.5	8.2
4	0.5 *(0.5)**	0.6	0.1	6.1 *(0.1)**	0.5	7.8
Private Residences						
1	NA	NA	NA	NA	NA	NA
2, 3, and 4	0	0.4	0.3	2.0	2.6	5.2
Total Impacts						
1	NA	NA	NA	NA	NA	NA
2	0	1.9	0.5	17.8 *(1.6)**	7.1	
3	2.0 *(2.0*	1.9	0.5	16.7 *(0.5**	7.1	
4	1.6 *(1.6)**	1.9	0.5	16.5 *(0.2)**	7.1	

*Impact totals for the LROs (Alternative 3 – Cave Creek and Cascade East LROs; Alternative 4 – Cave Creek and Cascade West LROs) and the section of Alternative 2 that would be replaced by the LROs are shown in parenthesis.

NA = Not Applicable

[1] High impacts are the result of strong visual contrast levels, which would result from removal of overstory vegetation, in the immediate foreground or foreground distance zones for highly sensitive viewers and moderate-strong visual contrast levels in the immediate foreground distance zone for highly sensitive viewers. Moderate-strong visual contrast levels would result from the proposed transmission line being built in a landscape with no existing transmission lines (the LROs), where overstory vegetation is absent (shrubland, grassland, unvegetated or talus slopes).

[2] High-Moderate impacts are the result of moderate-strong visual contrast levels in the foreground distance zone for highly sensitive viewers and moderate visual contrast levels in the immediate foreground for highly sensitive viewers.
Moderate-strong visual contrast levels are described above in ([1]). Moderate visual contrast levels would result where the proposed transmission line would replace a smaller existing line of the same structure type (where the existing transmission line would be rebuilt) and would cross talus slopes.
[3] Moderate impacts are the result of moderate visual contrast levels in the foreground distance zone for highly sensitive viewers. Moderate visual contrast levels are described above in ([2]).
[4] Moderate-Low impacts are the result of weak visual contrast levels in the immediate foreground distance zone for highly sensitive viewers. Weak visual contrast levels would result where the proposed transmission line would replace a smaller existing line of the same structure type (where the existing transmission line would be rebuilt), where overstory vegetation is absent (shrubland, grassland or unvegetated) but no talus slopes are crossed.
[5] Low impacts are the result of weak visual contrast levels in the foreground distance zone for highly sensitive viewers. Weak visual contrast levels are described above in ([4]).

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and no additional impacts to the EVC would occur, which is consistent with the existing conditions. The No Action Alternative would involve continued use and maintenance of the line and infrastructure. Routine and heavy maintenance needed to maintain the existing 69 kV line, such as pole replacement and vegetation clearing, would continue. The existing permit authorizes a clearing of 40 feet. In some places the clearing width has not been maintained to 40 feet, but could be cleared under the existing authorization. Past impacts of use and maintenance are a good indication of what would be expected however, pole and conductor replacement would eventually be part of the maintenance of the existing authorization.

Consistency with Forest Plan Standards

Management Areas and VQOs

Under the No Action Alternative, no changes to MA 25 would occur.

Wild and Scenic Rivers

The No Action Alternative would not alter scenic integrity of the landscape viewed from the Gallatin River corridor and would not alter the scenic values of the river from its current condition.

Cumulative Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and would not add to any cumulative impacts. The existing transmission line would remain and would continue to be viewed from the sensitive observation points and corridors. The EVC would remain the same and no change would occur in areas where the existing transmission line is a dominant visual element that negatively influences the visual condition.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2

The Proposed Action would replace the existing 69 kV transmission line with a new 161 kV transmission line and follow the existing ROW, typically widening it 10 feet to a total of 50 feet. The proposed route would follow the existing alignment for approximately 23 miles (approximately 16 miles through NFS lands) through the Gallatin River Canyon to the Big Sky turn-off at MT Hwy 64. From the Big Sky turn-off (MT Hwy 64), the proposed route would then turn west, following the existing 69 kV line alignment for approximately 1.4 miles to the new Meadow Village Substation site.

Under Alternatives 2, 3, and 4, the new transmission line would include four main types of transmission structures or transmission structures. The most common type would be single-pole wooden transmission structures placed approximately 300 feet apart (average ruling span), with a nominal transmission structure height above ground of approximately 60 to 70 feet (an increase of 5 to 10 feet from existing transmission structure height). Transmission structures would typically be 1.5 feet in diameter; however transmission structure diameter could vary up to four feet depending on design criteria. Depending on terrain and other design criteria, transmission structure height could be as tall as 90 feet. In some areas where single-pole wooden transmission structures or guyed transmission structures are infeasible due to obstructions, steep terrain, river and canyon crossings and/or areas where the line changes direction resulting in a greater angle, the transmission line could be supported by self supporting steel transmission structures or wood laminate transmission structures directly embedded into the ground. In some areas, two-pole wooden "H-frame" structures have been used on the existing 69 kV alignment, and could be used to allow further spacing between structures. However, this structure has not been identified during pre-engineering for use anywhere along the 16 mile segment on NFS lands.

Although the Project has not been engineered and locations where transmission structure types other than single-pole wooded transmission structures would be necessary have not been determined, an assumption that steel transmission structures may be used at locations where the point of intersection (PI) is a greater angle than three degrees was made for the purposes of the Scenery impact analysis. Steel transmission structures may also be used for some transmission structure locations where the PI is less than three degrees, but helicopter access (access road category Level 3) would be necessary for construction. The number and potential locations of steel transmission structures and other transmission structure types would be determined during Project engineering.

The existing two-wire distribution underbuild circuit that is carried along much of the route would be replaced with a three-phase, four-wire 12.5 kV distribution circuit to improve electrical service for customers along the ROW. The distribution underbuild would be more noticeable than the existing underbuild due to the increase from two wires to four, larger diameter wires, and larger hardware required to hang the wires.

The new 161 kV transmission line replacing the existing 69 kV transmission line would create an additional moderate contrast, or moderate structure change to the existing landscape, due to the difference in height and scale of the transmission structures, hardware, and conductor wires of the161 kV transmission line and the existing 69 kV transmission line. This contrast would add to the existing contrast created by the existing 69 kV transmission line because the 161 kV line components and transmission structures are larger and bulkier than the existing 69 kV line and transmission structures. Steel transmission structures and other alternative transmission structure types would create stronger structure contrast levels than single-pole wooden transmission structures or guyed wood transmission structures.

The transmission ROW would increase from approximately 40 feet to 50 feet, although additional ROW width could be required if alternate transmission structure types are required due to terrain or other design criteria. H-frame transmission structures would require an 80 foot ROW. The level of vegetation clearing within the increased ROW would be the same as the level of vegetation clearing that NorthWestern currently does to ensure the safety and reliability of the existing transmission line and provide access for maintenance operations. Removal of mature vegetation, under or near the conductors, would be done to provide adequate electrical clearance. Woody vegetation 14 feet or higher or vegetation that could grow to 14 feet or higher within the ROW would be cleared. Clearing would consist of felling the woody vegetation as close to the ground as possible and leaving roots intact and removing the material from the ROW where

safely feasible. In addition, trees that are outside of the ROW boundary but have potential to fall into lines or affect lines during wind-induced line swing would be removed. Dead, dying or otherwise dangerous trees or tree limbs located near the ROW that could pose a hazard to the transmission line would be removed as part of NorthWestern's routine vegetation management program. Vegetation that would not grow higher than 14 feet would not be cut or cleared unless required to provide construction and maintenance access.

Trees and tree branches have encroached into the existing ROW in places, reducing the apparent width of the ROW. However, they would be cleared from the existing ROW at some time as part of NorthWestern's maintenance operations for the existing 69 kV transmission line even if the Project is not built.

Because vegetation clearing would add incrementally to an existing clearing rather than creating a new cleared area, a weak level of vegetation contrast would result due to the increase in ROW width from 40 feet to 50 feet. A moderate level of vegetation contrast would result from the increased vegetation clearing in any forested areas where a ROW width of 80 feet would be required for H-frame transmission structures; however, no H-frame transmission structure locations have been identified.

Of a total of 16 mile of Proposed Project on NFS lands, there would be 3.4 miles having conventional access to the ROW, consisting of vehicular access from existing roads and trails which require no road work. An additional 1.6 miles of existing roads and trails with conventional access would require road improvements. There are 10.2 miles having no access due to terrain or other obstacles. Therefore, helicopter and/or walk-in access would be used unless a crane can reach from an existing road. An additional 0.8 miles have an undetermined access prescription but would be similar to those described above. Disturbed areas, with the exception of existing access roads, would be restored, as nearly as possible, to their original contour and reseeded where appropriate to reduce visual contrast and restore the visual condition, as described in Project Design Feature (PDF) 1.7 (see Chapter 2 for description). Grading and resulting soil exposure would be limited due to the use of existing roads and overland travel, which consists of "drive and crush" over existing vegetation for vehicular access, and pedestrian and helicopter access, resulting in a weak level of contrast with the existing landform, with the exception of talus slope areas, where moderate landform contrast levels could result from construction activities.

Two temporary construction yards/staging areas for materials and equipment storage and staging for construction activities may be constructed on NFS land. One would be located at a mid-canyon location near Portal Creek on the east side of US Hwy 191 and one may be located at a north canyon location near Indian Ridge trailhead. The Portal Creek yard would be visible from US Hwy 191 while the Indian Ridge yard would be located away from US Hwy 191 and would not be visible from the highway, but would be visible from the Indian Ridge Trailhead. Vegetation crushing from overland travel and placement of materials on the ground would likely occur at these locations. Five log decking areas approximately one to three acres each may be constructed on NFS land on previously disturbed areas. Three would be located near US Hwy 191 and would be visible from the highway and two would be located away from the highway and would not be visible to travelers. Refer to Figure 2-7 in Chapter 2 for a map of the construction and decking areas. No clearing of trees is anticipated at any of the construction or decking areas. Temporary visual contrast with the surrounding landscape would occur due to the presence of materials and equipment, vegetation crushing and potential vegetation cutting. These areas would be restored, as nearly as possible, to their original contour and reseeded as described in PDF 1.7 (see PDF description in Chapter 2).

Consistency with Forest Plan Standards

Management Areas and VQOs

To meet the MA 25 Forest Plan Standard for visual quality, the VQOs of the adjacent management areas (Retention and Partial Retention) would be considered. The Proposed Action would follow the existing 69 kV transmission line ROW, which would result in less vegetation removal than a new ROW and would concentrate visual impacts in the area immediately around the existing transmission line rather than impacting the visual condition of a new area. Using pedestrian and helicopter access methods where no existing access roads are present would avoid grading and vegetation removal that would impact the existing visual condition. Leaving shrubs and other vegetation that would remain lower than 14 feet would minimize the contrast of the cleared area with surrounding vegetation and impacts to the existing visual condition.

The PDFs (described in Chapter 2 of this FEIS) would also contribute to consideration of the VQOs of the adjacent management areas. PDFs 1.1 and 1.7 would reduce ground disturbance and landform scarring, and require surface and vegetation restoration as practicable. PDFs 1.5 and 1.6 would require transmission structures to be placed the maximum distance from observation points and corridors, as practicable. PDF 4.1 would reduce the contrast of the conductors with the landscape by making them non-specular (not reflective).

Wild and Scenic Rivers

The Proposed Action would comply with the Forest Plan Wild and Scenic Rivers management standard by following the existing ROW, which would be expanded to a 50-foot width. Minimizing visual contrast levels in areas visible from the river by leaving vegetation that would remain less than 14 feet in height in the ROW, and avoiding grading and vegetation removal by using pedestrian and helicopter access methods where no existing access roads are present, would contribute to protection of its outstandingly remarkable scenery value. Implementation of the PDFs listed above in the Compatibility with Forest Plan Standards, Management Areas and VQOs Section and described below would help to protect the EVC. Refer to the impact discussion below for additional detail regarding impacts to the Gallatin River corridor.

Effects to Scenery Viewed from Sensitive Observation Points and Corridors

Recreation Sites

Visibility was reviewed from recreation sites from where the project actions would be visible. Refer to Table 3.3.1-1 for a summary of impacts to recreation sites.

Indian Ridge Trailhead

The Indian Ridge Trailhead is located in an open meadow where it would have unobstructed views of the proposed transmission line. The transmission line would be located between the trailhead and US Hwy 191, which it would parallel. An approximately 0.4 mile long segment of the proposed transmission line would be visible on NFS land and a long sequence of transmission structures would be visible. Four steel transmission structures could be required in locations where existing transmission structures with PIs of three degrees or greater are present in the area. Private residences are scattered on the opposite side of US Hwy 191. Because viewers at the trailhead would view the transmission line in tandem with the highway and private residences, the incremental change to the EVC caused by the Proposed Action would be less noticeable to viewers. The temporary construction yard/staging area that may be constructed near Indian Ridge trailhead would also be visible from the trailhead and would result in a temporary change to the EVC of the landscape viewed from the trailhead.

Lava Lake Trailhead Area

The Lava Lake trailhead area was identified as a highly sensitive area based on the visual dominance of the proposed transmission line at river crossing locations in the area and the high

level of recreation use. The Lava Lake Trailhead area includes the Lava Lake Trailhead on one side of the river and the Gallatin River National Recreation Trail and Trailhead on the opposite side. It is also an access area for the Gallatin River used for rafting, kayaking, and fishing access. Parking areas where recreationists gather and travelers may stop to view the scenery are located on both sides of the river. It is an area of heavy recreation use.

The current transmission line alignment crosses US Hwy 191 and the Gallatin River in this area. An existing guyed transmission structure is located at the trailhead immediately next to the restroom and trailhead parking and thus is viewed in extremely close proximity by visitors and recreationists at the trailhead. The guy wires and the transmission structure itself are visually dominant elements. A steel transmission structure could be required in this location, which would increase the visual dominance of the proposed transmission line. Both the Lava Lake Trailhead and the Gallatin River National Recreation Trail Trailhead have immediate foreground views of the proposed alignment. The Gallatin River National Recreation Trail follows the river and the highway. The trail is close to the proposed alignment, with some views screened by trees and some open views of the existing transmission line. The larger transmission structures, bulkier hardware and larger diameter conductors of the proposed transmission line would be more visually dominant than the existing transmission line and would reduce the EVC of the surrounding scenery. Steel transmission structures that would be visible from the Gallatin River National Recreation Trail could be required. Photo-Simulation 4 in Appendix E illustrates what the transmission line in the Proposed Action would look like from the Lava Lake Trailhead parking area.

The existing alignment is located east of the Lava Lake trail. It is closest to the trail north of the Cascade Creek recreation residence tract, where it passes approximately 80 feet from the trail 250 feet from the trailhead.

Moose Creek Campground

Moose Creek Campground includes both overnight facilities and a day use picnic area. It is also used for fishing and as a raft launch site for floating the Gallatin River. The site is located in an open area between US Hwy 191 and the Gallatin River at a lower elevation than the highway. The current alignment is located on the opposite side of US Hwy 191, close to the highway and is not screened by vegetation. Activities at the campground are generally oriented toward the Gallatin River, which borders the campground on the west. The campground would have unobstructed immediate foreground views of a sequence of multiple transmission structures in the proposed alignment. The larger transmission structures and conductors of the new transmission line would increase the visual contrast of the existing line with the surrounding scenery. Steel transmission structures could be required in this area. The Proposed Action would lower the EVC of the landscape viewed from the Moose Creek Campground. Photo-Simulation 8 in Appendix E illustrates what the transmission line in the Proposed Action would look like from a viewpoint in the Moose Creek Campground.

Deer Creek Trail

The Deer Creek Trail is crossed by the existing transmission line and would be crossed by the proposed transmission line. The proposed transmission line would not be visible from the trailhead. In the Deer Creek Trail area the proposed transmission line would cross US Hwy 191 and the Gallatin River and then follow and alignment northwest of the Deer Creek Trailhead. The proposed transmission line would cross the trail approximately 0.2 mile from the trailhead on the edge of an area of meadow and scattered trees. The larger transmission structures, bulkier hardware and larger diameter conductors of the proposed transmission line would be more visually dominant than the existing transmission line and would reduce the EVC of the surrounding scenery. A steel transmission structure could be required close to the Deer Creek Trail, further increasing the visual dominance of the proposed transmission line.

Other Recreation Observation Points

The Project would be visible from the Hellroaring trailhead. The trailhead is adjacent to US Hwy 191 and to private development across the road. The current alignment crosses US Hwy 191 and the trailhead, with a guyed transmission structure located at the trailhead, right behind the trailhead information board. A steel transmission structure could be required at this location. Because the Proposed Project would be viewed in tandem with the highway and the nearby private development, the Proposed Action would have a limited impact.

River access for fishing and access for trailheads are located near the Shenango helicopter/fire base. The existing transmission line and the proposed Alternative 2 alignment are located on the opposite side of the highway from the river access area. Views of the proposed transmission line from this area would be partially to fully screened by vegetation, depending on a viewer's location along the river or in the parking area. Some of the trees that provide screening in this area are thinning or dying due to disease and pests.

The existing transmission line and the proposed upgraded transmission line would be located on the opposite side of the Gallatin River and US Hwy 191 from the Asbestos Creek Trailhead, which is accessed from the Karst Area, where a relatively large area of private houses is located. The trailhead is located in a wooded area near the river. Trees would provide screening from views of the proposed transmission line from the trailhead.

The proposed transmission line would not be visible from the Greek Creek Campground on either side of US Hwy 191. The transmission line is located upslope from the campground in a forested area. Trees would screen any views of the transmission line from the campground.

The proposed transmission line would not be visible from the Moose Creek Group Site but would be visible from the access road between US Hwy 191 and the group site. In this area the proposed transmission line would cross a small meadow adjacent to the access road and US Hwy 191 and then cross over the access road where the road turns east. Trees fully screen views from the group site, which is located in a forested area. Because the transmission line is only seen from the access road in close proximity to US Hwy 191 and is not viewed from the group site, the Proposed Action would have a limited impact.

US Hwy 191 and Gallatin River Corridor

The number of US Hwy 191 and Gallatin River crossings would remain the same under Alternative 2. The greatest impacts to highway and river corridor viewers would occur at crossings and in the areas where long stretches of the existing line are visible and are visually dominant elements in the landscape. These areas are summarized above in Existing Visual Condition. The larger transmission structures, bulkier hardware and larger diameter conductors of the proposed transmission line would be more visually dominant than the existing transmission line and would reduce the EVC of the surrounding scenery. Although transmission structures may not be visible at river crossings, the larger diameter conductors crossing above the river would increase the visual dominance of the transmission line. Steel transmission structures could be required at various locations. A total of approximately 50 locations where existing transmission structures with PIs of three degrees or greater are visible from US Hwy 191 and steel transmission structures could be required were identified for the Scenery Impact Analysis. Steel transmission structures would increase the visual dominance of the proposed transmission line and further reduce the EVC of the surrounding scenery.

Several photo-simulations illustrate views of the Proposed Action from the highway and river corridor. All photo-simulations are located in Appendix E. Photo-Simulation 1 illustrates what the transmission line in the Proposed Action would look like from a viewpoint near the GNF sign. Photo-Simulation 2 illustrates what the transmission line in the Proposed Action would look like

from one of the pullouts north of the Cave Creek recreation residence tract. Photo-Simulation 4 illustrates what the transmission line in the Proposed Action would look like from the Gallatin River National Recreation Trail parking area south of the 35 mph bridge. Photo-Simulation 10 illustrates what the transmission line in the Proposed Action would look like from US Hwy 191 with the mitigation described below in Visual Resources Mitigation Measures, which would straighten the transmission line alignment through a meadow next to US Hwy 191 and shift the alignment a maximum of 100 feet to the west in that location. Photo-Simulation 11 illustrates what the transmission line in the Proposed Action would look like from a viewpoint along MT Hwy 64.

Refer to Table 3.3.1-1 for a summary of scenery impacts to US Hwy 191 and the Gallatin River.

Private Residences

It is assumed that the existing ROW on private land will be negotiated between NorthWestern and the landowner. For our analysis, we assumed alignment on private lands would remain within the existing alignment.

Views from private residences where the existing or proposed transmission lines could be seen were analyzed during the field observation. The relationship of the transmission line to the residences varies, with the transmission line close to the highway and in front of the residences in some locations and at the rear of the residences in others. The greatest impacts to private residences would occur where unobstructed views with no vegetation screening occur. Private residences would have open views of the Proposed Action on GNF land in several locations. Residences near the GNF sign and in the Indian Ridge trailhead area near the north end of the analysis area would view the proposed transmission line across the road in an open meadow. Some residences in the Karst area would have views of the Proposed Action. However, the alignment would stay within the forested area on the edge of the clearing and most views would be fully or partially screened by trees. A cluster of residences in the Dudley Creek area would also have open views of the alignment across the road. Some views of the line would also potentially occur for residences in the Big Sky area, although vegetation would provide some screening. Steel transmission structures could be required at various locations that would be visible from private residences. Because the transmission line would be viewed in these areas in tandem with the highway, which reduces the visual condition of the landscape as viewed from the residences, the Proposed Action would have a limited impact.

Consistency with Forest Plan Standards

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Alternative 3 was developed to improve upon the visual effects of the existing and proposed transmission line (Alternative 2) by reducing its visual dominance in two specific areas. Alternative 3 would utilize the same alignment as the Proposed Action and would result in the same impacts, with the exception of the Cave Creek and Cascade Creek LROs described below. Alternative 3 minimizes river crossings in a candidate wild and scenic river corridor and reduces scenery impacts to the wilderness access trail. This alternative would also remove a highly visible transmission line structure that currently exists in the heavily used Lava Lake trailhead parking lot. Alternative 3 would better “consider” the VQOs (Retention and Partial Retention) of the adjacent management areas, as required by the Forest Plan in MA 25. Refer to Table 3.3.1-1 for a summary of the impacts of Alternative 3.

Cave Creek LRO

The Cave Creek LRO was developed to increase the distance between recreation residences in the Cave Creek recreation residence tract and the transmission line. The existing transmission line crosses through the middle of the tract. Refer to Figure 3.3.1-3 for a map of the Cave Creek LRO. Refer to Recreation Residences section below for a discussion of recreation residence impacts. The Cave Creek LRO would result in the same impacts as the Proposed Action for all other sensitive observation points and corridors.

Cascade East LRO

The Cascade East LRO was developed to eliminate two highway and two river crossings of the transmission line and the guyed transmission structure in the middle of the Lava Lake Trailhead. The LRO was also developed to move the transmission line further from the recreation residences in the Cascade Creek recreation residence tract and from the Lava Lake Trailhead recreation area and thus reduce visual, heritage and recreational impacts. It would also eliminate the river and highway crossing of a distribution line that serves a MDT flashing beacon along US Hwy 191. The existing 69 kV transmission line contains 18 transmission structures along this one-mile stretch. This LRO would require minimal tree clearing due to the alignment moving east of US Hwy 191 along less forested slopes. The transmission structures required for the Cascade East LRO could potentially be steel transmission structures due to the steep topography, helicopter construction, PIs of three degrees or greater and other design criteria.

The LRO would improve the visual setting of the Lava Lake Trailhead area and the Gallatin River, removing visually dominant deviations and reducing visual contrast. Removing the guyed transmission structure next to the restroom in the Lava Lake Trailhead would substantially improve the EVC within the trailhead area. Because the trailhead is adjacent to the forest and steep slopes on the west side, views at the trailhead area are generally oriented to the east, where views are more expansive. In this direction views include the river and the more distant mountain slopes, where the LRO would be visible on a steep area of scattered vegetation and exposed rock. Because the background slope has diverse texture and color, the LRO would blend partially into the background.

The LRO would eliminate the visible highway and river crossing of the transmission line and the distribution line at the Lava Lake Trailhead. It would eliminate the transmission line from the highway and river crossing south of the Cascade Creek recreation residence tract, although the distribution line crossing would remain on shortened poles. The LRO would also eliminate the distribution line crossing that serves the MDT flashing beacon east of the Cascade Creek recreation residence tract. The transmission line across the steep slopes on the east side of the river and US Hwy 191 would be visible from the highway, especially for northbound traffic south of the Cascade Creek recreation residence tract. Northbound travelers would view the transmission line crossing the slope and a transmission structure and conductor wires skylined (visible against the sky) on a ridge directly ahead of them as they travel along a relatively straight stretch of the highway. Motorists are typically moving at 55 to 60 mph on this section of US Hwy 191 and would have relatively short view durations. Photo-Simulations 6A and 6B in Appendix E illustrate what the transmission line in the Cascade East LRO would look like for northbound traffic on US Hwy 191 in this area.

Although the LRO would degrade a portion of the scenery viewed from the Lava Lake trailhead area, the Gallatin River and US Hwy 191, overall it would improve the existing visual condition of the area and the scenery as a whole that is viewed from these locations.

Refer to Figure 3.3.1-4 for a map of the Cascade East LRO.

Consistency with Forest Plan Standards

Management Areas and VQOs

The LROs would move the transmission line ROW and expand MA 25. The management areas adjacent to the portion of MA 25 that would contain the Cave Creek LRO and the Cascade East LRO have Retention VQOs, with the exception of a short section of the Cascade East LRO, which would cross through a Partial Retention VQO area. To meet the MA 25 Forest Plan Standard for visual quality, the VQOs of the adjacent management areas (Retention and Partial Retention) would be considered.

Alternative 3 was developed to improve upon the visual effects of the existing and proposed transmission line (Alternative 2) by reducing its visual dominance in two specific areas. The Cave Creek LRO would increase the distance between recreation residences in the Cave Creek recreation residence tract and the transmission line, and reduce its visual dominance in the tract. The Cascade East LRO would locate the transmission line on the opposite side of the Gallatin River from the Cascade Creek recreation residence tract, removing it from the tract and reducing its visual dominance. Both of these LROs would reduce visual dominance of the transmission line for recreation residences in the two tracts. The existing transmission line crosses through the middle of both tracts. Using pedestrian and helicopter access methods where no existing access roads are present would avoid grading and vegetation removal that would impact the existing visual condition. Leaving shrubs and other vegetation that would remain lower than 14 feet would minimize the contrast of the cleared area with surrounding vegetation and impacts to the existing visual condition. Alternative 3 minimizes river crossings in a candidate wild and scenic river corridor and reduces scenery impacts to the wilderness access trail. This alternative would also remove a highly visible transmission line structure that currently exists in the heavily used Lava Lake trailhead parking lot.

Wild and Scenic Rivers

The Cave Creek LRO would not alter scenic integrity of the landscape viewed from the Gallatin River corridor and would not alter the scenic values of the river from its current condition.

The Cascade East LRO would improve the visual setting of the Gallatin River by eliminating the visible river crossing of the transmission line at the Lava Lake Trailhead. It would also eliminate the highway and river crossing of the transmission line (but not the distribution line crossing) south of the Cascade Creek recreation residence tract and would eliminate the distribution line crossing that serves the MDT flashing beacon east of the Cascade Creek recreation residence tract. It would eliminate the existing guyed transmission structure in the middle of the Lava Lake Trailhead. The crossing at the Lava Lake Trailhead and guyed transmission structures are currently visually dominant within the trailhead area and negatively impact the visual condition. The LRO would be visible across the river on the mountain slope in a steep area of scattered vegetation and exposed rock. Although it would be seen by river recreationists and travelers stopping to view the scenery along the river, it would blend partially into the background of diverse color and texture.

Overall, the LRO would contribute to preserving the outstandingly remarkable scenery value of the river by reducing the transmission and distribution line river crossings and removing the existing line from the Lava Lake trailhead area, directly adjacent to the river.

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

Alternative 4 was developed to improve upon the visual effects of the existing and proposed transmission line in two specific areas by reducing its visual dominance. Alternative 4 would

utilize the same alignment as the Proposed Action and would result in the same impacts with the exception of the LROs described below. Alternative 4 would better "consider" the VQOs (Retention and Partial Retention) of the adjacent Management Areas, as required by the Forest Plan in MA 25. Refer to Table 3.3.1-1 for a summary of the impacts of Alternative 4.

Cave Creek LRO

Impacts to Cave Creek LRO from Alternative 4 are the same as those described above for Alternative 3.

Cascade West LRO

The Cascade West LRO was developed to eliminate two highway and two river crossings of the transmission line and the guyed transmission structure in the middle of the Lava Lake Trailhead. This LRO was also developed to move the transmission line further from the recreation residences in the Cascade Creek recreation residence tract and from the Lava Lake Trailhead recreation area and thus reduce visual, heritage and recreational impacts. The existing 69 kV transmission line contains 18 transmission structures along this one-mile stretch. This LRO would require additional tree clearing for new ROW in forested lands due to the alignment moving approximately 500 feet upslope from the existing 69 kV transmission line. The transmission structures required for the Cascade West LRO could potentially be steel transmission structures due to steep topography, helicopter construction, PIs of three degrees or greater and other design criteria.

Hikers on the Lava Lake trail would pass under the LRO approximately 0.25 mile from the trailhead. The LRO would parallel the trail between the trailhead and the crossing for about 750 feet at a distance of approximately 80 feet away. Views of the LRO through the trees would occur in this area. The cleared ROW would be highly visible at the trail crossing.

Removing the guyed transmission structure from the Lava Lake Trailhead would substantially improve the EVC of the trailhead area, however, approximately 0.3 mile of the Cascade West LRO would parallel and be adjacent to US Hwy 191 north of the 35 mph bridge and then would parallel and be adjacent to Cascade Creek Road, which provides vehicular access to the Cascade Creek recreation residence tract, the Lava Lake Trailhead, and a Gallatin River access area for paddlers, fishermen and other recreationists. Cascade Creek Road is also used by foot traffic in the winter and by recreationists crossing the river. This section of the LRO would cross talus slopes where it would be highly visible and areas of trees where it would be partially screened. It would be more visible than the section of the existing transmission line north of the 35 mph bridge that it would replace. Portions of the cleared ROW would be visible from Cascade Creek Road. It would reduce the EVC of the area it crosses on the west side of the river as viewed from the Gallatin River, US Hwy 191 and the Gallatin River Nation Recreation Trail but would improve the EVC where the existing transmission line would be removed.

Photo Simulation 3 in Appendix E illustrates what the transmission line in the Cascade West LRO would look like from the Gallatin River National Recreation Trail south of the 35 mph bridge. Refer to Figure 3.3.1-4 for a map of the Cascade West LRO.

Consistency with Forest Plan Standards

This section discusses the Cascade West LRO. Refer to the Alternative 3 Compatibility with Forest Plan Standards section for a discussion of the Cave Creek LRO.

Management Areas and VQOs

The Cascade West LRO would move the transmission line ROW and expand MA 25. The management areas adjacent to the portion of MA 25 that would contain the Cave Creek LRO and

the Cascade West LRO have Retention VQOs. To meet the MA 25 Forest Plan Standard for visual quality, the VQOs of the adjacent management areas (Retention) would be considered.

Alternative 4 was developed to improve upon the visual effects of the existing and proposed transmission line (Alternative 2) by reducing its visual dominance in two specific areas. The Cave Creek LRO would increase the distance between recreation residences in the Cave Creek recreation residence tract and the transmission line, and reduce its visual dominance in the tract. The Cascade West LRO would locate west of the Cascade Creek recreation residence tract, removing it from the center of the tract and reducing its visual dominance. Both of these LROs would reduce visual dominance of the transmission line for recreation residences in the two tracts. The existing transmission line crosses through the middle of both tracts. Using pedestrian and helicopter access methods where no existing access roads are present would avoid grading and vegetation removal that would impact the existing visual condition. Leaving shrubs and other vegetation that would remain lower than 14 feet would minimize the contrast of the cleared area with surrounding vegetation and impacts to the existing visual condition. Alternative 4 minimizes river crossings in a candidate wild and scenic river corridor. This alternative would also remove a highly visible transmission line structure that currently exists in the heavily used Lava Lake trailhead parking lot.

Wild and Scenic Rivers Standards

The Cascade West LRO would further protect the outstandingly remarkable scenic values of the river and improve the EVC of the river corridor by eliminating two river crossings and the existing guyed transmission structure in the middle of the Lava Lake Trailhead, which are visually dominant in the landscape. Approximately 0.3 mile of the LRO would parallel the west side of the river and would be visible from the river, either through trees or on open talus slopes. It would be viewed in tandem with US Hwy 191, Cascade Creek Road, parking areas and the 35 mph bridge, which are human-made landscape alterations as viewed from the river. The portion of the LRO that would be visible would reduce the EVC of the river corridor. However, overall the LRO would contribute to the outstandingly remarkable scenery value of the river by eliminating the two river crossings and the existing guyed transmission structure in the Lava Lake Trailhead area.

Cumulative Effects of Alternatives 2, 3, and 4

Cumulative effects would be similar for Alternatives 2, 3, and 4. Other current and future projects would have the potential to affect the EVC and views from sensitive observation points and corridors cumulatively with this project. The proposed US Hwy 191 Gallatin Canyon Safety Improvements would involve widening and improving US Hwy 191, including construction of a two-way left turn lane in the Greek Creek area, and construction of left turn lanes in the Swan Creek, Moose Creek, and Karst Ranch areas. Construction of a left turn lane at Moose Creek would be viewed with the proposed transmission line from Moose Creek Campground and would cumulatively reduce the EVC viewed from the campground. The US Hwy 191 Gallatin Canyon Safety Improvements and the Montana Opticom project could result in the removal of trees along US Hwy 191, which would potentially reduce screening of the proposed transmission line, increase visibility of the transmission line from US Hwy 191 and the Gallatin River and reduce the EVC.

Comparison of Alternatives

All alternatives would comply with the Forest Plan standards because they would be located within the expanded MA 25. The No Action Alternative (Alternative 1) would result in no change to the EVC as no improvements would be made to the existing transmission line. The No Action Alternative would involve continued use and maintenance of the line and infrastructure. Routine

and heavy maintenance needed to maintain the existing 69 kV line such as pole replacement and vegetation clearing would continue. The current impact of the existing transmission line on the visual condition varies from low impacts in areas where it is screened from view or blends into the background, to high impacts in areas where the existing transmission line is unscreened and stands out in the surrounding landscape.

Alternative 2 would remain in the existing ROW. Alternatives 3 and 4 would also remain within the existing ROW with the exception of the proposed LROs. Where the alternatives would replace the existing transmission line and remain within the existing ROW, they would increase the existing visual contrast level of the existing transmission line with the scenery and lower the EVC. An incremental increase to the impact of the existing transmission line would occur, resulting in potentially high impact levels for sensitive viewers. This incremental increase would be the result of larger and taller transmission structures, bulkier hardware, larger diameter conductor wires, increased ROW clearing, and disturbance of talus slopes. Refer to Table 3.3.1-1 for a summary of impacts for Alternatives 1, 2, 3, and 4.

Because the proposed LRO portions of Alternatives 3 and 4 do not follow the existing transmission line alignment and would require new ROW, they would result in new visual impacts where none previously occurred. However, the LROs would reduce or eliminate visual impacts where the existing transmission line conductor wires and hardware would be removed and transmission structures would either be removed or be shortened to accommodate existing distribution lines. Refer to Tables 3.3.1-2 and 3.3.1-3 for a summary comparison of impacts to sensitive observation points and corridors for Alternatives 1, 2, 3, and 4. Refer to Table 3.3.1-5 for a comparison of Alternatives for recreation residences.

Overall, Alternative 3 would make the greatest improvement to the US Hwy 191 and Gallatin River corridor and to the Lava Lake Trailhead Area and would have the least impacts to the Scenery resource.

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TABLE 3.3.1-2 SUMMARY COMPARISON - US HWY 191 AND GALLATIN RIVER CORRIDOR

ALTERNATIVE 1 (NO ACTION ALTERNATIVE)	ALTERNATIVE 2 (PROPOSED ACTION SECTION THAT WOULD BE REPLACED BY THE LROS)	ALTERNATIVE 3 (CAVE CREEK LRO AND CASCADE EAST LRO)	ALTERNATIVE 4 (CAVE CREEK LRO AND CASCADE WEST LRO)
US Hwy 191 and Gallatin River Corridor			
Highway and River Crossings The existing river crossings would be maintained.	Highway and River Crossings Three existing river and highway crossings (transmission and distribution) would remain. The furthest north crossing is the shortest (crosses at a nearly perpendicular angle) and least noticeable; the middle crossing at the Lava Lake Trailhead crosses a wide open area at a large pullout and has the greatest impact on scenery; the crossing south of the Cascade Creek recreation residence tract is longer than the north crossing but much less noticeable than the middle crossing.	Highway and River Crossings The middle (Lava Lake Trailhead) transmission and distribution crossing and the south transmission crossing would be eliminated. The distribution crossing for the MDT flashing beacon would also be eliminated. The north transmission/ distribution crossing and the south distribution crossing would remain.	Highway and River Crossings The middle (Lava Lake Trailhead) transmission and distribution crossing and the north transmission and distribution crossing would be eliminated. The south transmission and distribution crossing would remain, as would the distribution crossing for the MDT flashing beacon.
	The transmission line would generally not be visible except at the crossing areas described above.	The transmission line would be visible on a hillside that is not disturbed but is adjacent to the highway corridor. Northbound traffic currently views the hillside through and above the MDT flashing beacon distribution line that would be eliminated by the LRO. The line would be viewed in the context of the highway corridor (an area where the landscape has been altered and traffic signs, guardrails and other intrusions are located).	In addition to the crossings noted above, the transmission line would be viewed where it would parallel the highway and Cascade Creek Road. The line would be part of the highway corridor (an area where the landscape has been altered and traffic signs, guardrails, and other intrusions are located). A portion of the cleared ROW would be visible from the roadway where it climbs the hill north of the Cascade Creek recreation residence tract.
Although Alternative 3 would have slightly more miles of impacts due to visibility from the highway and river corridor as summarized in Table 3.3.1-1, it would eliminate the most prominent crossings, including the distribution crossing for the MDT flashing beacon, which is not accounted for numerically in the summarized miles of impacts. Overall, Alternative 3 would have the least impact.			

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TABLE 3.3.1-3 SUMMARY COMPARISON – LAVA LAKE TRAILHEAD AREA

ALTERNATIVE 1 (NO ACTION ALTERNATIVE)	ALTERNATIVE 2 (PROPOSED ACTION SECTION THAT WOULD BE REPLACED BY THE LROS)	ALTERNATIVE 3 (CAVE CREEK LRO AND CASCADE EAST LRO)	ALTERNATIVE 4 (CAVE CREEK LRO AND CASCADE WEST LRO)
Lava Lake Trailhead			
The existing line would remain through the Cascade Creek recreation residence and Lava Lake Trailhead areas. A guyed structure on the existing line would remain within the Lava Lake Trailhead.	The existing highway and river crossing would remain at the Lava Lake Trailhead Area. The guyed transmission structure within the trailhead area would remain. The furthest north crossing is the shortest (crosses at a nearly perpendicular angle) and least noticeable; the middle crossing at the Lava Lake Trailhead crosses a wide open area at a large pullout and has the greatest impact on scenery; the crossing south of the Cascade Creek recreation residence tract is longer than the north crossing but much less noticeable than the middle crossing.	The highway and river crossing at the Lava Lake Trailhead Area would be eliminated as would the visually dominant guyed transmission structure within the trailhead area. The transmission line would be visible on the hillside across the river and would be viewed in the context of the highway corridor and its associated visual intrusions. Although a portion of the line would be viewed from the trailhead area, it would be further away and would be less intrusive than the Cascade West LRO which would parallel Cascade Creek Road. Alternative 3 would have the least impact.	The highway and river crossing at the Lava Lake Trailhead Area would be eliminated as would the visually dominant guyed transmission structure within the trailhead area. The transmission line would be visible where it would parallel Cascade Creek Road. It would be highly visible where it would cross open talus slopes and may be visible where the ROW would have to be cleared through dense forest, where the transmission line would climb the slope west of the Cascade Creek recreation residence tract. This section would be viewed by both vehicular traffic accessing the trailhead area and for pedestrians accessing the area by foot in the winter and crossing to the other side of the river in all seasons.
Lava Lake Trail			
The existing impacts to the trail would remain, although the impacts are primarily at the Trailhead and the trail within the vicinity of the Trailhead.	A couple of transmission structures would be visible through the trees at the beginning of the trail.	Alternative 3 would not be visible from the trail, and thus would have the least impact.	Views from the trail would occur where the transmission line parallels it. This occurs near the beginning of the trail where the trail skirts the cabin area. The Alternative would cross the trail and diverge to the south before the trail turns west and approaches the wilderness. The cleared ROW would be highly visible at the trail crossing.
Gallatin River National Recreation Trail			
The existing 69 kV transmission line crosses the parking area for the	The transmission line crosses the parking area for the trailhead. It parallels the trail and	Alternative 3 would move the transmission line away from the	Alternative 4 would be visible across the river from the trailhead where it would cross open

ALTERNATIVE 1 (NO ACTION ALTERNATIVE)	ALTERNATIVE 2 (PROPOSED ACTION SECTION THAT WOULD BE REPLACED BY THE LROS)	ALTERNATIVE 3 (CAVE CREEK LRO AND CASCADE EAST LRO)	ALTERNATIVE 4 (CAVE CREEK LRO AND CASCADE WEST LRO)
trailhead. It parallels the trail and is periodically visible through the trees.	is periodically visible through the trees.	trailhead but would be visible on the hillside on the east side of US Hwy 191 across from Lava Lake Trailhead. It would also be visible periodically through the trees along other portions of the route.	talus slopes. Alternative 4 would have the least impact.

Recreation Residences

Refer to Table 3.3.1-4 for a summary of impacts to recreation residences.

TABLE 3.3.1-4 IMPACTS ON VIEWS FROM RECREATION RESIDENCES

ALTERNATIVE	MILES OF HIGH IMPACTS	MILES OF HIGH-MODERATE IMPACTS	MILES OF MODERATE IMPACTS	MILES OF MODERATE-LOW IMPACTS	MILES OF LOW IMPACTS	TOTAL MILES
Recreation Residences						
1	NA	NA	NA	NA	NA	NA
2	0	0	0	2.8 *(0.8)**	0.4	3.2
3	0.2 *(0.2)**	0	0	2.0	0.4	2.6
4	0.4 *(0.4)**	0	0	2.1 *(0.1)**	0.4	2.9

* Impact totals for the LROs (Alternative 3 – Cave Creek and Cascade East LROs; Alternative 4 – Cave Creek and Cascade West LROs) and the section of Alternative 2 that would be replaced by the LROs are shown in parenthesis.
NA= Not Applicable.

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and no new impacts to the EVC would occur, which is consistent with the existing conditions.

Cumulative Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and would not add to any cumulative impacts. The existing transmission line would remain and would continue to be viewed from the recreation residences that currently view it. The EVC would remain the same and no change would occur in areas where the existing transmission line is a dominant visual element that negatively influences the visual condition.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2

Visibility was reviewed from access roads and from walking in common areas in the recreation residence tracts. The descriptions below list the number of recreation residences where the Proposed Project would be located within the immediate foreground, and the foreground distance zones. Vegetation clearing of the ROW and the new taller, bulkier transmission structures and conductors of the Proposed Action would result in impacts to recreation residences. Views from individual recreation residences may currently be screened by vegetation; however, vegetation screening could be reduced due to clearing around recreation residences for safety, thinning from disease or insect damage, or fire damage, resulting in increased visibility of the Proposed Action. Vegetation screening could increase over time due to growth or increased vegetation density. Refer to Table 3.3.1-4 for a summary of impacts to recreation residences.

Cave Creek

A total of five residences are located within the Cave Creek tract. The current alignment of the transmission line is next to the deck of one residence, with a transmission structure located approximately 25 feet from the deck. Because of the angle of this transmission structure, a transmission structure other than a wood cedar pole could be required for the Proposed Action in this location. The transmission line crosses through the common parking area, with the conductor wires close to a large central tree that is important to the residents. The Project would be located within the immediate foreground distance zone for all recreation residences. The transmission

structures and conductors of the Proposed Action would be viewed in very close proximity and would be dominant visual elements within the recreation residences. Vegetation clearing would result in trimming or cutting the large central tree. The new transmission line would cross above the deck of the recreation residence that is located extremely close to the existing line. The Proposed Action would increase the existing visual contrast of the existing transmission line and would lower the EVC within the Cave Creek tract. Refer to Figure 3.3.1-3 for a map of the Proposed Action at Cave Creek.

Welcholm Springs

A single residence is located at Welcholm Springs. The Proposed Project would be located within the immediate foreground distance zone of the residence. The current transmission line alignment crosses over an out building and is extremely close to the main recreation residence, with a transmission structure located within 15 feet of it. The Proposed Action would move the transmission line 10 to 15 feet upslope and away from the buildings. The transmission structures and conductors of the Proposed Action would be viewed in very close proximity and would be dominant elements in the scenery. A transmission structure, other than a wood cedar pole, could be required for the Proposed Action in this location. Vegetation clearing could increase visibility of the transmission line. The Proposed Action would lower the EVC of the area viewed from the Welcholm Springs recreation residence.

Cascade Creek

A total of 23 residences are located within the tract. The Proposed Project would be located within the immediate foreground distance zone of 17 residences and within the foreground distance zone of six residences. The current alignment crosses through the tract, with transmission structures generally located between the recreation residences. Views from some residences are screened by vegetation while views from others are open. There are several unobstructed views of the current transmission line from the access road. The transmission structures and conductors of the Proposed Action would be viewed in very close proximity and would be more dominant in the scenery than the existing transmission line due to transmission structures, hardware, and conductor wires that would be larger and bulkier. Transmission structures, other than wood cedar pole, could be required for the Proposed Action in the Cascade Creek recreation residence tract. Vegetation clearing would alter the landscape character within the tract and increase visibility of the transmission line. The existing conductors are highly visible and dominant in some areas even where no transmission structures are visible. The larger diameter conductors of the proposed transmission line would be more visible than the existing conductors and would have greater visual dominance. The Proposed Action would lower the EVC within the Cascade Creek tract. Photo Simulation 5 in Appendix E illustrates what the transmission line in the Proposed Action would look like from a viewpoint along the road in the Cascade Creek recreation residence tract. Refer to Figure 3.3.1-4 for a map of the Proposed Action at Cascade Creek.

Greek Creek

A total of 11 residences are located within the tract. The Proposed Project would be located within the immediate foreground distance zone of nine residences and within the foreground distance zone of two residences. The current alignment crosses through the tract, with transmission structures generally located between the recreation residences. Views from many of the recreation residences are screened by vegetation. However, the transmission structures and conductors of the Proposed Action would be viewed in close proximity from some locations within the tract. An axial view of the proposed transmission line would occur from one of the recreation residences, which has a view down the ROW from its porch. The transmission structures and conductors of the Proposed Action would be more dominant in the scenery than the existing transmission line due to transmission structures, hardware and conductor wires that would be larger and bulkier. Transmission structures, other than wood cedar pole, could be

required for the Proposed Action in the Cascade Creek recreation residence tract. Vegetation clearing would alter the landscape character within the tract and increase visibility of the transmission line. The Proposed Action would lower the EVC within the Greek Creek tract. Photo-Simulation 7 in Appendix E illustrates the transmission line in the Proposed Action would look like from a viewpoint along the road in the Greek Creek recreation residence tract.

Tamphery Creek

A total of 13 residences are located within the tract. The Project would be located within the immediate foreground distance zone of all the residences. The current alignment generally follows the access road through the tract. The transmission structures are visible from various locations within the tract and the conductor is visually obvious. Axial views of the ROW and the proposed transmission line would occur from within the tract. The Proposed Action would result in an increase in visual dominance of the transmission line due to transmission structures, hardware and conductor wires that would be larger and bulkier than the existing transmission line. Transmission structures, other than wood cedar pole, could be required for the Proposed Action in the Cascade Creek recreation residence tract. In areas where just the existing conductor wires are visible, the larger diameter conductors of the proposed transmission line would be more visible and would have greater visual dominance. Vegetation clearing would alter the landscape character within the tract and increase visibility of the transmission line. The Proposed Action would lower the EVC within the Tamphery Creek tract. Photo Simulation 9 in Appendix E illustrates what the transmission line in the Proposed Action would look like from a viewpoint along the road in the Tamphery Creek recreation residence tract.

Other Recreation Residence Tracts

The Proposed Action would also result in visual impacts for Egyptian Creek, Kitchen Rock, and Wilma Creek. The Proposed Action would cross through an area of scattered trees in the immediate foreground distance zone of the two recreation residences at Egyptian Creek. Avoiding clearing of trees would reduce the impacts to the tract. Views of the transmission line would generally be screened by existing vegetation if clearing of trees between the line and the recreation residences is avoided. The Proposed Action would be located in the immediate foreground distance zone of the two recreation residences in the Kitchen Rock recreation residence tract between the recreation residences and US Hwy 191. Views of the Proposed Project would generally be screened by vegetation. The conductor wires would be visible in the view from the residences across the road and river. The Proposed Project would cross through the Wilma Creek recreation residence tract in the immediate foreground distance zone of the five recreation residences. The Project would generally not be seen from recreation residences but would be seen from various locations within the tract. Transmission structures, other than wood cedar pole, could be required in or near the Egyptian Creek (1 transmission structure), Kitchen Rock (2 transmission structures) and Wilma Creek (2 transmission structures) recreation residence tract. The Swan Creek and Portal Creek recreation residence tracts would not have views of the Project.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Alternative 3 would utilize the same alignment as the Proposed Action and would result in the same impacts with the exception of the LROs described below. Refer to Table 3.3.1-4 for a summary of the impacts of Alternative 3 to recreation residences.

Cave Creek LRO

The Cave Creek LRO was developed to increase the distance between recreation residences and the transmission line and to move the transmission line from the center of the tract, thus reducing the visual dominance of the transmission line within the Cave Creek recreation residence tract

and improving the EVC within the tract, and to decrease the visual effect of the transmission line on the recreation residences, which is among the oldest in the Canyon. The existing line contains four transmission structures along this 0.25 mile stretch. This LRO would require additional tree clearing due to the alignment moving approximately 200 feet upslope from the existing 69 kV transmission line. Portions of this LRO would occupy the original 1950s 50 kV transmission line corridor that was abandoned in the early 1970s when the current 69 kV transmission line was upgraded. The abandoned corridor is still visible through the forest. It is approximately 20 feet wide, and is vegetated with shrubs and small trees. The LRO would require several steel transmission structures and would be visible within the forest from the periphery of the tract.

The existing distribution lines to the residences in the Cave Creek recreation residence tract would remain in place. The existing transmission structures outside of those required for distribution within the recreation residence tract would be removed. Service for distribution would be connected at either the north or south end of the recreation residence tract due to the deviation from the existing alignment. The additional distance upslope from the recreation residences would likely require the installation of one to two distribution transmission structures on the north or south end of the recreation residence tract depending on where the connection is determined. The existing 69 kV transmission line structures required for distribution would stay in place, but the top section (no longer required for the transmission line) would be cut off. Although the transmission line would be relocated around the tract, the visual contrast created by the distribution line would remain. Refer to Figure 3.3.1-3 for a map of the Cave Creek LRO.

Cascade East LRO

The Cascade East LRO would remove the transmission line from the Cascade Creek recreation residence tract. The proposed transmission line would only be visible from the tract at the edge of the trees along the river. The existing distribution line to the residences in the Cascade Creek recreation residence tract would remain in place. The existing transmission structures except for those required for distribution within the recreation residence tract would be removed. Service for distribution would likely be connected on the south end of the of the recreation residence tract similar to the proposed action and Cascade West LRO alignment. The existing 69 kV transmission line structures required for distribution would stay in place but the top section no longer required for the transmission line would be cut off. The EVC of the tract would improve, although the visual contrast created by the distribution line would remain. The shorter transmission structures, and the elimination of the transmission hardware and conductor wires, would reduce the visual dominance of the remaining transmission structures and distribution line within the Cascade Creek recreation residence tract and decrease the visual effect of the transmission line on the recreation residences and tract. Overall, the LRO would improve the visual condition of the Cascade Creek recreation residence tract.

Refer to Figure 3.3.1-4 for a map of the Cascade East LRO.

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

Alternative 4 would utilize the same alignment as the Proposed Action and would result in the same impacts with the exception of the LROs described below. Refer to Table 3.3.1-4 for a summary of the impacts of Alternative 4 to recreation residences.

Cave Creek LRO

Impacts to the Cave Creek recreation residence tract from the Cave Creek LRO are the same as those described above for Alternative 3.

Cascade West LRO

The Cascade West LRO would move the transmission line further from the recreation residences in the Cascade Creek recreation residence tract. The cleared transmission corridor would not be visible from most of the recreation residences in the Cascade Creek recreation residence tract. The cleared transmission corridor and the proposed transmission line structures and conductors would potentially be visible within the forest from the western edge of the tract and from the residences closest to the western edge of the tract, especially from one recreation residence that would be approximately 80 feet from the alignment.

Like the Cascade East LRO, the existing distribution line to the residences in the Cascade Creek recreation residence tract would remain in place. The existing transmission structures outside of those required for distribution within the recreation residence tract would be removed. Service for distribution would likely be connected on the south end of the tract similar to the proposed action alignment. The existing 69 kV transmission line structures required for distribution would stay in place but the top section no longer required for the transmission line would be cut off. The EVC of the tract would improve, although the visual contrast created by the distribution line would remain. The shorter transmission structures, and the elimination of the transmission hardware and conductor wires, would reduce the visual dominance of the remaining transmission structures and distribution line within the Cascade Creek recreation residence tract and decrease the visual effect of the transmission line on the historic recreation residences and tract.

Refer to Figure 3.3.1-4 for a map of the Cascade West LRO.

Cumulative Effects of Alternatives 2, 3, and 4

The current and future projects that would have the potential to affect the EVC of the Gallatin Canyon, when combined with the visual impacts of these alternatives would result in negligible cumulative visual effects. The current and future projects are/would not be visible from the recreation residences. As such, they would not create additive adverse visual impacts.

Comparison of Alternatives

No Action Alternative (Alternative 1) would result in no change to the EVC of the recreation residence tracts as no improvements would be made to the existing transmission line. However, trees and tree branches that have encroached into the existing ROW in places would be cleared from the existing ROW at some time as part of NorthWestern's maintenance operations for the existing 69 kV transmission line. Maintenance of the infrastructure would continue.

Alternative 2 would remain in the existing ROW. Alternatives 3 and 4 would also remain within the existing ROW, with the exception of the proposed LROs. Where the alternatives would replace the existing transmission line and remain within the existing ROW, they would increase the existing visual contrast level of the existing transmission line with the scenery and would result in potentially high impact levels for recreation residences. This incremental increase would be the result of larger and taller transmission structures, bulkier hardware, larger diameter conductor wires, increased ROW clearing, and disturbance of talus slopes.

The proposed LRO portions of Alternatives 3 and 4 would reduce or eliminate visual impacts where the existing transmission line conductor wires and hardware would be removed and transmission structures would either be removed or be shortened to accommodate existing distribution lines. This would improve the EVC of the Cave Creek and Cascade Creek recreation residence tracts. Refer to Table 3.3.1-5 for a summary comparison of impacts to recreation residences for Alternatives 1, 2, 3, and 4.

TABLE 3.3.1-5 RECREATION RESIDENCES SUMMARY COMPARISON OF ALTERNATIVES

ALTERNATIVE 1 (NO ACTION)	ALTERNATIVE 2 (PROPOSED ACTION)	ALTERNATIVE 3 (Cave Creek LRO and Cascade East LRO)	ALTERNATIVE 4 (Cave Creek LRO and Cascade West LRO)
	Cave Creek Recreation Residence Tract		
No change. The existing transmission line would continue on alignment through the center of the tract.	Alternative 2 would follow the existing transmission line alignment through the center of the tract.	The Cave Creek LRO would be visible at the perimeter of the tract, especially from the recreation residence located farthest west. The distribution line would remain within the tract. The EVC would improve in the tract.	Alternative 4 would follow the same alignment around the tract as Alternative 3. The distribution line would remain within the tract. The improvement to the EVC would be the same as Alternative 3.
	Cascade Creek Recreation Residence Tract		
No change. The existing transmission line would continue to be operated through the center of the tract.	Alternative 2 would follow the existing transmission line alignment through the center of the tract.	The Cascade East LRO would be located across the river and US Hwy 191 and would be visible only from the edge of the tract along the Gallatin River. Of the Alternatives, Alternative 3 would locate the transmission line the furthest away from the Cascade tract, although the distribution line would remain within the tract. Alternative 3 would make the greatest improvement to the EVC in the tract. Alternative 3 would have the least impact for recreation residences.	The Cascade West LRO would be visible from a few of the recreation residences through the trees. Visibility would be partially screened by the trees and the transmission line would not be visible from the road through the recreation residence area. The distribution line would remain within the tract. Alternative 4 would improve the EVC in the tract.

Both Alternative 3 and Alternative 4 would improve the EVC of the Cave Creek recreation residence tract by moving the transmission line to the perimeter of the tract and partially onto a former ROW. Alternative 3 (Cascade East LRO) would make the greatest improvement to the EVC of the Cascade Creek recreation residence tract because it would move the transmission line the furthest away from the tract and would be least visible from the tract, although the distribution line and shortened transmission structures required for electrical service to the recreation residences would remain. Overall, Alternative 3 is the preferred choice for recreation residences.

Summary Conclusion

The No Action alternative would have no additional effect on the scenery of Gallatin Canyon. No change would occur in areas where the existing transmission line is a dominant element of the landscape that reduces the visual condition, including the Cave Creek and Cascade Creek recreation residence tracts and the Lava Lake trailhead area. Each action alternative would have potential permanent adverse effects on scenery due to impacts to the EVC of the Canyon viewed from observation points and corridors including recreation residences, campgrounds, trailheads and trails, river accesses, the US Hwy 191 and Gallatin River corridor and private residences. The differences between the alternatives are summarized above in Tables 3.3.1-2, 3.3.1-3, and 3.3.1-5. These tables describe the impacts to views from US Hwy 191 and the Gallatin River Corridor, the Lava Lake trailhead area, and recreation residences in the Cave Creek and Cascade Creek recreation residence tracts that would result from each alternative. LROs were identified for these areas to reduce visual impacts to sensitive viewers. Impacts to other sensitive viewpoints and corridors in the visual resources study area would be the same for the three action alternatives.

Alternative 3 and Alternative 4 would improve the EVC where LROs are proposed. Alternative 3 with the Cascade East LRO would make the greatest overall net improvement to the EVC of the US Hwy 191 and Gallatin River corridor, the Lava Lake Trailhead area, and the Cascade Creek recreation residence tract. Overall, Alternative 3 would have the least impacts to the scenery resource of the action alternatives.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Project design features and mitigation measures relevant to scenery and common to several resources are described in Chapter 2 and include 1.1, 1.5, 1.6, and 1.7. PDFs specific to visual resources outlined in Chapter 2 include 4.1 and 4.2. Additional measures relevant to scenery and visual resources are also presented in the Weed Management, Reclamation, and Revegetation Plan (Appendix C).

Visual Resources Mitigation Measures

To reduce visual impacts of the existing transmission line on US Hwy 191, eliminate one very visible guyed transmission structure that is located in an open meadow on the east side of the highway in T5S, R4E, Section 23, east of the Gallatin River and south of the Deer Creek Trail access road. The existing 69 kV transmission line contains four transmission structures along this 0.2 mile stretch. The existing transmission line crosses an open meadow and the highway. Southbound highway travelers have unobstructed views of the transmission line at a relatively perpendicular angle for approximately 0.5 mile. The mitigation refinement would reduce the visual dominance of the transmission line in the view from the highway. This mitigation measure would apply to Alternatives 2, 3, and 4.

Consistency with Laws, Regulations, and Forest Plan

All alternatives would be consistent with the Forest Plan Standards for visual quality. To meet the MA 25 Forest Plan Standard for visual quality, the VQOs of the adjacent management areas would be considered. The analysis carefully evaluated the effects on visual quality in terms of adjacent visual quality objectives from construction, operation and maintenance of the alternatives. Mitigation was incorporated in project design to reclaim areas and minimize adverse impacts. Environmental analysis and project design have included discussion on how the range of visual quality objectives in adjacent management areas (retention and partial retention) were utilized. VQOs are defined on page VI-44 of the Forest Plan.

All action alternatives would use pedestrian and helicopter access methods where no existing access roads are present, avoiding grading and vegetation removal that would reduce the existing visual condition. Shrubs and other vegetation lower than 14 feet would remain, which would minimize the contrast of the cleared area with surrounding vegetation and minimize the impact to the existing visual condition. Project design features common to all action alternatives would also contribute to consideration of the VQOs of the adjacent management areas. PDFs 1.1, 1.7, and 4.2 would reduce ground disturbance and landform scarring and require surface and vegetation restoration as practicable. PDFs 1.5 and 1.6 would require poles to avoid and be placed the maximum distance from observation points and corridors, as practicable. PDF 4.1 would reduce the contrast of the conductors with the landscape through the use of non-specular (not reflective) conductors. The utilization of these measures would reduce the visual contrast of the action alternatives with the surrounding landscape character and would contribute to consideration of the VQOs of the adjacent management areas.

Pedestrian and helicopter access methods, limited vegetation clearing, and the PDFs discussed above would reduce the contrast of the action alternatives with the existing landscape character of the Gallatin Canyon. However, neither the No Action alternative, which would not alter the existing transmission line, nor the action alternatives, which would introduce taller poles, bulkier hardware and larger diameter conductor wires, would be consistent with Retention VQOs in areas where it would be visible from sensitive viewpoints and corridors and moderate-low or greater impacts on views would occur. The existing transmission line is evident to the casual observer and does not repeat the form, line, color, texture and pattern of the landscape character of the Gallatin Canyon. The proposed transmission line would be more noticeable to the casual observer due to its larger size and would result in additional contrast with the existing landscape character.

The action alternatives would be consistent with Partial Retention VQOs, where human activities may be evident and the landscape character may appear slightly altered, within one year after project implementation is complete in areas where it would be visible from sensitive viewpoints and corridors and moderate, moderate-low, or low impacts on views would occur. Where the proposed transmission line would be visible from sensitive viewpoints and corridors and high and moderate-high impacts would occur, it would not be subordinate to the landscape character being viewed and would not be consistent with Partial Retention VQOs in those areas.

All alternatives would comply with the Forest Plan Wild and Scenic Rivers management standard by protecting the outstandingly remarkable scenic values of the river.

3.3.2 Historic and Archaeological Sites

Description of Issue

Historic and archaeological sites, together referred to as cultural resources, are districts, sites, buildings, structures, or objects considered to be important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Historic sites include standing buildings (e.g., houses, barns, outbuildings, cabins) and intact structures (e.g., dams, bridges, fences). Archaeological sites are locations where human activity has measurably altered the earth or left deposits of physical remains (e.g., stone tools, bottles, former roads, stone circles [sometimes called tipi rings], house foundations).

Another class of cultural resource, traditional cultural properties (TCPs), includes resources that are important to a community's traditional practices and beliefs, and for maintaining the community's cultural identity (Parker and King 1998). In Montana, TCPs are often sacred sites or other places of significance to Native Americans. The Gallatin National Forest (GNF) has initiated government-to-government consultation with seven Tribes that could potentially have TCPs in the Jack Rabbit to Big Sky Meadow Village (JRBS) Project Area. Because their characteristics and locations are confidential, TCPs are not discussed in this Final Environmental Impact Statement (FEIS).

Potential impacts to historic and archaeological sites were identified as an issue by GNF staff and during initial agency and public scoping. Scoping comments received from recreation residence owners identified impacts to recreation residences, including impacts on their historic value, as an important issue, although when public scoping occurred none of the recreation residences had been formally evaluated by the GNF for eligibility to the National Register of Historic Places (National Register). Related to this issue are the following concerns:

There are known historic and archaeological sites in the Project Area that could potentially be impacted by the Proposed Project.

There have been very limited cultural resource surveys performed in the Project Area in the past; undiscovered historic and archaeological sites may exist in unsurveyed areas.

The GNF has identified unsurveyed locations within the JRBS Project Area that are likely to contain archaeological sites.

The Cascade Creek recreation residence tract is a historic site of particular concern to the GNF.

Most of the known historic and archaeological sites in the Project Area had not been evaluated for their eligibility to the National Register.

For the selected alternative, identifying historic and archaeological sites, evaluating their National Register eligibility, assessing the effects (or impacts) of the Proposed Project on National Register-eligible sites, and implementing measures to avoid, minimize, or mitigate adverse effects are steps required under Section 106 of the National Historic Preservation Act (NHPA). Compliance with Section 106 would be largely completed prior to construction of the transmission line. For this FEIS, the GNF is basing the analysis of impacts to historic and archaeological sites on existing data, archaeological survey of areas of potential ground

disturbance, and documentation and evaluation of the Cascade Creek Recreation Residence Tract historic site and ten other recreation residence tracts.

Tribal Consultation

Government-to-government Tribal consultation has been initiated by the GNF to identify issues of concern to Native Americans regarding the JRBS project. The GNF has used the Notice of Intent (NOI) required by the National Environmental Policy Act (NEPA) to initiate the consultation process. The following Tribes have been contacted regarding the Proposed Project: Confederated Salish and Kootenai Tribal Historic Preservation Office (THPO), Eastern Shoshone Tribe THPO, Crow Tribal Council, Crow Cultural Committee, Nez Perce Tribe, Shoshone-Bannock Business Council, and Wind River Shoshone Cultural Committee. The GNF archaeologist met with members of the Confederated Salish and Kootenai Tribes on April 17, 2012, and members of the Crow Nation on May 1, 2012. Consultations are ongoing with all of the concerned Tribal entities. In November 2010, a representative of the Crow Cultural Committee made a visit to the Project Area with a GNF archaeologist.

Indicators

For this FEIS, indicators specific to historic and archaeological sites are equivalent to the types of adverse effects identified in the Code of Federal Regulations (CFR), 36 CFR 800.16(d), the regulations implementing Section 106 of the NHPA. Adverse effects include:

Physical destruction or damage;

Alteration inconsistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*;

Relocation of a property;

Change in the character of the property's use or setting;

Introduction of incompatible visual, atmospheric, or audible elements;

Neglect and deterioration; or

Transfer, lease, or sale out of federal control without adequate preservation restriction.

Effects could be adverse to the extent that a proposed project affects those qualities of a historic or archaeological site that contribute to its National Register eligibility.

For the JRBS transmission project, specific indicators include:

Direct physical impacts to historic and archaeological sites caused by ground disturbance or vegetation clearing related to the construction of the transmission line.

Direct visual impacts to historic and archaeological sites caused by the alteration of the visual setting of a site by a new or modified transmission line.

Indirect impacts (e.g., vandalism) to historic and archaeological sites caused by increased public use of improved access roads.

Scale of Analysis

The spatial boundary for assessing impacts to historic and archaeological sites is the area within which ground disturbance would occur and the larger area within which sites may be subject to visual impacts. These areas are equivalent to the Area of Potential Effects (APE) defined at 36 CFR 800.16(d): "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." A historic property is any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register.

The GNF has determined that under the guidelines detailed in 36 CFR 800, the APE for physical effects is 200 feet, or 100 feet on either side of the centerlines for the existing ROW and the proposed LROs. Other areas of likely ground disturbance (e.g., material staging areas, decking areas) are also analyzed. The APE for visual effects on cultural resources has been defined by the Forest Archaeologist as 0.25 mile on each side of the existing centerline, a relatively narrow corridor because of the steep topography, the width of the Gallatin canyon and the dense forest.

Archaeological and historic sites are non-renewable resources; damage and destruction often result in permanent loss of all or part of the resource. Visual impacts to historic and archaeological sites may be permanent (e.g., a change in landform), long-term (e.g., a new transmission line), or short-term (e.g., the presence of construction vehicles).

Affected Environment

Recreation Residences

For this FEIS, the only historic sites are recreation residences distributed in 11 tracts within the GNF.

The analysis of recreation residences in the project area involved three steps: 1) archival research; 2) field inventory of the recreation residences; and 3) National Register evaluation of each residence for individual eligibility and of each tract for eligibility as a potential district.

Archival data on recreation residences in the analysis area came from several sources:

A 2009 records search at the Montana Historical Society (MHS) in Helena;

Recreation Residence Historic Contexts for Eight National Forests in USDA-Region 1, GNF (HHM 2006);

Information in permit holder files at the GNF Bozeman District office;

Sketch maps of the tracts prepared in the past by GNF staff;

Newspapers files, microfiche and secondary sources in the Bozeman Public Library archives; and

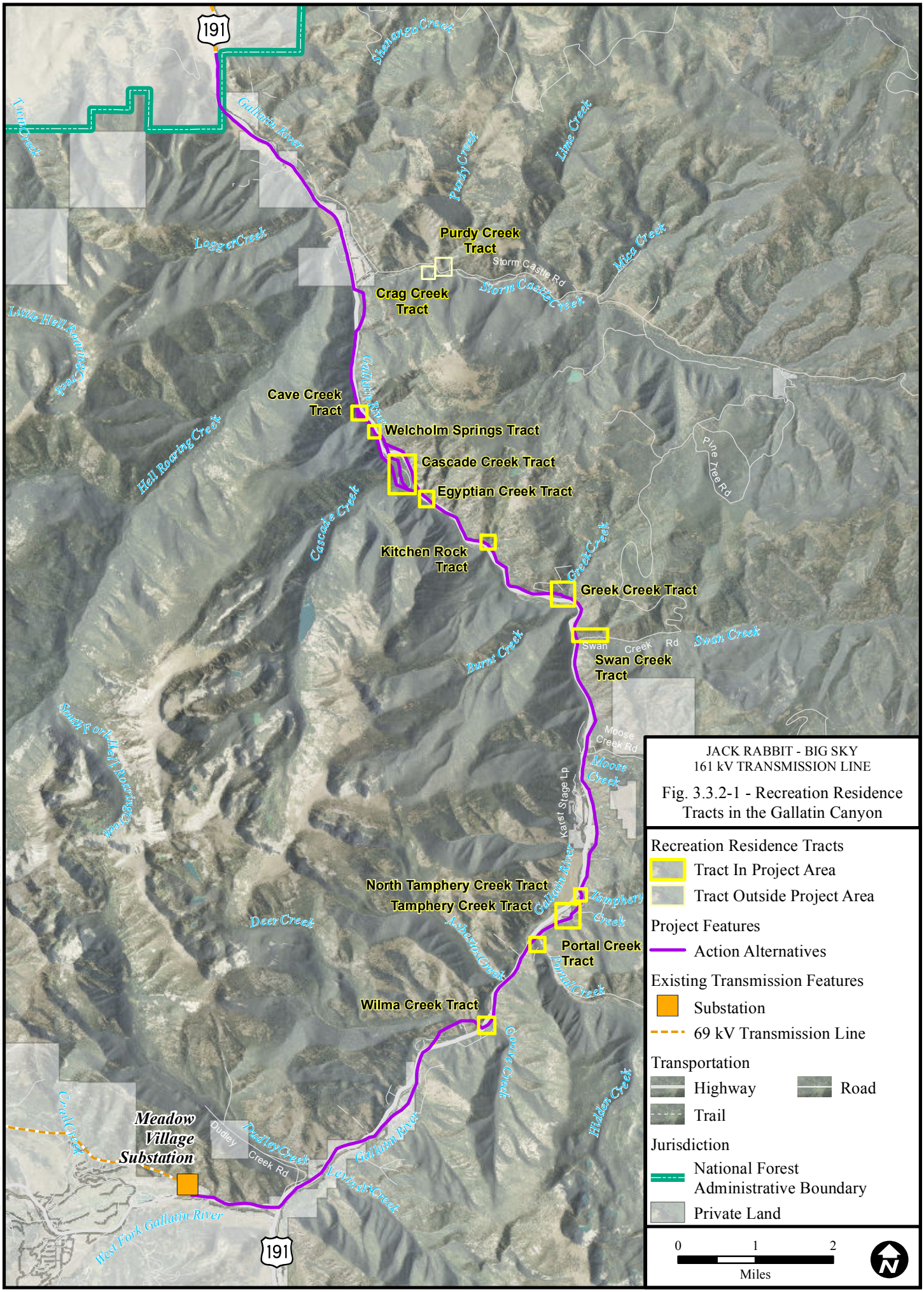
The Gallatin Historical Society Pioneer Museum in Bozeman.

Since the early twentieth century, many National Forests, including the GNF, have permitted privately-owned recreation residences to be built on National Forest System (NFS) land. A recreation residence tract is an area with several lots that each contain a single residence and sometimes outbuildings. Over 15,000 recreation residences are found in NFS lands nationwide,

and 673 recreation residences exist in Forest Service Region 1. In the GNF, there are 29 residence tracts with almost 200 residences (HHM 2006; USFS 2008). Within the JRBS Project Area, the GNF maintains 11 tracts containing 69 recreation residences, all of which were built between 1914 and 1965. The 11 recreation residence tracts (Figures 3.3.2-1 through 3.3.2-9) are, from north to south:

Cave Creek Tract	5 residences
Welcholm Springs Tract	1 residence
Cascade Creek Tract	23 residences
Egyptian Creek Tract	2 residences
Kitchen Rock Tract	2 residences
Greek Creek Tract	11 residences
Swan Creek Tract	3 residences
North Tamphery Creek Tract	2 residences
Tamphery Creek Tract	13 residences
Portal Creek Tract	2 residences
Wilma Creek Tract	5 residences

Two recreation residence tracts to the north – Crag Creek (1 residence) and Purdy Creek (4 residences) – fall entirely outside the JRBS Project Area and are not discussed further in this section.



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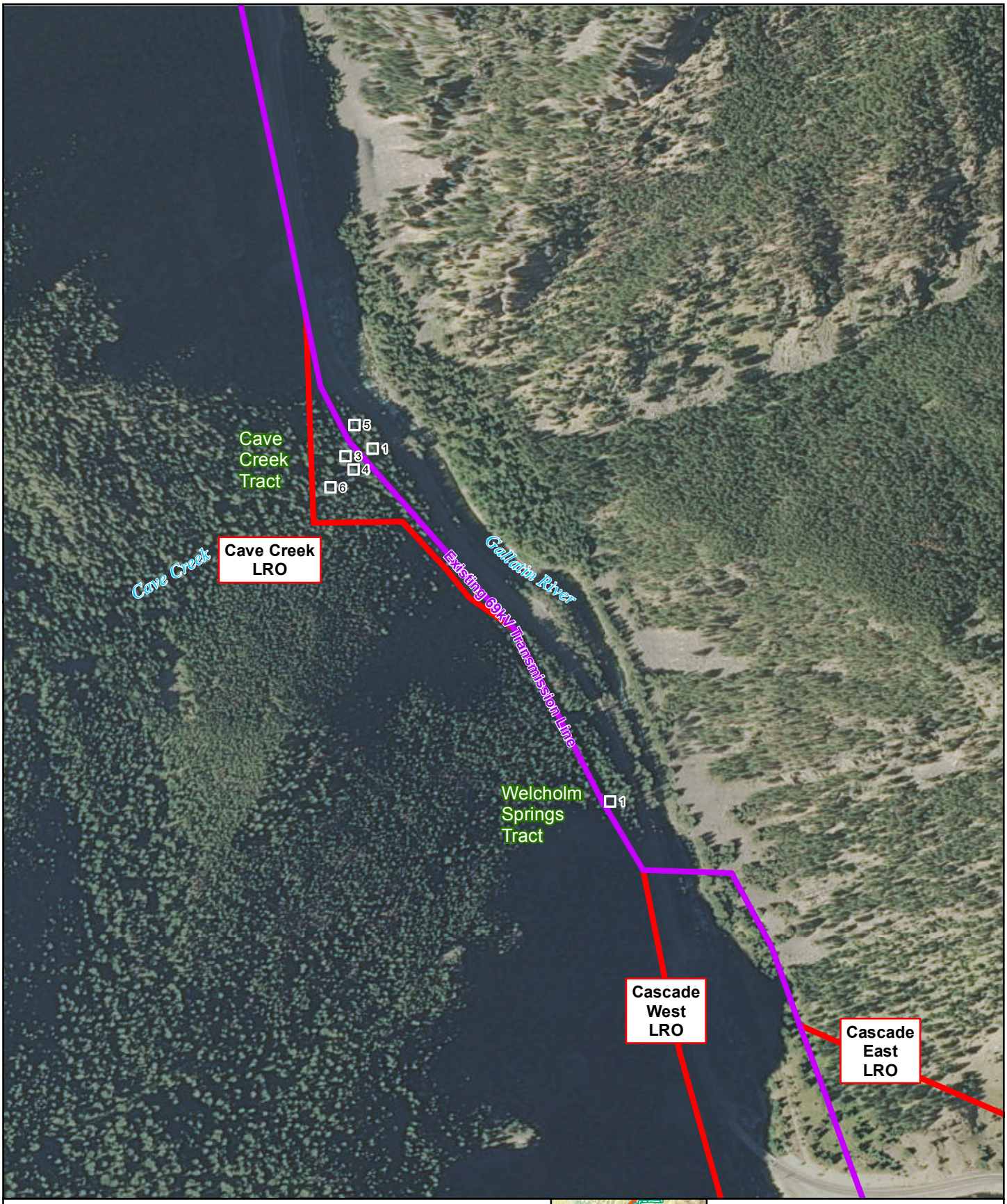


Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

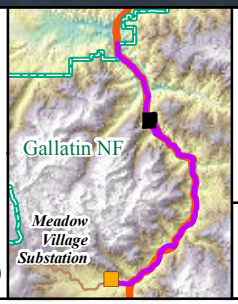
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-2
Cave Creek and Welcholm Springs Recreation Residence Tracts

0 250 500
Feet

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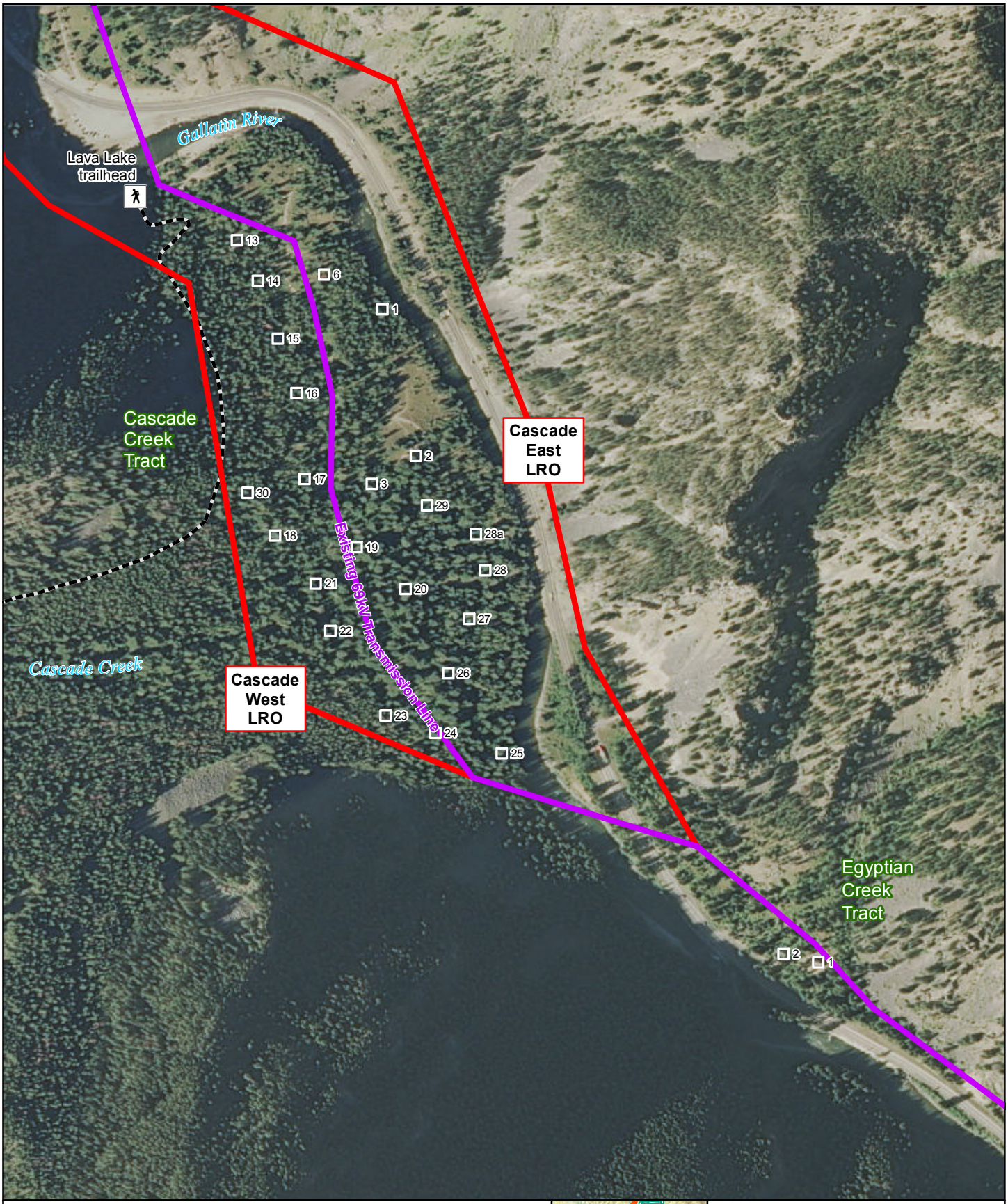


Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

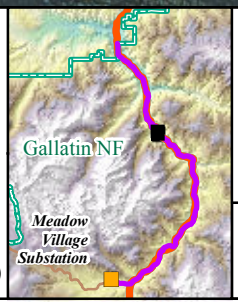
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-3
Cascade Creek and Egyptian Creek Recreation Residence Tracts

0 250 500
Feet

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Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

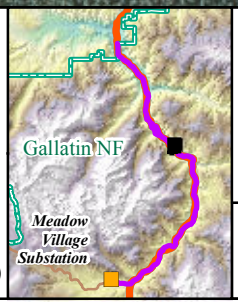
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-4
Kitchen Rock Recreation
Residence Tract

0 250 500
Feet

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Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

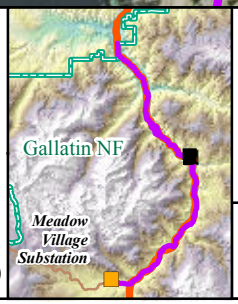
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-5
Greek Creek Recreation Residence Tract

0 250 500
Feet

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Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

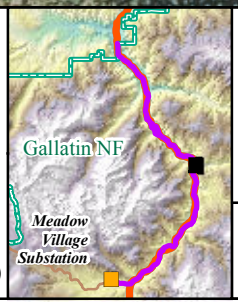
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-6
Swan Creek Recreation Residence Tract

0 250 500
Feet

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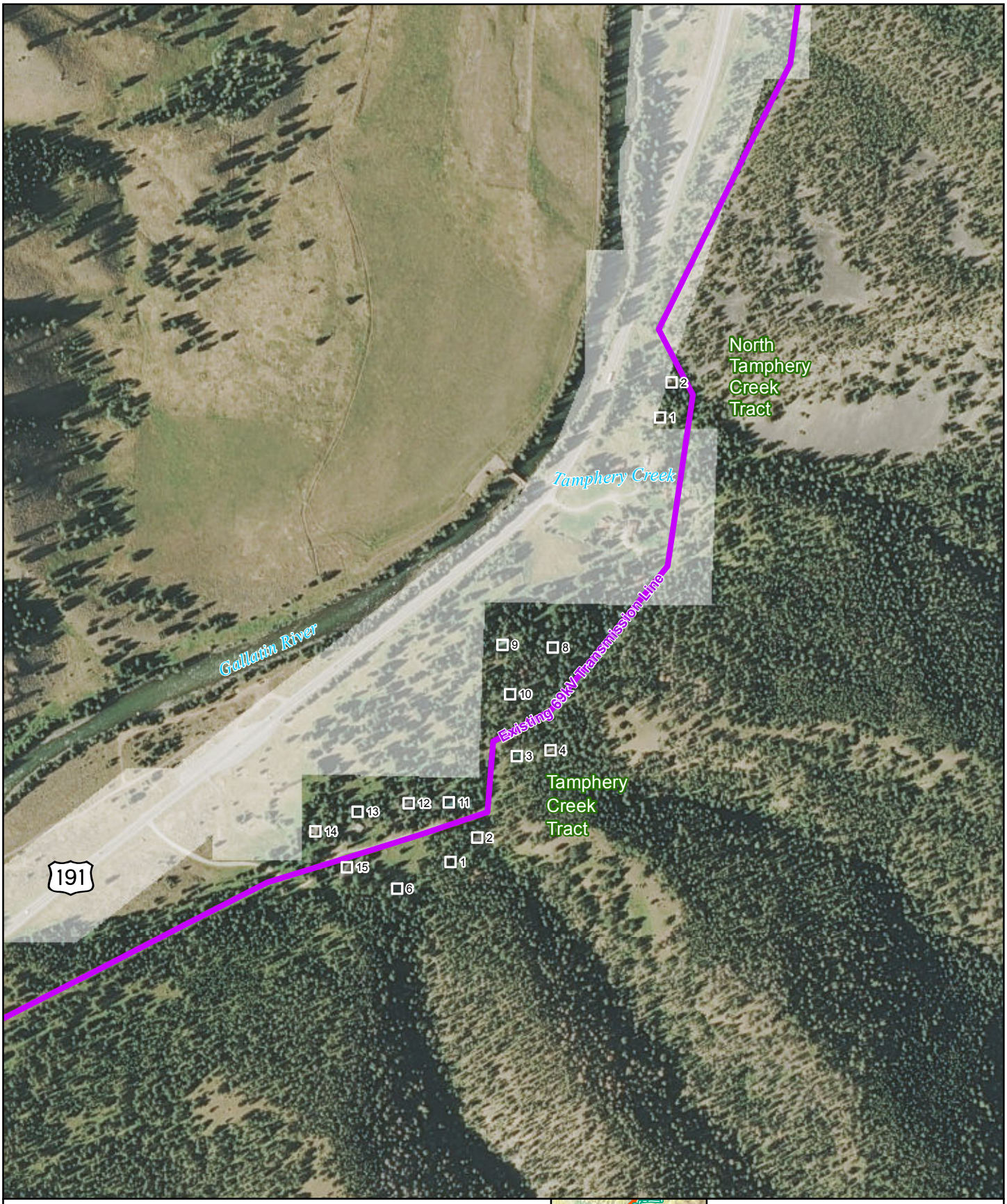


Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

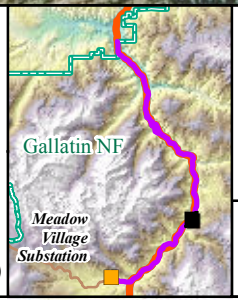
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-7
North Tamphery Creek and
Tamphery Creek Recreation
Residence Tracts

0 250 500
Feet

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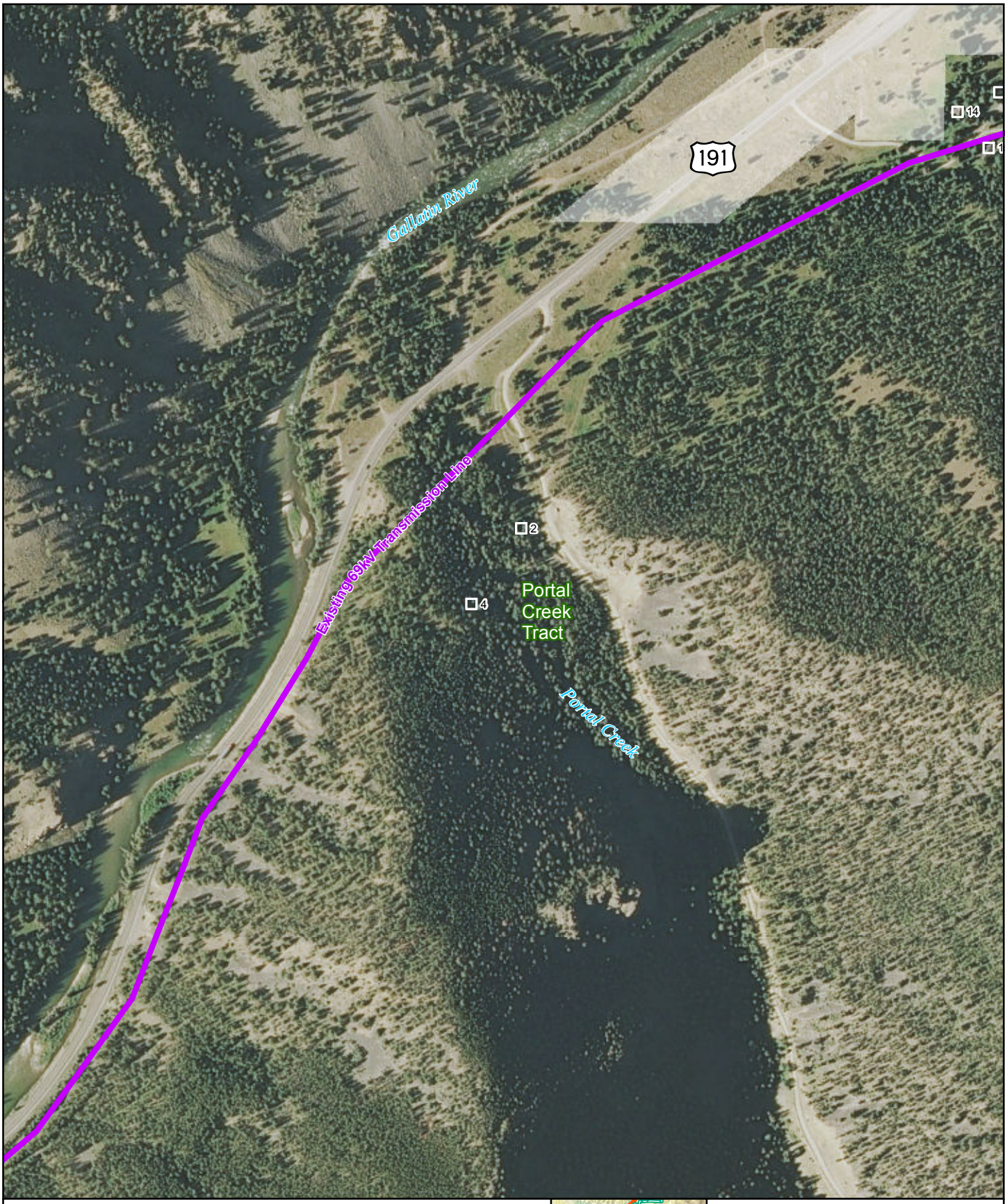


Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

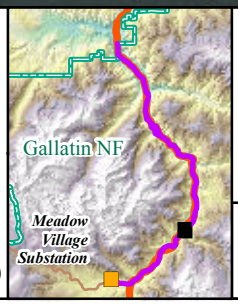
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-8
Portal Creek Recreation Residence Tract

0 250 500
Feet

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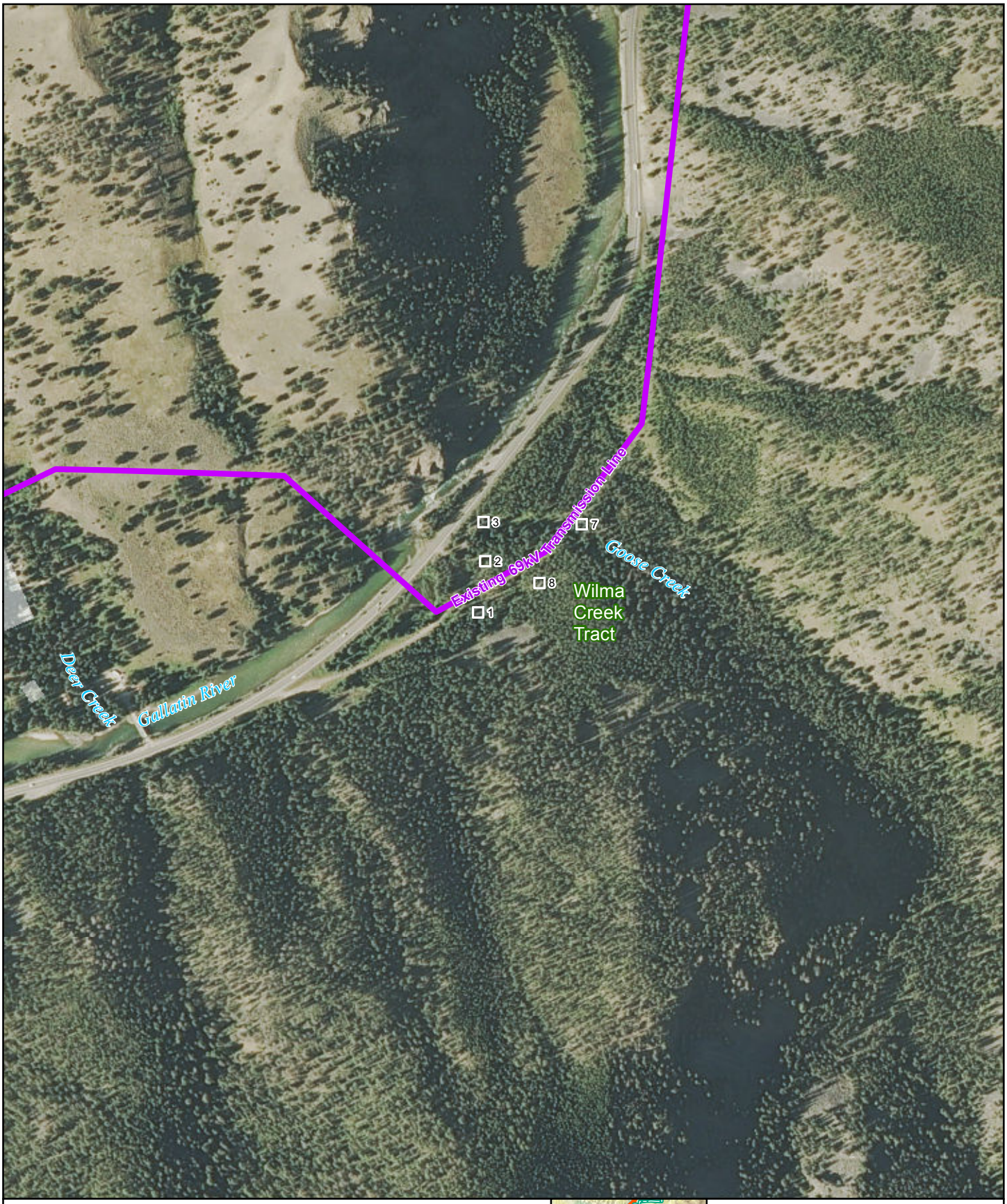


Recreation

USFS Recreation Residence

Trail

Trailhead

Jurisdiction

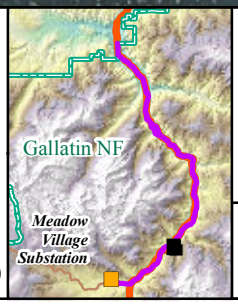
Private and State Lands

Forest Service Lands

Project Features

Existing Transmission Line

Local Routing Option (LRO)



JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE

Figure 3.3.2-9
Wilma Creek Recreation Residence Tract

0 250 500
Feet

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In October 2011, on behalf of the GNF, an architectural historian from POWER Engineers, Inc. (POWER) inventoried all 69 residences and evaluated the residences and the 11 tracts for their eligibility to the National Register (POWER 2012). The GNF Forest Archaeologist has accepted the results of the inventory and evaluation.

To be eligible for listing in the National Register (36 CFR 60), a property must typically be more than 50 years old and must meet one or more of the following criteria:

A. Associated with events that have made a significant contribution to the broad patterns of our history; and/or

B. Associated with the lives of significant persons in our past; and/or

C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or

D. Yielded or may be likely to yield, information important in history or prehistory.

To be considered for listing in the National Register, a cultural resource must also retain integrity. Integrity is the authenticity of a resource's historic identity as evidenced by the survival of physical characteristics that existed during its period of use. Integrity is the ability of a property to convey its significance. National Register Bulletin 15 (National Park Service [NPS] 1998) lists seven qualities that address integrity: location, design, setting, materials, workmanship, feeling, and association. To be eligible to the National Register, a resource must possess several, and usually most, of these aspects.

Historical significance assessments of the recreation residences are based on National Register Criteria A (Event) and C (Design).

All recreation residences recorded for this study are associated with the same historic event (Criterion A), namely the Forest Service's recreation residence development program in the GNF from 1914 to 1962. This 48-year period was when Special Use Permits (SUPs) were issued by the GNF to individuals to construct private residences on land owned by the Forest Service. Although this program continues today, the end-date for evaluation of residences was 50 years ago.

For this study, to be recommended eligible for National Register listing a residence must not only be associated with the Forest Service's recreation residence development program (Criterion A), it must also retain integrity of those characteristics that make it distinctive and representative of its type (Criterion C). HHM (2006) characterizes the designs of recreation residences built under the Forest Service's program as being relatively simple. Sometimes a building may have originally had only a few features, such as form, roof shape, or materials, which made it distinctive. Consequently, loss of integrity sufficient to trigger a determination of non-eligibility could result from adding new wings or rooms; enclosing or changing windows or doors; removing or changing porches or chimneys; removing distinctive architectural detailing; adding modern or anachronistic elements; or changing the roof form or pitch.

Only two of the 69 residences have been determined by the GNF to be individually eligible for the National Register. These two properties, Swan Creek #7 (Figure 3.3.2-6) and Wilma Creek #1 (Figure 3.3.2-9), both retain almost all of the seven aspects of integrity used in evaluating

eligibility under Criterion C. They are also the two properties within the JRBS Project Area that best represent the historic importance of the Forest Service's recreation residence program (Criterion A). For the remaining 67 residences, design, materials, and workmanship have been lost entirely or substantially diminished to the degree that the individual residences no longer represent the simple design and construction characteristics of their types.

POWER's architectural historian also evaluated each tract as a potential National Register district. National Register Bulletin 15 (NPS 1998) indicates that a district can comprise both features that lack individual distinction and individually distinctive features that serve as focal points. A district may be considered eligible to the National Register even if all of the components lack individual distinction, provided that the grouping achieves significance as a whole within its historic context. In either case, the majority of the components that add to the district's historic character, even if they are individually undistinguished, must possess integrity, as must the district as a whole.

POWER assessed National Register eligibility for each tract as a potential historic district in two steps: 1) by determining if the tract was designed by a noteworthy landscape architect or if it exhibited characteristics of Forest Service tract design; and 2) by assessing whether the tract and more than 50 percent of residences within the tract retained sufficient integrity to qualify for National Register eligibility. No record was found in HHM (2006), in Bozeman District files, or elsewhere to indicate that any of the 11 tracts were designed by a professional landscape architect. Each tract was developed independently over time with little or no adherence to design guidelines. Also, because only two of the 69 residences retain sufficient integrity to be eligible to the National Register, in no case are more than 50 percent of the residences in a single tract considered eligible. Therefore, none of the 11 tracts qualify as National Register-eligible districts.

Archaeological Sites

For this FEIS, the inventory of archaeological sites in the Project Area involved two steps: 1) archival research; and 2) archaeological survey.

Data on previously identified archaeological sites in the analysis area came from several sources:

A 2009 records search at the MHS in Helena;

A 2010 search of GNF files in Bozeman;

Conversations with GNF staff;

The NPS Focus digital library of National Register-listed properties; and

The website of the NPS National Historic Landmarks Program.

Archival research revealed that nine previously recorded archaeological sites are near the centerlines of Alternatives 2 (Proposed Action), 3 or 4. These include one trail, seven prehistoric scatters of stone flakes and tools, and one site with a possible stone circle. Two of the sites may have been destroyed after they were first recorded. According to the MHS, one site, the Lava Lake Trail, has been recommended as not eligible to the National Register (although it has not had a formal determination of eligibility) and the remaining sites were unevaluated. No National Register-listed properties are within one mile of the alternatives. Further information on the locations and characteristics of archaeological sites is not presented in the FEIS to protect them from vandalism.

In 2009, archaeological surveys were conducted at six locations in the analysis area identified by the GNF Forest Archaeologist as containing previously recorded archaeological sites or as having a high sensitivity for containing undiscovered archaeological sites. The known sites were re-recorded and their boundaries redefined in relation to the existing transmission line. Boundary definition was based on systematic surface inspection and shovel test pits. Two sites, one of the stone flake scatters and the one site with a stone circle, could not be relocated and may have been destroyed after they were first recorded. Shovel test pits were also excavated in an area of high cultural resource sensitivity, but no archaeological sites were found there.

In 2010, Local Routing Options (LROs), the corresponding portions of the existing transmission line ROW, and a proposed staging area were surveyed for archaeological sites.

Cascade West LRO was intensively surveyed in its entirety, except for a 1,500-foot section that was realigned away from the Lava Lake Trail after completion of the fieldwork to reduce visual and recreation impacts. No new archaeological sites were identified. This LRO crosses and runs parallel to a portion of the Lava Lake Trail, a previously recorded site that was recommended not eligible to the National Register. The corresponding section of the existing transmission line was also intensively surveyed and no archaeological sites were found.

Cascade East LRO was intensively surveyed except for a very short (160-foot) section and no archaeological sites were identified. The corresponding section of the existing transmission line was also intensively surveyed and no archaeological sites were found.

Cave Creek LRO was intensively surveyed in its entirety and no archaeological sites were identified. The corresponding section of the existing transmission line was also intensively surveyed and no archaeological sites were found.

A proposed 10-acre staging area at Portal Creek was surveyed for archaeological sites. No archaeological sites were identified.

In 2012, POWER performed intensive archaeological surface survey and excavated 35 shovel test pits within a 100-foot wide corridor along the entire length of the existing transmission line on the GNF and in other areas of proposed ground disturbance. Two archaeological sites were identified in addition to previously recorded sites.

As a result of archival research and field surveys in 2009, 2010, and 2012, of all areas where the JRBS project may cause ground disturbance, it has been determined that only five archaeological sites, four prehistoric artifact scatters, and one historic trash scatter exist within the JRBS APE. Of these five sites, only one has been recommended eligible to the National Register.

Applicable Laws, Regulations, Forest Plan Direction

The following plans, laws, and regulations apply to the management and protection of historic and archaeological sites in the GNF.

Gallatin National Forest Plan (1987)

The Forest Plan ensures that historic and archaeological sites will be managed to maintain their scientific, social, and historic value while in compliance with all applicable federal and state laws. There are eight guidelines sets forth in the plan:

A systematic program of cultural resource inventory, evaluation, and preservation will be developed;

Inventories will be performed prior to all undertakings;

Qualifying sites will be nominated to the National Register;

Sites evaluated as significant will be preserved in place;

Projects will be designed to avoid or minimize adverse impacts on significant historic and archaeological sites;

When significant historic and archaeological sites are discovered during projects, operations will be curtailed until an evaluation is complete;

Education to increase public understanding of the importance of identified historic and archaeological sites will be provided; and

A comprehensive GNF Prehistoric and Historic overview will be developed.

National Environmental Policy Act of 1969

NEPA (42 United States Code [U.S.C.] § 4321-4346) establishes national policy for the protection and enhancement of the environment. Part of the function of the federal government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage."

National Historic Preservation Act

The NHPA, as amended (16 U.S.C. § 470f), is the principal federal law protecting historic and archaeological sites. Section 106 of the NHPA directs all federal agencies to take into account the effects of their undertakings (i.e., actions, financial support, and authorizations) on properties included in or eligible for the National Register.

Advisory Council on Historic Preservation (ACHP) regulations at 36 CFR 800 implement Section 106. These regulations use the National Register as a planning tool to help federal agencies evaluate the significance of historic and archaeological sites. The criteria for determining whether these resources are eligible for listing in the National Register are provided in 36 CFR 60.4.

Section 106 and 36 CFR 800 have procedures for considering the effects of proposed federal undertakings on historic properties (i.e., historic and archaeological sites listed in or eligible for inclusion in the National Register). Procedures are outlined for identifying resources; evaluating their significance; assessing effects; implementing measures to mitigate adverse effects; and consulting with the ACHP, State Historic Preservation Officers (SHPOs), THPOs, other agencies, Native American groups and other interested parties.

A *Programmatic Agreement Regarding Cultural Resource Management on National Forests in the State of Montana* was first executed in 1995 by Region 1 of the Forest Service, the ACHP, and Montana SHPO, and was updated in 2000. This Programmatic Agreement (PA) addresses procedures for implementing the NHPA on the GNF and other national forests in Montana.

Antiquities Act

The Antiquities Act of 1906 (16 U.S.C. § 431-433) was the first law to protect and preserve cultural resources on federal lands. This law makes it illegal to remove cultural resources from federal lands without a permit and establishes penalties for illegal excavation and looting.

Federal Land Policy and Management Act

The Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. § 1701) requires the Forest Service to manage their lands on the basis of multiple use in a manner that will "protect the quality of…historical…resources and archaeological values." FLPMA is a comprehensive law that provides for the periodic inventory of public lands and resources, for long-range, comprehensive land use planning, for permits to regulate the use of public lands, and for the enforcement of public land laws and regulations. FLPMA compels agencies to manage all cultural resources on public lands through the land management planning process.

Archaeological Resources Protection Act

The Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. § 470 aa-mm) establishes civil and criminal penalties for the unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources; prohibits trafficking in resources from public lands; and directs federal agencies to establish educational programs on the importance of archaeology. The act also establishes permit requirements for removal or excavation of archaeological resources from federal lands.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 (AIRFA) requires federal agencies to consult Native American groups when a proposed land use might conflict with traditional Indian religious beliefs or practices, to avoid interference with these beliefs to the extent possible, and to maintain access to religious or sacred areas whenever feasible.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. § 3001) provides a process for federal agencies to return certain Native American cultural items – human remains, funerary objects, sacred objects, or objects of cultural patrimony – to lineal descendants and culturally affiliated Indian Tribes. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional excavation and unanticipated discovery of Native American cultural items on federal lands, and penalties for noncompliance and illegal trafficking. The Secretary of the Interior's implementing regulations are at 43 CFR 10.

Executive Order 11593, Protection and Enhancement of the Cultural Environment

Issued in 1971, Executive Order (E.O.) 11593 directs land-holding federal agencies to identify and nominate properties to the National Register and requires that these agencies avoid damaging properties that might be eligible to the National Register. It also directs agencies to treat resources eligible to the National Register as if they were already listed.

Executive Order 13007, Indian Sacred Sites

E.O. 13007, issued in 1996, directs federal agencies responsible for managing federal lands to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners; avoid adversely affecting the physical integrity of such sacred sites; and maintain the confidentiality of sacred sites.

Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments

E.O. 13175, issued in 2000, directs federal agencies to establish regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian Tribes, and to reduce the imposition of unfunded mandates upon Indian Tribes.

Executive Order 13287, Preserve America

This E.O., issued in 2003, encourages the federal government to take a leadership role in the protection, enhancement, and contemporary use of historic properties and establishes new accountability for agencies with regard to inventories and stewardship.

Effects Analysis

Recreation Residences

Methodology

Consistent with Section 106 of the NHPA and 36 CFR 800, this FEIS assumes that only historic sites that are eligible for the National Register can be impacted by the JRBS project. National Register-eligible historic sites within the analysis area may be subject to both direct and indirect impacts.

Only two recreation residences – Wilma Creek #1 and Swan Creek #7 – have been determined by the GNF to be eligible to the National Register (see Affected Environment Recreation Residences Section above). The other 67 residences have been determined by the GNF to be not eligible. Therefore, impacts to recreation residences would potentially occur only to those two recreation residences.

In terms of design, materials, workmanship, and location, impacts to National Register-eligible historic sites were assessed by determining if ground disturbing activities associated with the construction of the transmission line, such as clearing vegetation, preparing staging and decking areas, improving existing access roads, installing monopoles, stringing and tensioning conductors, and using restoration and re-vegetation measures, would directly alter or destroy the physical fabric of Wilma Creek #1 and Swan Creek #7 or cause any change to their locations. See Chapter 2 for more details on ground disturbance associated with different aspects of the project.

In terms of setting, feeling, and association, direct visual impacts may result when the transmission line is introduced into the settings of National Register-eligible historic sites, if their eligibility is based in part on the quality of that setting. Direct visual impacts to National Register-eligible historic sites were assessed by determining if the proposed 161 kV transmission structures or removal of trees would alter the historic setting. The average transmission structure height for this project would be between 60 and 90 feet. Although most trees in the Project Area are taller, there could still be visual impacts to historic sites should the transmission line be in areas with few trees where it would not be screened from the historic sites.

Indirect impacts to historic sites in project areas can result from the improvement of existing access roads. Improved roads may lead to increased public use in certain areas, and uncontrolled public recreation may in turn lead to vandalism of historic buildings. For the JRBS project, construction vehicles and equipment would use existing roads and trails for access wherever feasible. It is not anticipated that new access roads would be necessary, although it is possible that portions of existing access roads outside the ROW would require improvements. Because access to the recreation residence tracts would not change as a result of the JRBS, and because only the

Wilma Creek and Swan Creek tracts contain National Register-eligible residences, no further analysis of impacts related to vandalism was conducted.

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1 (No Action)

Under the No Action alternative, the existing 69 kV transmission line would not be rebuilt to a new 161 kV transmission circuit, and transmission structure locations and ROW width would not change. On-going maintenance of the 69 kV transmission line would continue. There would be no ground disturbing activities and there would be no direct physical impacts to any historic sites. There would also be no direct impacts related to changes to the visual setting of any of the recreation residence tracts. There would be no indirect impacts related to improved access roads.

Cumulative Effects of Alternative 1 (No Action)

Cumulative effects on historic sites are those effects that result from incremental impacts of the JRBS project when added to other current and reasonably foreseeable future actions. Table 3.2.3-1 lists the projects considered for the cumulative effects analysis. Because Alternative 1 would have no impacts on historic sites, it would not contribute to any cumulative effects caused by other projects.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2 (Proposed Action)

The Proposed Action is an upgrade of the existing transmission line. For the most part, the existing ROW would be used except in heavily forested areas where it might be widened from 40 feet to approximately 50 feet. Replacing the few existing H-frame structures might require that the ROW be widened from 50 feet to 80 feet in some locations. New transmission structures may be constructed 10 to 15 feet from current transmission structure locations.
Only two recreation residences - Swan Creek #7 and Wilma Creek #1- are National Register-eligible and have the potential to be impacted as historic sites by Alternative 2.

Swan Creek #7

Swan Creek #7 is in a narrow canyon and would be over 1,600 feet from the proposed transmission line upgrade.

In terms of design, materials, workmanship, and location, the proposed upgrade of the transmission line from 69 kV to 161 kV would have no impact because the project would not directly alter or destroy the physical fabric of the building or cause any change to its location. In terms of setting, feeling, and association, views of the existing transmission line from the residence are currently obscured by dense forest; taller transmission structures and ROW clearing would not be visible and would have no impact on Swan Creek #7 as a historic site.

Wilma Creek #1

Wilma Creek #1 is approximately 50 feet southeast of the existing 69 kV transmission line. The two nearest existing transmission structures are Structure 30-10 and Structure 30-11. Structure 30-10 is approximately 75 feet north-northeast of Wilma Creek #1. It is a 69 kV single-pole, alternating horizontal post tangent structure. It would be replaced with a 161 kV single-pole, alternating horizontal post tangent structure 60 feet tall. Structure 30-11 is approximately 75 feet west of Wilma Creek #1. It is a 69 kV single-pole, guyed angle double-deadend structure with a guy pole on the opposite side of an access road. It would be replaced with a 161 kV single wood laminate structure 65 feet tall and the existing guy pole and guy wires would be removed.

In terms of design, materials, workmanship, and location, the proposed upgrade of the transmission line from 69 kV to 161 kV would have no direct impact on Wilma Creek #1 because

the project would not directly alter or destroy the physical fabric of the building or cause any change to its location.

In terms of setting, feeling, and association, the proposed transmission line would have no visual impact.

The proposed 161 kV transmission structures would be approximately 5 to 10 feet taller than the existing 69 kV structures and would be similar in appearance, although the hardware would be larger than the existing hardware and the conductors would have a larger diameter than the existing conductor wires. The poles would generally not be visible from the recreation residence itself but would be visible from the clear area north of the recreation residence. Also, the removal of the existing guy wires could improve the visual setting.

It is also relevant that the original setting, feeling, and association for this historic property have been altered in recent decades. This residence was permitted and probably built in 1945, four years before the first electrical transmission line was built in this part of the GNF. Thus, the setting surrounding Wilma Creek #1 was altered after the date of its construction. The original 50 kV transmission line serving the area was replaced in the 1970s by an improved and upgraded line (the existing 69 kV transmission line). Replacing the existing poles with somewhat larger poles would not result in a further decrease in the integrity, feeling and association of the setting of Wilma Creek #1 and would not affect the qualities that contribute to the building's National Register eligibility. Therefore, Alternative 2 would have no impact on Wilma Creek #1 as a historic site.

Staging Areas/Fly Yards

Neither of two proposed staging areas would impact any historic sites.

Decking Areas

Of the five proposed decking areas, none contain historic sites.

Cumulative Effects of Alternative 2 (Proposed Action)

There are a few planned or foreseeable projects that are proposed or currently underway in the JRBS vicinity (Table 3.2.3-1). The current condition described in the Affected Environment section reflects past projects in the study area. All of the projects listed in Table 3.2.3-1 are on GNF land and, as such, are considered federal undertakings under Section 106 of the NHPA. Two of these projects are yearly activities conducted by the GNF to manage vegetation and to provide maintenance for recreation residences. The Jack Smith Bridge timber sale (14 acres) is complete and the fuels reduction activities will occur when there are appropriate weather conditions. The location of the Jack Smith Bridge fuel reduction is over one mile away from the closest historical residence at Wilma Creek. MDT projects include those that are in the construction phase or are planned.

As federal undertakings, each of the projects in Table 3.2.3-1 has complied or will comply with Section 106 of the NHPA. Compliance would include identification, evaluation, assessment of effects, and implementing measures to eliminate or reduce adverse effects. As a result of Section 106 compliance, impacts of a project that may have been initially high could be reduced to low.

The northern portion of the JRBS project is currently being built is on private land. Data from the MHS and from field survey indicates that no historic sites are present within the existing ROW for this portion of the project. Therefore, the project would have no direct impact on historic sites on private land.

However, over time and despite PDFs, there could be a general loss of the integrity of historic sites resulting from the combined, incremental effects of many actions. Alternative 2 could contribute to cumulative effects on historic sites because it would make an unquantifiable contribution to this general loss.

Alternative 3 - Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

The two historic residences are located in the Wilma Creek and Swan Creek tracts. No LROs are proposed in these areas. They are not affected by the Cave Creek and Cascade East LROs. As such, impacts on historic sites for Alternative 3 would be identical to the impacts described under Alternative 2 (Proposed Action). Indirect impacts resulting from improved access roads would also be identical to those caused by Alternative 2.

Also, neither the Cave Creek LRO nor the Cascade East LRO is near National Register-eligible recreation residences, so neither LRO would have an impact on historic sites.

Cumulative Effects of Alternative 3

The cumulative effects of the projects listed in Table 3.2.3-1 combined with Alternative 3 would be similar to those of Alternative 2.

Alternative 4 – Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

The two historic residences are located in the Wilma Creek and Swan Creek tracts. No LROs are proposed in these areas. They are not affected by the Cave Creek and Cascade West LROs. As such, impacts along most of Alternative 4 would be the same as for Alternative 2 (Proposed Action) and Alternative 3. Indirect impacts resulting from improved access roads would also be identical to those caused by Alternatives 2 and 3.

Also, neither the Cave Creek LRO nor the Cascade West LRO is near National Register-eligible recreation residences, so neither LRO would have an impact on historic sites.

Cumulative Effects of Alternative 4

The cumulative effects of the projects listed in Table 3.2.3-1 combined with Alternative 4 would be similar to those of Alternative 2 and 3.

Comparison of Alternatives

Alternative 1, No Action, would have no identifiable impacts on historic sites within the ROW of the existing transmission line.

The Cascade East LRO (Alternative 3) and Cascade West LRO (Alternative 4) were proposed to reduce scenic impacts on residents at the Cascade Creek Recreation Residence Tract (refer to Section 3.3.1 – Scenery). Neither tract is eligible to the National Register as a district, nor does either tract contain individually eligible residences. For this reason, the visual impacts on historic sites under Alternatives 2, 3, and 4 would be identical.

Potential impacts on the two National Register-eligible recreation residences would be the same under Alternatives 2, 3, and 4.

Summary Conclusion

The impact analysis for historic sites within the Project Area is based on background research, and field documentation and evaluation of recreation residences. Scoping comments received from recreation residence owners identified impacts to recreation residences, including impacts

on their historic value, as an important issue. After further documentation and evaluation of the residences, the GNF has determined that only two of the 69 recreation residences within the Project Area are individually eligible for the National Register. Of these two residences, neither would be impacted by the proposed transmission line or LROs. Impacts would be the same for Alternatives 2, 3, and 4.

Based on the analysis presented above, there would be no impacts on recreation residences as historic sites under either Alternative 2, 3, or 4.

Archaeological Sites

Methodology

National Register-eligible archaeological sites within the Project Area may be subject to both direct and indirect impacts. Impacts to National Register-eligible archaeological sites were assessed by determining if ground disturbing activities associated with the construction of the transmission line, such as clearing vegetation, preparing staging and decking areas, improving existing access roads, installing monopoles, stringing and tensioning conductors, and using restoration and re-vegetation measures, would directly alter or destroy the site. Even if the ground itself is not disturbed, activities such as vegetation clearing can compact soils, crush artifacts, and alter prehistoric and historic features. Where there are no access roads, the Proposed Action would use overland access with tracked or rubber-tired equipment that could also cause impacts to archaeological sites. See Chapter 2 for more details on ground disturbance associated with different aspects of the project.

Direct visual impacts may result when the transmission line is introduced into the settings of National Register-eligible sites, if their eligibility is based in part on the quality of that setting. However, National Register-eligible archaeological sites are usually significant because of the scientific data they contain (National Register Criterion D), not their setting, and are rarely adversely affected by visual intrusions. This would not be true for pictograph sites, rock cairns, vision quest sites, some stone circles, or TCPs, none of which are known to exist within the Project Area. Direct visual impacts to archaeological sites that are National Register-eligible due to their setting, should such sites be identified in the future, would be assessed by determining if the proposed 161 kV transmission structures, ground disturbing activities or removal of trees would alter their setting.

Indirect impacts to archaeological sites in project areas can result from the improvement of existing access roads. Improved roads may lead to increased public use in certain areas, and uncontrolled public recreation may in turn lead to vandalism of archaeological sites. For the JRBS project, construction vehicles and equipment would use existing roads and trails for access wherever feasible. It is not anticipated that new access roads would be necessary, although it is possible that portions of existing access roads outside the ROW would require improvements.

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1 (No Action)

Under the No Action alternative, the existing 69 kV transmission line would not be rebuilt to a new 161 kV transmission circuit, and transmission structure locations and ROW width would not change. On-going maintenance activities would continue. There would be no ground disturbing activities and there would be no direct physical impacts to any archaeological sites. There would be no indirect impacts related to improved access roads. One archaeological site has been disturbed in the past and impacted by an existing transmission structure; there would be no additional disturbance under the No Action alternative.

Cumulative Effects of Alternative 1 (No Action)

Cumulative effects on archaeological sites are those effects that result from incremental impacts of the JRBS project when added to other past, current and reasonably foreseeable future actions. Table 3.2.3-1 lists the projects considered for the cumulative effects analysis. Because Alternative 1 would have no impacts on archaeological sites, it would not contribute to any cumulative effects caused by other projects.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2 (Proposed Action)

The Proposed Action is an upgrade of the existing transmission line. For the most part, the existing ROW would be used except in heavily forested areas where it might be widened from 40 feet to 50 feet. Replacing the few existing H-frame structures might require that the ROW be widened from 50 feet to 80 feet. New transmission structures may be constructed 10 to 15 feet from current transmission structure locations.

One known archaeological site, recommended to be eligible to the National Register, falls within the ROW and could be impacted by ground-disturbing construction activities. This site is already disturbed by a transmission structure along the existing transmission line. Investigations at this site suggest that the proposed replacement of the existing transmission structure with a new one just 10 to 15 feet away would be an impact. However, impacts to this site could be reduced by placing the pole outside the site boundary (see PDF 3.2 in Chapter 2) and by cutting off the existing pole at ground level. This site would also be impacted by a proposed log decking area unless that decking area is eliminated from further consideration.

Implementing PDFs, such as data recovery, strategic pole placement, and construction monitoring, may reduce the level of potential impact.

Staging Areas/Fly Yards

One proposed staging area would be unlikely to cause impacts to archaeological sites. No archaeological sites were found during surveys at this location, and a previously recorded site nearby could not be relocated by archaeologists. Another proposed staging area would not impact any archaeological sites. These areas have not yet been finalized, so if the location of such is in another area, then it would be surveyed for cultural resources.

Decking Areas

Of the five proposed decking areas, three are heavily disturbed and are unlikely to contain intact archaeological sites. Of the two undisturbed proposed decking areas, one contains a prehistoric lithic scatter than is recommended not eligible to the National Register, and the other contains a previously recorded archaeological site that has been recommended to be eligible to the National Register. A description of possible mitigation measures is included in Chapter 2 (PDFs 3.1, 3.2, and 3.3).

Cumulative Effects of Alternative 2 (Proposed Action)

There are a few planned or foreseeable projects that are proposed or currently underway in the JRBS vicinity (Table 3.2.3-1). The current condition described in the Affected Environment section reflects past projects in the Project Area. Two of these projects are yearly activities conducted by the GNF to manage vegetation and to provide maintenance for recreation residences. The Jack Creek timber sale is underway but is very small and the fuels reduction activities will occur when there are appropriate weather conditions. The MDT projects include those that are in the construction phase or are planned.

As federal undertakings, each of the projects in Table 3.2.3-1 has complied or will comply with Section 106 of the NHPA. Compliance would include identification, evaluation, assessment of

effects, and implementing measures to eliminate or reduce adverse effects. As a result of Section 106 compliance, impacts of a project that may have been initially high could be reduced to low.

The northern portion of the JRBS project off of Forest Service land is currently being built is on private land. Data from the MHS indicates that this portion of the project would cross 12 archaeological sites (in the vicinity of this portion of the project), including four prehistoric lithic scatters and eight historic sites. The historic resources include irrigation ditches, a wagon road, a trail, and an abandoned railroad grade. Only the railroad grade has had a formal determination of eligibility, and it has been found eligible to the National Register. Because the eight historic sites are all linear features that cross the existing ROW, it is likely that the resources would be spanned by the JRBS transmission line and ground disturbance would be minimal.

Over time and despite PDFs, there could be a general loss of archaeological sites and of the information they contain resulting from the combined, incremental effects of many actions. Alternative 2 would contribute to cumulative effects on archaeological sites because it would make a contribution to this general loss.

Alternative 3 - Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

The Cave Creek and Cascade East LROs are not located near any of the four known archaeological sites. Therefore the impacts for Alternative 3 would be very similar to the impacts described under Alternative 2 (Proposed Action). Indirect impacts resulting from improved access roads would also be identical to those caused by Alternative 2.

Cumulative Effects of Alternative 3

The cumulative effects of the projects listed in Table 3.2.3-1 combined with Alternative 3 would be similar to those of Alternative 2.

Alternative 4 – Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

The Cave Creek and Cascade West LROs are not located near any of the four known archaeological sites. Therefore the impacts for Alternative 4 would be very similar to those for Alternative 2 (Proposed Action) and Alternative 3. Indirect impacts resulting from improved access roads would also be identical to those caused by Alternatives 2 and 3.

Cumulative Effects of Alternative 4

The cumulative effects of the projects listed in Table 3.2.3-1 combined with Alternative 4 would be similar to those of Alternative 2 and 3.

Comparison of Alternatives

Alternative 1, No Action, would have no identifiable impacts on archaeological sites within the ROW of the existing transmission line.

The Cave Creek LRO (both Alternatives 3 and 4), Cascade East LRO (Alternative 3), and Cascade West LRO (Alternative 4) were all intensively surveyed for archaeological sites as were the corresponding rebuild sections along Alternative 2. No archaeological sites, except the ineligible Lava Lake Trail, were identified in the LROs or rebuild sections. The remaining sections of Alternatives 2, 3, and 4 were intensively surveyed and only one National Register-eligible archaeological site was identified. However, impacts could be reduced or eliminated by shifting one proposed pole location and by not using one proposed log decking area. Therefore, Alternatives 2, 3, and 4 would have identical impacts on archaeological sites, unless unanticipated discoveries are made during construction of any of the LROs in which case appropriate mitigation

measures would be implemented. In the event that previously unidentified historic and archaeological sites are discovered during construction, potentially destructive work within 100 feet of a discovery would be halted and PDF 3.3 would be implemented to assess/protect the resource.

Summary Conclusion

The impact analysis for archaeological sites within the Project Area is based on background research and survey. Scoping comments did not mention archaeological sites as an issue of concern, but compliance with Section 106 of the NHPA is still required.

Based on the analysis presented above, there would be minimal differences, if any, among Alternatives 2, 3, and 4 in terms of impacts to known archaeological sites.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

To ensure compliance with Section 106 of the NHPA, a Memorandum of Agreement (MOA) or PA will be drafted between the Forest Service, Montana SHPO and other parties to address how historic and archaeological sites affected by the JRBS transmission line should be treated. The MOA or PA will identify specific PDFs that will be implemented to mitigate identified adverse impacts if archaeological monitoring is necessary, and how eligibility will be determined for archaeological sites discovered during construction. Potential impacts on TCPs, if any, will be identified and addressed during continuing government-to-government consultation between the GNF and interested Tribes. PDFs identified to date are listed in Chapter 2 and include 3.1, 3.2, and 3.3.

Consistency with Laws, Regulations, and Forest Plan

All alternatives would be consistent with federal historic preservation legislation, including Section 106 of the NHPA and its implementing regulations at 36 CFR 800, and E.O.s. Identification, evaluation, and treatment of historic and archaeological sites will also be consistent with the 1995 (updated in 2000) *Programmatic Agreement Regarding Cultural Resource Management on National Forests in the State of Montana* executed by Region 1 of the Forest Service, the ACHP, and Montana SHPO. Alternatives will also be consistent with the guidelines established in the Forest Plan.

The Jack Rabbit to Big Sky Meadow Village Transmission Line Upgrade cultural resource report by POWER, was provided to the Montana SHPO for review on February 11, 2013 pursuant to 36 CFR 800. The Montana SHPO responded on February 25, 2013 and March 18, 2013, and agreed with the Forest Service determination of project effect. They recommended that National Register evaluations be completed as part of this project, which the GNF will pursue following release of the Environemtnal Impact Statement (EIS) and Record of Decision (ROD). Therefore, state SHPO consultation requirements have been met. Please refer to SHPO-GNF correspondence in the project record.

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3.3.3 Transportation, Traffic, and Access to NFS Lands

Description of Issue

During the construction period of the project, construction activities would occur along the narrow United States Highway 191 (US Hwy 191) and Montana State Highway 64 (MT Hwy 64) travel corridor, as well as at Gallatin National Forest (GNF) access points. This would include terrestrial operating equipment, construction crews, vegetation clearing, and helicopter use over roadways. These activities have a potential to increase traffic and cause delays from temporary road closures of access roads, US Hwy 191, and MT Hwy 64. These activities may also decrease traveler safety for temporary periods of time during construction. Operation and maintenance activity for the proposed upgraded transmission line would have minimal effect on travel or transportation along US Hwy 191 and MT Hwy 64. Recreation residence owners raised concerns that construction, vegetation clearing, and line upgrades will restrict or modify access to recreation residences, damage property, and result in displacement. These issues drove the development of alternatives that minimize temporary impacts to the Cascade Creek and Cave Creek recreation residence tracts.

Indicator

Transportation, traffic, and access impacts would be significant if there are prolonged temporary closures of US Hwy 191 due to transmission line construction across or near the highway. In addition, restricting access to recreation residents between Memorial Day weekend and Labor Day would be considered significant. The temporary closures and delays of US Hwy 191 would occur during the construction season for the two years of construction on the GNF. The exact method for construction employed and the sequence with which construction tasks occur would be dependent on final engineering, contract award, conditions of permits and contractor preference. Therefore, the duration of temporary closures or delays is not known at this time, but is anticipated to occur for only a few minutes at a time. The No Action Alternative, the Proposed Action (Alternative 2), and Alternatives 3 and 4 are evaluated to determine the degree of impact to travelers and residents using US Hwy 191, MT Hwy 64, and GNF access points to the Cave Creek and Cascade Creek recreation residence tracts.

Scale of Analysis

The spatial boundary for the transportation and traffic analysis area includes roads and access points within the Gallatin Canyon and Big Sky area for the 16 mile Project Area on NFS lands and the approximate five miles of private inholdings between the Forest Service boundary north of Spanish Creek to the Meadow Village Substation. The entire 37-mile corridor was considered for the assessment of cumulative effects below. Additionally all roads which have access from US Hwy 191 and MT Hwy 64 are considered as part of the analysis (see Figure 3.3.3-1). The temporal boundary for the transportation and traffic analysis includes the short-term impacts during construction activities, as well as long-term impacts after construction, including operation and maintenance of the transmission line.

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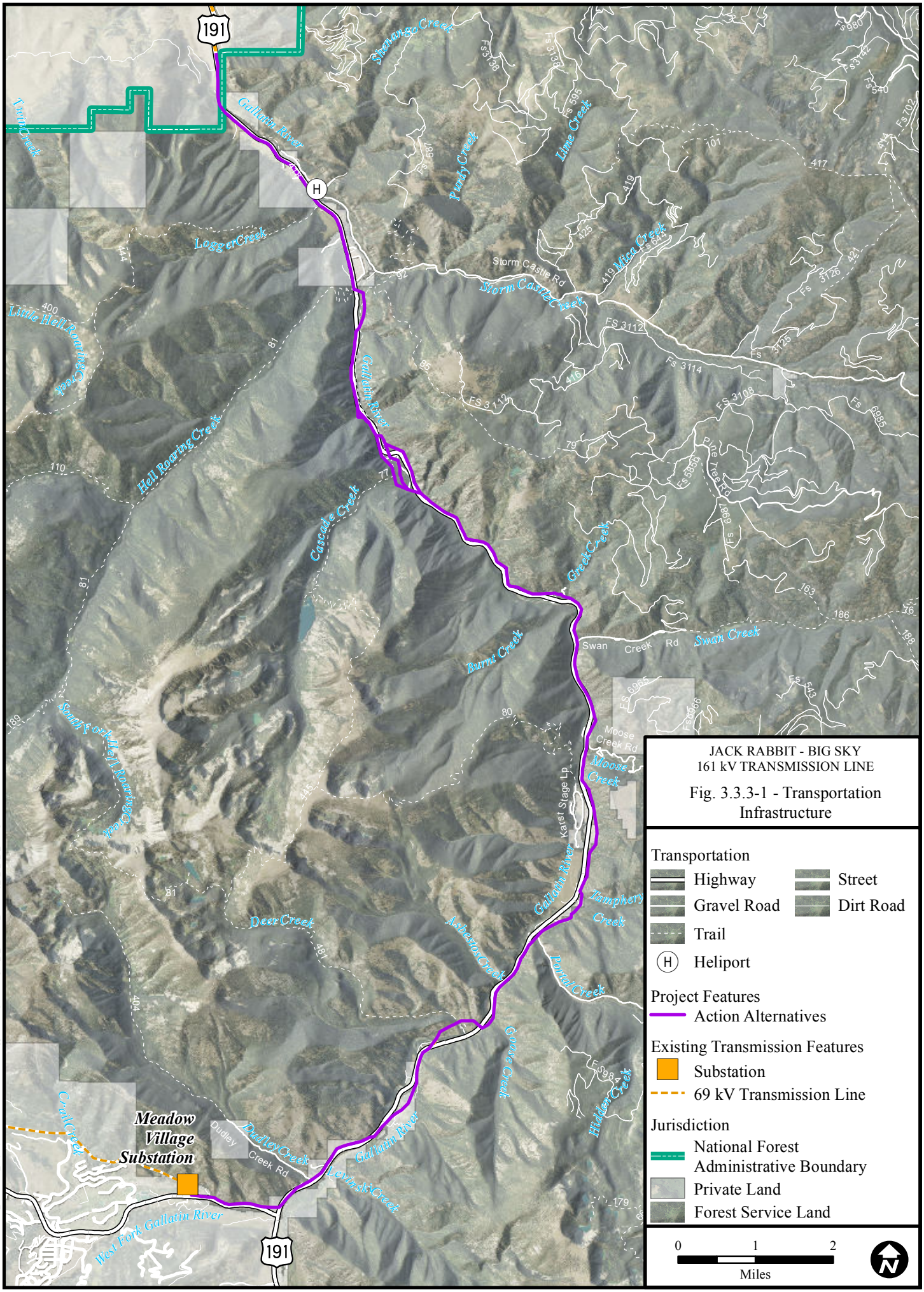

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Affected Environment

Transportation and Traffic

According to the Montana Department of Transportation's (MDT) Functional Highway Classification Map (2005), US Hwy 191 is classified as a "principal arterial-non-interstate." According to the Federal Highway Administration's (FHWA) 2005 "National Highway System", it is designated as a non-interstate highway. In the analysis area, it is a two-lane paved highway that winds through Gallatin Canyon, adjacent to the Gallatin River. US Hwy 191 provides a major route for interstate and intrastate travel, including tourism and commercial routes to West Yellowstone, Big Sky, and Yellowstone National Park from United States Interstate 90 (I-90) near Bozeman. It provides the only access to all the roads which are within the Gallatin Canyon, as well as access to GNF and the amenities it provides such as campgrounds, trailheads, boat ramps, recreation residences, and other recreational opportunities. The highway section in the analysis area becomes congested during the summer and fall seasons when peak travel demand occurs along the highway and when ongoing projects or maintenance is being conducted by MDT causing travel delays.

NFS roads provide public access to and across lands managed by the GNF from US Hwy 191. Some privately owned roads also connect into US Hwy 191. These roads are primarily accessed from US Hwy 191 and the local subdivision road systems within the analysis area; are typically kept open on a seasonal basis; and consist of both paved and unpaved surfaces, such as dirt and gravel.

MT Hwy 64, also referred to as Big Sky Spur Road, is an east-west state highway which intersects with US Hwy 191 in the southern part of the analysis area and provides access to the Big Sky area, including two large ski resorts. MT Hwy 64 extends to the west beyond the analysis area into Madison County.

Within the project area US Hwy 191 and MT Hwy 64 are authorized to occupy and use National Forest System (NFS) lands for highway purposes under an easement granted by the FHWA and consented to by the United States Forest Service (Forest Service or USFS).

Recreation Residences

In the analysis area, recreation residences are primarily located in tracts with roads and trails accessing the recreation residences. The areas surrounding each recreation residence is cleared forest ground with some undergrowth. There are above ground and underground utilities serving the recreation residences. Recreation residences are owned by the permit holders, but the land underneath or surrounding the structures is NFS land. Such land is mostly undeveloped except for the clearing of hazard trees to prevent the potential for destruction of private property or injury to humans. The recreation residences are used during much of the year, but are not permitted to be primary residences lived in year-round.

The following table (Table 3.3.3-1) shows the quantity of recreation residences within the analysis area.

TABLE 3.3.3-1 RECREATION RESIDENCES QUANTITY

	Count of Recreation Residences within Analysis Area			
Tract	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cave Creek	5	5	5	5
Welchom Springs	1	1	1	1

	COUNT OF RECREATION RESIDENCES WITHIN ANALYSIS AREA			
TRACT	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Cascade Creek	23	23	23	23
Egyptian Creek	2	2	2	2
Kitchen Rock	2	2	2	2
Greek Creek	11	11	11	11
Swan Creek	3	3	3	3
North Tamphrey Creek	2	2	2	2
Tamphrey Creek	13	13	13	13
Portal Creek	2	2	2	2
Wilma Creek	5	5	5	5
Total:	69	67	67	69

Road access from US Hwy 191 to the recreation residence tracts is included as part of the authorization for the recreation residence. However, a separate permit has been issued by the Forest Service to the Cascade Creek recreation residence owners association for their access road (Cascade Creek Road), which includes one bridge that crosses Cascade Creek. In either case, the recreation residence owners are responsible for the operation and maintenance of the access roads. The access road is maintained by the Cascade Creek recreation residence association as part of dues it receives from the owners. For all other recreation residence tracts, the access roads are permitted by the Forest Service through each individual recreation residence permit. Each individual cabin owner is responsible for the maintenance and operation of their own access. For larger tracts, such as Greek Creek and Tamphrey Creek, all individual permittees are granted access by the Forest Service and are expected to maintain the road. It is up to the tract residents to determine how to share maintenance and operating costs of the roads when necessary. In any recreation residence tract, in the event of damage to the road and/or bridge by NorthWestern Energy (NorthWestern) during construction and operation, the utility would be expected to repair the damage.

Planned Transportation Improvement Projects

According to the State Transportation Improvement Plan 2010-2014, MDT's projects in the analysis area include adding turn lanes on US Hwy 191 within Gallatin Canyon, adding turn lanes on MT Hwy 64 going to Big Sky, slope flattening, widening of shoulders, improving clear zones, improving site distance, installing new and upgraded guardrails, and replacing two bridges. The bridge replacements and additional turn lanes at the junction of US Hwy 191 and MT Hwy 64 have been completed.

This project work is evaluated in the Cumulative Impacts subsection for each alternative.

Applicable Laws, Regulations, Forest Plan Direction

Gallatin National Forest Management Plan (1987)

The Gallatin National Forest Management Plan of 1987 (Forest Plan) identifies standards at two geographical levels, Forest-wide and Management Areas. Forest-wide Standards, which apply to NFS land that is administered by the GNF, are intended to supplement, not replace, the national and regional policies, standards, and guidelines found in Forest Service manuals and handbooks. Forest Plan standards relevant to the Proposed Project and alternatives are listed below:

13. Facilities

Roads and trails will be designed to standards that meet resource management objectives.

Roads and trails that have been disrupted by management activities and are required for continued use will be restored to serviceable condition prior to completion of the project.

Existing roads and trails will be maintained consistent with management area goals.

Gallatin National Forest Travel Management Plan (2006)

The GNF Travel Management Plan was adopted by the Forest Supervisor in December 2006. The purpose of the Management Plan is to:

Provide for public access and recreation travel on the GNF considering both the quantity and quality of opportunities provided.

Establish objectives and/or restrictions to correct any unacceptable resource damage that is occurring due to the use of forest roads, trails and areas open to cross-country travel.

Remove outdated, ineffective, and/or unclear existing Forest Plan standards and other direction applicable to road and trail management.

Identify administrative access routes to facilitate management of a variety of resources on the GNF.

Gallatin National Forest Summary of Forest Plan Amendments (2009)

Amendment #45, Gallatin National Forest Travel Plan Amendment Forest Plan, amended 10/30/06 (legal notice 12/18/06) via the Record of Decision (ROD) for the Gallatin National Forest Travel Management Plan.

This amendment removed all prior Forest Plan direction related to access and travel management. The Travel Management Plan also established new goals, objectives, standards, and guidelines for access and travel management, but this direction was not amended into the GNF as originally proposed.

State Transportation Permits

The use of Montana state highway right-of-ways (ROWs) for other than transportation purposes requires an encroachment permit from MDT, in addition to an authorization for the non-highway use being granted by the Forest Service for occupancy of NFS lands. Also, any Project requirement to transport oversize or overweight loads on state and interstate highways would require approval from MDT.

Methodology for Analysis

Base maps were prepared at a scale of 1:24,000. The Forest Plan and amendments, as well as the 2006 Travel Management Plan were reviewed to identify Forest policies and management goals related to the issue. In addition, MDT and FHWA maps and publications were reviewed to identify the functional classification of US Hwy 191 and policies related to traffic control. Geographic information system (GIS) data were collected and included in the inventory, as appropriate. POWER Engineers, Inc. (POWER) delineated the number of recreation residences in

each tract, and access roads to these recreation residences, within a 0.5 mile of each side of all alternatives.

A reconnaissance of the US Hwy 191 and MT Hwy 64 corridors was conducted by POWER and GNF personnel prior to the Final Environmental Impact Statement (FEIS) project kickoff meeting and site visit in April 2010. A subsequent field investigation of the analysis area was conducted by POWER to verify and supplement selected existing land uses between June and August 2010. Ground and aerial reconnaissance was aided by the use of selected global positioning system (GPS) readings and GIS mapping. Discussions with GNF personnel (Teri Seth, Fred Haas, and Steve Christman), were conducted between June 2010 and September 2011.

Impacts to transportation, traffic and access to NFS lands were determined by identifying construction activities that would result in travel restrictions. The analysis evaluated traffic congestion and stoppages, lane restrictions, travel delays, and restricted access to recreation residences; and identified areas where these activities would potentially occur and the roadways that would be impacted. The impact analysis assumed a Transportation Management Plan (TMP) would be implemented to effectively address transportation, traffic, and access to NFS lands. As stated in PDF 0.1 in Chapter 2, appropriate traffic control measures would be utilized to ensure public safety during construction as part of a comprehensive TMP. As defined by the MDT, a TMP consists of a Traffic Control Plan, a Public Information Component, and a Transportation Operations Component (TOC). Prior notice would occur for any extended delays or road blockage. The TMP would be reviewed by the MDT and GNF prior to construction and once approved, included as part of the Forest Service Special Use Permit (SUP). The goal of the TMP would be to limit project related temporary delays to 15 minutes.

Effects Analysis

This section describes the anticipated changes in the transportation network and operations for each alternative. The following roads are currently crossed by the existing transmission line (Alternative 1 - No Action Alternative), and would be crossed by Alternatives 2, 3, and 4. The number of road crossings for each alternative, as well as the multitude of crossings for each road is shown on Table 3.3.3-2 below:

TABLE 3.3.3-2 ROAD CROSSINGS

ROAD NAME	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
US Hwy 191	8	8	6	6
MT Hwy 64	0	0	0	0
Cascade Creek Road #130[2]	6	6	0	0
Storm Castle Road #132	1	1	1	1
Dier Lane (private)	1	1	1	1
Dudley Creek Road #2502	2	2	2	2
Goose Creek Road[1]	1	1	1	1
Greek Creek Road #81[3]	7	7	7	7
Lazy J Road (private)	1	1	1	1
Lower Dudley Creek Road (private)	1	1	1	1
Moose Creek Road # 479	1	1	1	1
Portal Creek Road # 984	1	1	1	1
Swan Creek Road # 481	1	1	1	1
Swift River Lane (private)	1	1	1	1
Tamphery View Road #537[1]	3	3	3	3

Notes: All crossings are on the existing alignment. There are no new road crossings.
[1]Recreation residence tract access roads; [2]Recreation residence tract and trailhead access roads; [3] Recreation residence tract and campground access roads

None of the alternatives create any new crossings of roads and highways along their respective routes. The transmission lines associated with Alternatives 3 and 4 have two fewer crossings of US Hwy 191 compared to the existing line. Cascade Creek Road would not be crossed by the upgraded transmission line under Alternatives 3 and 4, but would still retain crossings from the associated distribution line.

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative, the upgraded transmission line would not be constructed and no additional impacts to the existing transportation network or traffic patterns would occur. Existing roads would still be used to maintain the current transmission line.

Cumulative Effects of Alternative 1

Under the No Action Alternative, the Proposed Project would not be constructed and, therefore, would not contribute to any cumulative impacts.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2

Transportation and Traffic

The majority of the effects of the Proposed Action (Alternative 2) to the road network and traffic, particularly along US Hwy 191 and its access points, would occur as temporary lane closures and traffic delays during the construction period. Such impacts would affect local residents (on private lands), recreational users accessing campgrounds, trailheads, recreation residences, people accessing the GNF and Big Sky Resort area, and general thru-traffic on US Hwy 191 or MT Hwy 64.

Much of the construction associated with Alternative 2 would create temporary localized traffic impacts where construction is occurring. Impacts would include traffic congestion and controlled stoppages by flaggers, lane restrictions, and travel delays, resulting in travel disruption for motorists travelling along US Hwy 191 as well as from roads accessing US Hwy 191. To minimize these temporary impacts to traffic, delays and lane closures related to project construction. PDF 1.8 (in Chapter 2) would be implemented. Construction activity that could potentially impact US Hwy 191, MT Hwy 64, recreation residence tracts, and GNF access points would include the removal of trees, transport of workers and equipment, helicopter use, and stringing of the new conductor. This may result in restricted use of these travel corridors. Construction vehicles and heavy equipment would enter and exit the highway to travel to and from construction staging areas, fly yards, and decking areas. Temporary road/access point closures or lane reductions would occur so construction workers can: safely operate large trucks and equipment; get to designated access points per the construction schedule; allow helicopters to fly across US Hwy 191; access points to remove large logs; remove existing transmission line structures; bring new structures from the laydown areas to the structure's specific location; and string new conductor. Traffic control measures such as flaggers, signage and other safety devices would be implemented prior to project implementation and during the construction period to warn travelers in advance of changes to road conditions and potential travel delays due to construction.

Table 3.3.3-3 lists the roads that would be used as access during construction, either directly to the line or to gain access for other means of travel, such as overland travel. Alternative 2 would use the same roads for access purposes. Please see the Access Map in Appendix B for more details.

TABLE 3.3.3-3 ROADS ACCESSED DURING CONSTRUCTION

ROAD NAME	PRIMARY USE
US Hwy 191	Inter-state access from I-90 south to Big Sky, West Yellowstone and other areas
MT Hwy 64 (Big Sky Spur Road)	Public access to Big Sky resort and community from US Hwy 191
Cascade Creek Road	Recreation residence and trailhead access
Dudley Creek Road (USFS #2520)	Forest and private land access road
Goose Creek Road	Recreation residence access
Greek Creek Road (USFS #81)	Recreation residence and campground access
Moose Creek Road (USFS #479)	Forest and private land access road
Petes Way	Private road
Portal Creek Road (USFS #984)	Forest and recreation residence access road
Storm Castle Road (USFS #132)	Forest and recreation residence access road
Swan Creek Road (USFS #481)	Forest and recreation residence access road
Tamphery View Road (USFS #537)	Recreation residence access
Deer Creek Road (USFS #481)	Trailhead and private land access

NorthWestern would obtain the proper permits from MDT for the use of US Hwy 191 and MT Hwy 64 ROW for traffic control, oversized loads (if necessary), helicopter use over the highway, stringing new conductor over the highway, and approaches (trucks entering/exiting the highway at temporary access points). NorthWestern would enter into agreements with the recreation residence permit holders for use of the recreation residence tract access roads that are located on NFS lands.

Recreation Residences

Construction Impacts (Short-Term)

Impacts to recreation residence access created by the Proposed Action would occur during the following activities: removal of trees for a widened ROW; removal of existing structures (some existing structures would be modified for the existing distribution system for recreation residences); placement of new transmission structures; stringing of new conductors for transmission and underbuild; and any revegetation efforts. The duration of construction within the GNF would be approximately 24 months; however, construction within the tracts would actually occur for a fraction of that time. There would be no laydown, staging, or decking areas allowed within the recreation residence tracts. As noted in Project Design Feature (PDF) 1.8 in Chapter 2, between Memorial Day and Labor Day weekend construction will not occur near recreation residences without authorization from the Forest Service.

During construction, the use of recreation residence access roads would be necessary and permit holders of recreation residences may experience temporary travel delays due to lane restrictions and detours needed to construct the project. Temporary road closures are needed for trucks, personnel and equipment utilizing the road for removing old structures, placing new structures, and stringing the new conductor. No access roads to recreation residences would be permanently closed or rerouted as part of this Alternative. NorthWestern would enter into agreements with the recreation residence permit holders for use of their privately maintained roads. These roads are mostly dirt or gravel and improvements to roads may be required to accommodate the loads and weight of construction vehicles. Any improvements to these roads would be made by NorthWestern, in collaboration with the Forest Service.

The use of helicopters to remove timber, bring in new structures, and string new conductor could potentially impact access to recreation residences. However, with implementation of PDF 1.8 (see Chapter 2), those impacts would be minimized or avoided. The helicopter use restrictions would be determined through consultation with the Federal Aviation Administration (FAA) and would be outlined in a flight plan that will be developed prior to construction.

Cave Creek Tract

A total of five residences are located within the Cave Creek tract. Currently, one recreation residence is very close to the existing line. The Project would cause temporary restrictions of vehicle access, except during summer holiday weekends, to the recreation residences when crews are removing timber and placing new structures.

Welchom Springs Tract

Improvements would be required to current roads near Welchom Springs, which are primarily used for recreation residential access. There is one recreation residence in the Welchom Springs tract. Access to this residence would remain open. The existing transmission line is down slope from an outbuilding which is part of the residence. The Proposed Project would be further upslope and would improve access to the recreation residence once construction is completed. The existing permanent access to these recreation residences would remain unchanged.

Cascade Creek Tract

Currently, the main access to the 23 recreation residences within this tract is Cascade Creek Road. The existing transmission line crosses this road several times, as would proposed Alternative 2. As a safety measure and to reduce potential access impacts to recreational residences from construction activities, PDF 1.8 (see Chapter 2) would be implemented. The existing permanent access to these recreation residences would remain unchanged and the bridges would be protected.

Greek Creek Tract

A total of 11 recreation residences are located within the tract, and the existing transmission line crosses the tract, with transmission structures generally located between the recreation residences. Access to this tract is Greek Creek Road, which the Proposed Project would use for access, tree removal, and construction. As a safety measure and to reduce potential access impacts to recreational residences from construction activities, PDF 1.8 (see Chapter 2) would be implemented. The existing permanent access to these recreation residences would remain unchanged.

Tamphrey Creek Tract

A total of 13 recreation residences are located within the tract, and they are accessed using Tamphrey Creek Road. Tamphrey Creek Road would be utilitized for the Proposed Project and require temporary lane closures. As a safety measure, and to reduce potential access impacts to recreational residences from construction activities, PDF 1.8 (see Chapter 2) would be implemented. The existing permanent access to these recreation residences would remain unchanged.

Portal Creek Tract

A total of two (2) recreation residences are located within the tract and within the analysis area. Access to this tract is from Greek Creek Road and Tamphrey Creek Road, accessed through the Tamphrey Creek Tract. Both Greek Creek Road and Tamphrey Creek Road would be used for access, tree removal, and construction. As a safety measure, and to reduce potential access impacts to recreational residences from construction activities, PDF 1.8 (see Chapter 2) would be implemented. The existing permanent access to these recreation residences would remain unchanged.

Goose Creek Tract

Recreational Residences within Goose Creek Tract are not within the analysis area; however, the roads accessing this Tract would be utilized. The access road to Goose Creek would require temporary lane restrictions due to location of construction equipment and workers when in the area. As a safety measure, and to reduce potential access impacts to recreational residences from

construction activities, PDF 1.8 (see Chapter 2) would be implemented. The existing permanent access to these recreation residences would remain unchanged.

Cumulative Effects of Alternative 2 (Proposed Action)

Construction would create temporary impacts, as there would likely be other projects going on in the area at the same time. These planned projects include US Hwy 191 Gallatin Canyon Safety Improvements (tentative completion date of 2013), NorthWestern's construction of the northern portion (Phase 1) of the Jackrabbit to Big Sky 161 kV project and Montana Opticom's proposal to bury a fiber optic line (date unknown) from Four Corners to Big Sky. The Gallatin Canyon Safety Improvements include the following components: adding turn lanes on US Hwy 191 within Gallatin Canyon; slope flattening; widening of shoulders; improving clear zones; improving sight distance; and installing new and upgraded guardrails.

The cumulative effects of these projects and the Proposed Action would create traffic delays along US Hwy 191 in Gallatin Canyon and the Four Corners community, as well as some temporary traffic delays on some local streets in Four Corners where Phase 1 of the Jackrabbit to Big Sky 161 kV project is being constructed, if some or all of these projects were to be constructed simultaneously. However, the Phase 1 portion of the project will be completed prior to Phase 2 or 3 construction beginning. NorthWestern would obtain permits from MDT, as well as submit a TMP to MDT and GNF for safety and traffic measures. This plan will outline traffic control measures and safety procedures to be implemented during construction. NorthWestern would also coordinate the project's construction activities with the agency to help MDT determine when temporary lane closures, with respect to all projects, would be best timed to prevent delays and backups during times of high traffic volumes on US Hwy 191.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Under Alternative 3, the transmission line would cross US Hwy 191 six times, two less than the existing condition and Alternative 2. Alternative 3 eliminates a transmission line crossing of US Hwy 191 near the entrance of Cascade Creek Road, and the existing transmission line crossing south of the Cascade Creek Tract.

The direct and indirect effects of Alternative 3 would require temporary lane closures or restrictions along US Hwy 191 in the vicinity of the Cascade East LRO, where the existing transmission line would move east of US Hwy 191. The use of helicopters, for removing trees and placing new transmission line structures is anticipated. As a safety measure, and to reduce potential access impacts to recreational residences from construction activities, PDF 1.8 (see Chapter 2) would be implemented. Alternative 3 has two fewer transmission line crossings over US Hwy 191 compared with the Alternatives 1 and 2. The transmission line would not cross Cascade Creek Road; however, the road would still be utilized during construction for the removal of the existing conductors and modification of existing structures for continued distribution line use.

Transportation and Traffic

Cave Creek LRO

Construction of the Cave Creek LRO would not impact the transportation network or associated traffic and access.

Cascade East LRO

The Cascade East LRO would remove two existing transmission line crossings of US Hwy 191, and would reduce potential traffic delays resulting from stringing the new conductor over the

highway. The southernmost crossing of US Hwy 191, near where this LRO is located, would still be utilized for distribution lines. As a safety precaution during construction, motorists on US Hwy 191 may incur temporary lane closures and travel delays when helicopters are in use near the highway while removing trees or delivering transmission structures. This preventive measure would be done to avoid the chance of trees and transmission line structures suspended underneath the helicopter falling onto the highway or vehicles. As a safety measure, and to reduce potential traffic impacts from construction activities, PDF 1.8 (see Chapter 2) would be implemented. The transmission line construction associated with this LRO would completely avoid Cascade Creek Road. The local distribution line serving recreation residences in the area would be placed on the existing transmission line structures, which would be modified by the removal of the existing conductor.

Recreation Residences

Alternative 3 would have similar effects as those described in Alternative 2 (the Proposed Project) in all recreation residence tracts except in Cave Creek and Cascade Creek. As noted in PDF 1.8 in Chapter 2, between Memorial Day and Labor Day weekend construction will not occur near recreation residences without authorization from the Forest Service. The following describes the impacts of the Cave Creek LRO and the Cascade East LRO to recreation residence access.

Cave Creek LRO

Portions of the Cave Creek LRO would occupy the original 1950s 50 kV transmission line corridor, that remains some-what intact on the ground, but was abandoned in the early 1970s when the current 69 kV transmission line was upgraded. This LRO would locate the transmission line west and south of the recreation residences so as not to bisect the tract as Alternatives 1 and 2 would. As such, construction of the transmission line would not require temporary road access closures.

Cascade East LRO

The Cascade East LRO would route the transmission line east of the Gallatin River and US Hwy 191 and away from the Cascade Creek recreation residence tract. Cascade Creek Road would not be used for construction of the new transmission line, however the road may be used to modify the existing distribution line that crosses the tract. Construction work along Cascade Creek Road would involve the removal of the existing transmission line conductor, modifying the existing structures, and restringing for the local distribution line. This work would be conducted without requiring the road to be closed; however, traffic control measures would be required to provide the construction crews adequate space to work. This would create some brief travel delays for residents in the Cascade Creek tract. As noted in PDF 1.8 in Chapter 2, between Memorial Day and Labor Day weekend construction will not occur near recreation residences without authorization from the Forest Service.

Cumulative Effects of Alternative 3

The cumulative effects of Alternative 3 would be similar to those described in Alternative 2. Coordination with MDT and Montana Opticom representatives by NorthWestern would help facilitate the development of respective coordinated construction schedules so that scheduling conflicts can be minimized and adverse cumulative temporary traffic impacts would not occur.

Alternative 4 – Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

Under Alternative 4, the transmission line would cross US Hwy 191 six times, two less than the existing condition and Alternative 2. Alternative 4 eliminates a transmission line crossing of US

Hwy 191 near the entrance of Cascade Creek Road, and an additional existing transmission line crossing north of the entrance of Cascade Creek road.

Alternative 4 would route the transmission line to the west side of the Cascade Creek tract. The primary difference between Alternative 4 and Alternative 2 would be the alteration of the existing route through Cascade Creek with the use of the Cascade West LRO, as described in further detail below. The removal of trees and the placement of transmission line structures on the steep hillsides near Cave Creek and Cascade Creek would require temporary lane closures on US Hwy 191 for the safety of travelers. These closures would occur for the safety of travelers due to the nature of the steep terrain and proximity to US Hwy 191. The benefits of Alternative 4, through the implementation of the Cascade West LRO, are two fewer crossings over US Hwy 191 compared to Alternatives 1 and 2. Cascade Creek Road would have no transmission line crossings; however Cascade Creek Road would still be utilized during construction for the removal of trees, removal of the existing conductor and modification of existing structures for continued local distribution line use within proximity to the Cascade Creek recreation residence tract. As noted in PDF 1.8 in Chapter 2, between Memorial Day and Labor Day, construction will not occur near recreation residences without authorization from the Forest Service.

Transportation and Traffic

Cave Creek LRO

Construction of the Cave Creek LRO would not impact the transportation network or associated traffic.

Cascade West LRO

The Cascade West LRO that is the part of Alternative 4 that would place the upgraded transmission line further west of US Hwy 191 and the Gallatin River, as well as upslope of Cascade Creek Road and the existing line by approximately 500 feet. This alternative has two fewer transmission line highway crossings of US Hwy 191 compared to Alternatives 1 and 2, but would still require the southern crossing for local distribution lines to recreation residences in the area. Any helicopter activity required during construction would occur on the west side of the highway, in the Cascade Creek area, reducing potential impacts to US Hwy 191. The distribution line, serving recreation residences in the area, would be placed on the existing transmission line structures, which would be modified with the removal of the existing conductor. These modifications would require construction crews to use Cascade Creek Road, but no closures to vehicle traffic are anticipated.

Recreation Residences

Cave Creek LRO

Construction of the Cave Creek LRO would not impact the existing access to this tract.

Cascade West LRO

Alternative 4 would have similar effects as those described for Alternative 3 in all recreation residence tracts except in Cascade Creek where there is a LRO. The Cascade West LRO would locate the transmission line west and upslope of the Cascade Creek tract and require construction work along Cascade Creek Road. The removal of trees and the placement of transmission line structures on the steep hillsides near Cascade Creek would require temporary lane closures on Cascade Creek Road for the safety of travelers. These closures would occur for the safety of travelers due to the nature of the steep terrain and proximity to Cascade Creek road. Removal of the existing transmission line conductor, modifying the existing structures, and restringing for the local distribution line would also occur. This work would be conducted without requiring the road to be closed; however, traffic control measures would be required to provide the construction crews adequate space to work. This would create some brief travel delays for residents in the

Cascade Creek tract. As noted in PDF 1.8 in Chapter 2, between Memorial Day and Labor Day, construction will not occur near recreation residences without authorization from the Forest Service.

Cumulative Effects of Alternative 4

The cumulative effects of Alternative 4 would be similar to those described with Alternatives 2 and 3. Coordination with MDT and Montana Opticom representatives by NorthWestern would help facilitate the development of respective coordinated construction schedules so that scheduling conflicts can be minimized and adverse cumulative temporary traffic impacts would not occur.

Comparison of Alternatives

There would be no permanent road closures associated with any of the alternatives. Table 3.3.3-2 summarizes the number of road crossings by alternative that would potentially require temporary road closures at some point during construction. Alternative 1 (No Action) would not create any construction impacts related to traffic and transportation because the existing lines and maintenance would remain in place. Alternatives 2, 3, and 4 would cause temporary impacts related to lane reductions and travel delays along US Hwy 191 and GNF access points including access to recreation residences. Alternative 2 would have a slightly shorter duration of construction since it would have a smaller area of new ROW. Alternative 2 has a number of existing access points into the existing transmission line ROW and few improvements would be required, as shown on the Access Map in Appendix F. Cascade East LRO and Cascade West LRO, which are part of Alternatives 3 and 4, respectively, are not easily accessible by existing roads due to a number of constraints including, but not limited to, steep terrain. However, they would require two fewer crossings and temporary closures to US Hwy 191 as well as a shorter durations of construction activities along Cascade Creek Road since no new transmission line structures are being placed along that road. Following construction, operation and maintenance of the transmission line would not create traffic and transportation impacts

Summary Conclusion

For Alternatives 2, 3, and 4, construction-related traffic impacts would be temporary and require temporary lane reductions and closures on US Hwy 191 and GNF access points including access to recreation residences. As noted in PDF 1.8 in Chapter 2, between Memorial Day and Labor Day, construction will not occur near recreation residences without authorization from the Forest Service. Construction activities would be coordinated with MDT, GNF, and recreation residence owners before construction. With the implementation of the PDF 1.8, as well as other PDFs identified in Chapter 2, and implementation of a TMP, impacts to transportation, traffic and access to NFS lands would not be significant for any Alternatives.

Overall, Alternatives 3 and 4 would result in the least impacts to transportation, traffic and access to NFS lands of the action alternatives, because they would reduce the need for closures and delays to US Hwy 191, MT 64, and GNF access points.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

The committed PDFs (0.1, 1.1, 1.4, 1.8, and 2.1) discussed in Chapter 2 related to transportation and traffic would be implemented by NorthWestern to minimize the temporary construction impacts. No additional mitigation measures or monitoring are recommended.

Consistency with Laws, Regulations, and Forest Plan

All alternatives would be consistent with federal, state, and county transportation regulations and plans because NorthWestern would implement a Transportation and Access Plan. They would also be consistent with the Gallatin National Forest Travel Management Plan and all MDT requirements. The Transportation and Access Plan would address implementation of Best Management Practices (BMPs), access closures or restrictions during construction, required vehicles, and trips for construction and delivery of materials.

3.4 Analysis Issues

3.4.1 Recreation and Recreational Values

Description of Issue

The construction activities, as well as the long-term operation and maintenance of the transmission line associated with the Proposed Project and its alternatives, would affect recreationists, recreation resources, and businesses that rely on the recreation resources within the Gallatin Canyon. Construction and operational activities such as right-of-way (ROW) clearing, ground disturbance, and new structures would have a potential to alter the recreational values of these same areas within the Gallatin National Forest (GNF).

Indicator

The analysis area includes several types of unique recreational opportunities provided by the GNF. Recreational opportunities include hiking, rock climbing, river activities, camping and fishing. The GNF facilitates recreational activities which include developed campgrounds, boat and raft launches, developed trailheads, and hiking trails. The Gallatin Canyon area is also an important gateway for tourists visiting Big Sky and Yellowstone National Park. The GNF serves many public uses, and recreation is one of the most important uses provided by the forest.

In order to evaluate impacts to recreation and recreational values, the following indicators were established for analysis:

> Consistency with the recreation resource element objective of GNF management areas that are located adjacent to the existing transmission line ROW (Management Area [MA] 25).
>
> Closure or displacement of developed recreational facilities by the Proposed Project.
>
> Restriction of access for recreational opportunities at trailheads and temporary closure of trails.

The No Action (Alternative 1), the Proposed Action (Alternative 2), and Alternatives 3 and 4 have been evaluated to determine if there are differences in impacts between the Alternatives. The Alternatives have also been evaluated to determine if construction, operation, and maintenance activities would significantly impact the GNF recreation facilities through conversion of ROW or by limiting the use of recreation facilities or restricting available recreation opportunities.

Scale of Analysis

The spatial boundary for the recreational analysis area includes the proposed transmission line ROW for the 16-mile length of the project and existing recreational facilities on GNF within a 0.5 mile corridor centered on the proposed transmission line routes. The GNF is an appropriate boundary area for the direct and indirect analysis in the Final Environmental Impact Statement (FEIS) as there are more established and unique recreation facilities and opportunities in the GNF that could be potentially impacted by the Proposed Project. During scoping, impacts to recreation residences in GNF which are unique to the Forest were raised as a particular concern during

scoping. The only other established recreation areas along or in proximity to the entire proposed 37-mile transmission line corridor is the Montana Fish, Game and Parks (MFGP) Kirk Wildlife Refuge fishing access site along the Gallatin River about 1.5 miles north of Spanish Creek Ranch near the northern boundary of GNF. The site was considered in the cumulative effects analysis. Anglers may experience temporary restricted access impacts during construction of this section of transmission line which is located between the fishing access site and US Hwy 191 where vehicles would likely be parked adjacent to. The temporal boundary for the recreation analysis includes the short-term impacts during construction activities, as well as long-term impacts such as any permanent loss of recreational opportunities or loss of business from recreationalists after construction.

Affected Environment

The existing transmission line is within a 40-foot utility ROW with clearing for safe operations and maintenance. The existing line comes within close proximity to several campsites and trails, which may be obstructed or temporarily closed during operations and maintenance of the existing transmission line (see Figure 3.4.1-1). The recreational opportunities within the GNF are vast, offering both natural and undeveloped recreation opportunities, as well as developed and manmade recreation opportunities. Much of the analysis area consists of developed recreation areas including campsites, picnic areas, trails, boat launches, and raft launches that bring the user closer to the natural surroundings. Recreation resources are also shown in Figure 3.4.1-1. Table 3.4.1-1 identifies the existing recreational areas.

TABLE 3.4.1-1 EXISTING RECREATION AREAS

AREAS	TYPES OF RECREATIONAL FACILITY OR OPPORTUNITY		
	CAMPGROUND	TRAILHEAD	BOAT RAMP
Indian Ridge		X	
Storm Castle		X	X
Hell Roaring		X	
Lava Lake		X	X
Spire Rock	X		
Greek Creek	X		
Swan Creek	X	X	
Moose Creek Flat	X		X
Moose Creek Group	X		
Asbestos Creek		X	
Deer Creek		X	
Dudley Creek		X	
Gallatin River		X	

Campgrounds include facilities for parking recreational vehicles, car camping, tent camping, restroom facilities, a pumped water-source, and trash receptacles. The campsites are located along the Gallatin River and offer recreation opportunities such as fishing, hiking, and visual enjoyment. Moose Creek Flat includes a boat ramp for rafting, kayaking, and other non-motorized boating. The area surrounding each campground is forested with some undergrowth. The campgrounds are open during prescribed seasons set by the GNF. There are often trails which connect the campgrounds to the forest. The trailheads include vehicle parking, equestrian hitch rails, and signage of trails that includes important information provided by the GNF regarding where the trails are routed and types of access allowed. The boat ramps give boaters, rafters, and kayakers safe access to the Gallatin River for floating and fishing opportunities.

The Gallatin Riverside National Recreation Trail is located along the eastern bank of the Gallatin River, between Storm Castle and the Gallatin River (near Lava Lake Trail Head) trailheads. The

trail was designated in 1979 by the Secretary of Agriculture and is notable for the streams, vegetation and visual quality along the trail in the Gallatin River and Canyon.

Recreational opportunities in the Gallatin Canyon and on the Gallatin River are important to local communities such as Bozeman, Gallatin Gateway, and Big Sky, as well as the rest of Montana. The Gallatin Canyon offers many unique Dispersed Recreation uses and access to Yellowstone National Park. Dispersed Recreation is a term used to define activities that take place outside of developed camping or concessionaire-operated facilities, excluding motorized recreation. These activities include fishing, climbing, rafting and kayaking, horseback riding, hunting, and bicycling. Additionally, camping can be considered “dispersed” if designated sites lack substantial improvements.

There are commercial operations associated with, and dependent on, the recreational opportunities in the Gallatin Canyon. These operations are located mostly in Bozeman, Gallatin Gateway, Big Sky, and within the Gallatin Canyon. Companies like Montana Whitewater Raft Company, located in the Gallatin Canyon, are outfitters and guides for Dispersed Recreation opportunities, renting and selling necessary equipment and excursions for visitors to maximize their enjoyment of an activity. These companies offer a unique product which gives people a chance to enjoy the Gallatin Canyon and Gallatin River to the fullest extent. All campgrounds in the Gallatin Canyon are operated and maintained through a concessionaire permit. The concessionaire permit holder for campgrounds within the Gallatin Canyon is Yellowstone County Campgrounds.

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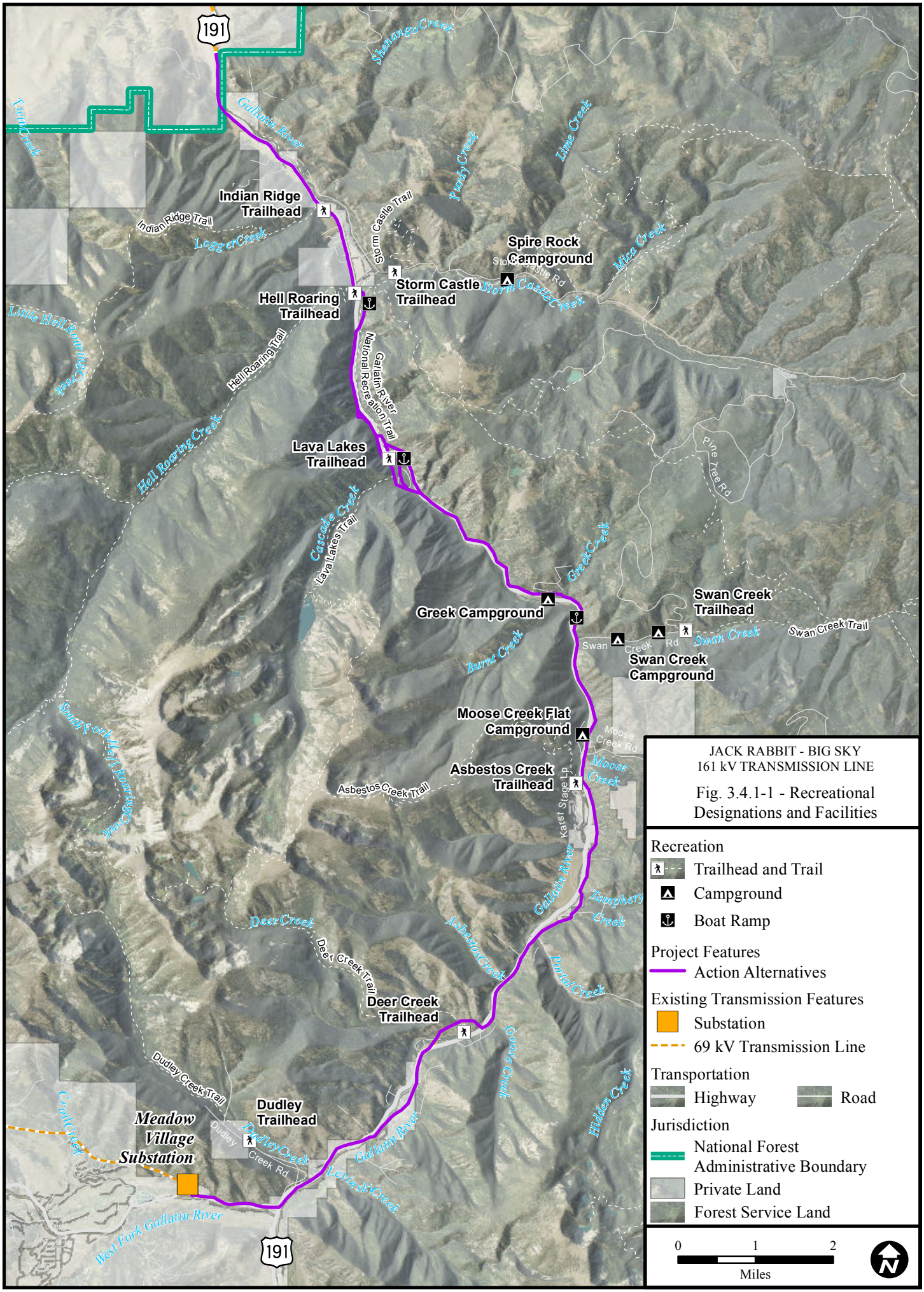

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Applicable Laws, Regulations, Forest Plan Direction

Gallatin National Forest Management Plan (1987)

The Gallatin National Forest Management Plan of 1987 (Forest Plan) identifies standards at two geographical levels, Forest-wide and management areas. Forest-wide Standards, which apply to NFS land that is administered by the GNF are intended to supplement, not replace, the national and regional policies, standards, and guidelines found in Unites States Forest Service (Forest Service or USFS) manual and handbooks. Forest Plan standards relevant to the Proposed Project and alternatives are listed below:

> *2. Recreation*
>
> *Campgrounds and other developed recreation facilities will be constructed and managed to disperse recreation use across the GNF. Private investment on private land will be encouraged to help meet the demand for more developed recreation. Permitted special uses or concession arrangements on National Forest lands will also be relied on to meet demand. Forest Service investment will be necessary where there is no opportunity for private investment.*
>
> *13. Facilities*
>
> *Roads and trails will be designed to standards that meet resource management objectives.*
>
> *Roads and trails that have been disrupted by management activities and are required for continued use will be restored to serviceable condition prior to completion of the project.*
>
> *Existing roads and trails will be maintained consistent with management area goals.*

The GNF has been divided into 26 management areas, each with different management goals, resource potentials, and limitations. Chapter III of the Forest Plan describes each management area and lists the goals, management standards, schedule of management practices, and monitoring requirements for each area.

The existing 69 kV transmission line ROW is within MA 25. MA 25 *"consists of electrical transmission lines and pipelines, climatic and snow measuring sites, and electronic sites. The Management Goal* for MA *25 is: Establish and manage facilities consistent with adjacent management area goals.*"

Any deviations from the existing 69 kV transmission line ROW by the Project Alternatives would need to be evaluated for their effects into other management areas. For Alternatives 2, 3, and 4, the following management areas would also apply:

> *Management Area 1 consists of areas such as developed campgrounds, picnic areas, boat ramps, and visitor information sites plus potential developed sites.*
>
> *The recreation resource element states that existing recreation opportunities should be maintained to be consistent with the rural and urban recreation class.*
>
> *Management Area 5 consists of areas that are travel corridors which receive heavy recreation use, including portions of the Gallatin Canyon and US Hwy 191.*

The recreation resource element states that existing recreation opportunities should be maintained to be consistent with the rural and urban recreation class. Public access shall be provided for trails or boat landings to lakes and rivers.

Management Area 7 is a riparian management area.

The recreation resource element states that all Recreation Opportunity Spectrum (ROS) classes are included and developed sites will be managed to reduce impacts on soil and water.

Management Area 8 consists of lands which are suitable for timber management.

The recreation resource element states that there will be dispersed recreation opportunities which will be provided at a low level of investment that focuses primarily on travel planning and trail maintenance.

Management Area 9 consists of timber lands with high dispersed recreation value which are visually sensitive. Portions of these areas are presently roaded naturally appearing.

The recreation resource element states that existing roads shall be managed for dispersed recreation uses and to protect other resources.

Management Area 11 consists of forested big game habitat, as well as timber harvest lands, and are roaded natural appearing and roaded modified.

The recreation resource element states that a variety of disperse recreation activities are compatible with the management area goals.

Management Area 12 consists of areas that provide important habitat for summer or winter wildlife, as well as offering dispersed recreation opportunities. The area is semi-primitive motorized and semi-primitive non-motorized.

The recreation resource element states that a variety of dispersed recreation activities are compatible with the management area goals; however, recreation activities may be restricted on important wildlife habitat.

Management Area 17 consists of areas suitable for livestock grazing and big game habitat, as they are grasslands or non-productive forestlands. The area is semi-primitive motorized and semi-primitive non-motorized.

The recreation resource element states that dispersed recreation opportunities shall be provided such as primarily travel planning and maintenance of recreation travel routes.

Management Area 23 consists of the National Recreation and Scenic Trails on the GNF.

The recreation resource element states that existing trails shall be managed for either motorized or non-motorized use.

The Gallatin River National Recreation Trail is paralleled by the existing 69 kV transmission line and is located within MA 23.

Gallatin National Forest Summary of Forest Plan Amendments (2009)

Amendment #45 approved the Gallatin National Forest Travel Plan Amendment to the 1987 Forest Plan, amended 10/30/06 (legal notice 12/18/06) via the Record of Decision for the Gallatin National Forest Travel Management Plan.

This amendment removed all prior Forest Plan direction related to access and travel management, including Recreation Opportunity Spectrum (ROS) standards listed for each management area. The Travel Management Plan (TMP) also established new goals, objectives, standards, and guidelines for access and travel management on the GNF.

Methodology

The goal of the Recreation and Recreational Values inventory and analysis was to document the existing and planned recreational opportunities and areas within the analysis area. There are no new recreational facilities planned in the study area. Detailed data inventories were compiled to facilitate the assessment of potential impacts to recreation from the construction and operation of the proposed action.

Initially, base maps were prepared at a scale of 1:24,000. A review of the Forest Plan and other environmental studies in the region were reviewed, refined, and updated. Existing maps and geographic information system (GIS) data were collected and included in the inventory, as appropriate. Forest Service resource management and planning documents were reviewed for applicable data and land management regulations and policies.

An initial reconnaissance survey was conducted by POWER Engineers, Inc. (POWER) and GNF personnel prior to the FEIS project kickoff meeting in April 2010. A subsequent field investigation of the analysis area was conducted by POWER to verify and supplement selected existing land uses recreational resources between June and August 2010. Ground and aerial reconnaissance was aided by the use of selected global positioning system (GPS) readings and GIS mapping. Continued correspondence with GNF personnel, Teri Seth and Fred Haas, was conducted between June 2010 and August 2011.

Effects Analysis

The existing transmission line ROW is within MA 25. The MA 25 Forest Plan standard for recreation refers the reader back to the Forest-Wide Standards and does not offer any additional standards.

Per Amendment #45 of the GNF Summary of Forest Plan Amendments, ROS classes are no longer considered applicable. Project related effects would be based on changes to recreational opportunities found within the analysis area.

This section describes the anticipated changes to the recreational opportunities of the GNF associated with each alternative.

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative (Alternative 1), the project would not be constructed and no additional impacts to the recreation resource would occur beyond the temporary disruptions to the use of trails that intersect the existing transmission line ROW while performing maintenance

activities. This alternative would be consistent with management goals of MA 25. As such, no other management goals were evaluated.

Cumulative Effects of Alternative 1 (No Action)

Under the No Action Alternative, the upgraded transmission line would not be constructed and there would be no additional cumulative impacts over those currently occurring.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2

Alternative 2 would require an additional 10 to 30 feet of ROW compared to the existing transmission line ROW. As previously noted, the additional ROW requirement of this alternative requires evaluation of the effects on additional management areas that lie adjacent to the existing transmission line (MA 25). The widened ROW would require additional clearing of trees to safely construct and maintain the Proposed Action. The Proposed Action would have impacts on the recreational use of the Gallatin Canyon due to the construction and maintenance of the new line; however, no developed recreational facilities would be permanently closed or displaced by the Proposed Project.

This alternative would be consistent with the recreation resource element objective of MA 1 by not creating impacts that would require permanent changes to existing recreation opportunities. The public's use of designated campsites, trailheads, day use areas, highway pull outs, and boat launches would be temporarily closed to accommodate construction and when maintenance is required. The campgrounds that would be directly affected by the Proposed Action would include Greek Creek, Moose Creek Flat, and the Moose Creek Flat Group Site because these sites are adjacent to US Hwy 191 and the existing transmission line. The trailheads and trails that would be directly affected are Gallatin Riverside National Recreation Trail, Indian Ridge, Hell Roaring, Lava Lake, Asbestos Creek, and Deer Creek. The Lava Lake Trail is a highly used access point into the Lee Metcalf Wilderness Area, due to the location of the Lava Lake Trailhead along US Hwy 191. There are other access points into the Lee Metcalf Wilderness Area, so access would not be completely restricted if construction and maintenance are required overhead the Lava Lake Trail.

The Greek Creek camping sites on the south side (river side) of US Hwy 191, closest to the Gallatin River, would not be as greatly affected as those along the north side (mountain side). Along the north, closures may occur so that the area can be utilized for construction of the new ROW. A decking area just east of the campground and south of recreation residences would be impacted during construction. As detailed in Section 3.3.1 – Scenery, the visibility of this Alternative may be greater depending on the where in the campground a visitor is located. This may become detracting to their enjoyment of the recreational opportunities at the campsite.

A proposed decking area may be located in the Moose Creek Flat Group Site, on the east side of the US Hwy 191. This site is gated and requires a reservation for users, effectively limiting the number of users during a season. This site may be utilized, when not reserved by campers, for portions of two seasons during construction. According to the GNF reservation data, the frequency of use since 2008 (the first year the site was available) are found below. The Group Site, as with several large group sites on public lands in the general area, have grown in popularity in recent years and demand has increased more rapidly than supply. Moose Creek is the only available site which can accommodate a large group (see Table 3.4.1-2) and offers services such as toilets, but does not offer water, or a dumping station.

TABLE 3.4.1-2 ANNUAL USE OF MOOSE CREEK GROUP SITE

YEAR	TOTAL DAYS RESERVED	TOTAL INDIVIDUALS
2008	4	104
2009	2	30
2010	6	136
2011	16	449

During construction, access for recreational opportunities at trailheads would be temporarily restricted. The effects are primarily based on closures during construction with work crews using the trails as overland access. The temporary closure of trails would be necessitated while removing trees from widening the ROW, removing old structures, and placing new structures in the ROW. Helicopters would be used for these construction activities, and these closures would be a safety mechanism for forest users when heavy equipment, structures, and line are in the area during construction. During the life of the line, maintenance would occur and would temporarily impact the recreational use of the trails when vegetation needs trimming or weeds sprayed.

Alternative 2 would be consistent with the recreation resource element objective of MA 5 by not creating impacts that would require permanent closure of public access for trail or boat landings. Travel corridors, including US Hwy 191 and access roads to Storm Castle, Swan Creek, Portal Creek, Dudley Creek, and Moose Creek Road would require temporary closures, lane restrictions or delays as these roads would be used for construction and maintenance access. Section 3.3.3 – Transportation, Traffic, and Access to NFS Lands, describes in more detail the transportation-related impacts. The Access Map in Appendix B shows the access points that would be affected. A proposed decking area would be located adjacent to the Indian Ridge trailhead. If selected, helicopters would fly in and out of the Indian Ridge Fly Yard when transporting removed trees or existing structures, as well as new structures for the new line. Use of Indian Ridge trailhead could incur limited access when helicopters are in use.

As it relates to dispersed recreation uses affiliated with MAs 8, 9, 11, 12, and 17; the areas would continue to appear or be suitable for their stated importance. This Alternative would primarily use the existing naturally appearing roads for overland travel to gain access during construction and maintenance. Refer to Section 3.4.3 – Inventoried Roadless Areas for discussion of management areas which include Inventoried Roadless Areas (IRAs).

As it relates to MA 23, the Gallatin Riverside National Recreation Trail would remain managed for non-motorized use under Alternative 2. Access to this trail would be affected during the construction period due to closures or lane restrictions on Storm Castle Road and US Hwy 191, as well as points where the route crosses the trail, just north of the trailhead access point. Traffic disruptions and delays would be the main source of temporary disruption.

Another effect of the Proposed Action during construction would be noise. This is described in detail in Section 3.4.10 – Human Health and Safety and Other Considerations; Noise.

Temporary restrictions and access to trails, recreation facilities, access points, and parking areas, as well as traffic controls that result in travel delays, may deter GNF visitors from utilizing the area for their recreational enjoyment. During construction of the project, such closures and delays could potentially cause a decline in visitors and recreationalists. In addition, financial impact to commercial enterprises such as outfitters and guides may potentially occur, due to the temporary decline in rafters, kayakers, climbers, bikers, riders, hunters, and campers requiring equipment rentals and guide trips in Gallatin Canyon. The potential decline of visitors is not expected to be permanent.

Campground concessionaires may also be affected by a decline in visitors to campgrounds in the Gallatin Canyon, during construction. The effects of such impacts would result in Yellowstone County Campgrounds seeing a temporary decline in revenue, as well as any monies that the GNF receives from campground use.

Once construction is complete and the project is in operation, it is expected that the numbers of tourists and recreationalists would return to current levels, at a minimum. This would allow for the financial wellbeing of outfitters, guides, and concessionaires to stabilize. Temporary impacts during maintenance activities with this alternative would be very similar to the existing situation.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

The direct and indirect effects of Alternative 3 would be very similar as those of Alternative 2. The proposed Local Routing Options (LROs) would benefit recreational users primarily in the Cave Creek and Cascade Creek/Lava Lake trail areas.

Cave Creek LRO

The Cave Creek LRO would be located farther west of the recreation residences at Cave Creek. The LRO has fewer impacts to the residences as well as users of any nearby and unmarked trails, due to being less visible. Additional analysis of visual effects is described in Section 3.3.1 – Scenery.

Cascade East LRO

The Cascade East LRO would be located east of the Cascade Creek recreation residences and Lava Lake Trailhead and would not adversely impact recreational facilities. The LRO avoids placing the transmission line along Cascade Creek Road which provides access to Lava Lake trailhead. The existing transmission line structures along Cascade Creek Road would be used or modified for distribution.

This LRO would be located east of Lava Lake Trail and the Gallatin River, and should not be as visible to trail users. An existing transmission line structure would be removed at the Lava Lake Trailhead. These positive effects are described more in Section 3.3.1 – Scenery. Construction activity to modify the existing transmission line structure for distribution use would require temporary traffic control measures along Cascade Creek Road. Some parking spaces would be temporarily unavailable at the Lava Lake Trailhead when the existing structures are modified or removed. There would be no restriction to access along the Lava Lake Trail once construction is complete, including access to the Lee Metcalf Wilderness Area.

Alternative 4 – Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

The direct and indirect effects of Alternative 4 would be similar to Alternatives 2 and 3 except in the Cascade Creek and Lava Lake area. The proposed Cascade West LRO would benefit recreational users at Cascade Creek and Lava Lake Trailhead by moving the transmission line farther west of the immediate area, making it less visible. Additionally, an existing transmission line structure would be removed from the parking lot at Lava Lake Trailhead when the existing transmission line structures are modified for distribution use.

The new transmission line ROW would extend across the Lava Lake Trail, which is an access point into the Lee Metcalf Wilderness Area. There are other access points into the Lee Metcalf Wilderness Area, so access would not be completely restricted if construction and maintenance are required overhead the Lava Lake Trail. However, this would cause a temporary impact to trail

users and wilderness area users during construction accessing Lava Lake farther west of the alternative.

Cave Creek LRO
The same description applies as in the Alternative 3 section.

Cascade West LRO
The Cascade West LRO would be located west of the Cascade Creek recreation residences and Lava Lake trailhead. The LRO avoids placing the line along Cascade Creek Road where the existing line, as well as the Proposed Action (Alternative 2), is located. This LRO would cross the Lava Lake trail, which would present a new clearing in the ROW. This move upslope would put the LRO mostly out of sight to users of Lava Lake Trailhead and the Gallatin River. These effects are described further in Section 3.3.1 – Scenery. The new ROW would cross the Lava Lake Trail, which provides access to the Lee Metcalf Wilderness Area. A new approximately 50-foot wide clearing would cause temporary closures of the trail in the area of this LRO during construction, as well as during any maintenance of the new ROW and line. Lava Lake Trail users would be able to walk underneath the new transmission line ROW.

Construction activity to modify the existing transmission line structure for distribution use would require temporary traffic control measures along Cascade Creek Road, and some parking spaces would be temporarily unavailable at the Lava Lake Trailhead when the existing structures are modified or removed.

Cumulative Effects of Action Alternatives 2, 3, and 4
The expected cumulative impacts from all of the action alternatives would be similar. They would occur during construction, and would restrict recreational opportunities within the forest. The proximity of the alternatives to the existing transmission line keeps permanent effects to recreational opportunities, as described above, to a minimum.

Planned transportation improvements along US Hwy 191 include safety projects, addition of turn lanes, and other enhancements within the existing corridor. Montana Opticom has applied to install an underground fiber optic line between Bozeman and Big Sky along US Hwy 191, however the application has not been processed and no construction timeframes have been established. Near Moose Creek Flat Campground and Greek Creek Campground, US Hwy 191 would be improved with lane widening, a turn lane, and new entrances between the day use and camping areas of the site. The cumulative impacts of this project, combined with the above mentioned planned transportation improvements (see Table 3.2.3-1) would be additional temporary closures or short-term access restrictions to developed recreation areas and/or dispersed recreational activities.

Comparison of Alternatives

Alternative 2 would be more impactive to recreational opportunities than Alternative 1 due to the necessity for the construction of a wider ROW. While the Proposed Action would not permanently displace or close developed recreation areas, or alter dispersed recreational opportunities, construction activities would temporarily restrict access to developed areas. As with Alternative 1, the transmission line would still cross the Lava Lake Trailhead parking lot under this alternative.

Alternative 3 would move the transmission line from the west side of the Gallatin River to the east, and away from several dispersed recreational activities, which occur at Cascade Creek and Lava Lake Trailhead, rivers users would notice the eastern portion of the ROW but their recreational opportunities would not be impacted. For more information regarding the Scenery

discussion, please see Section 3.3.1 – Scenery. An existing transmission line structure would be removed from the Lava Lake Trailhead parking lot as part of the Cascade East LRO associated with this alternative.

Alternative 4 would move the line west of the Gallatin River and closer to the Lava Lake Trailhead and areas of dispersed recreation. The additional ROW required with this alternative would not permanently impact existing recreation sites or recreation use. Alternative 4 is the only alternative that would permanently encroach upon an existing recreational facility in the GNF. Alternative 4 requires permanent ROW across the Lava Lake Trail, which provides access to several recreational areas including the Lee Metcalf Wilderness Area, and trail users would cross underneath the transmission line. With this change from the existing alternative, a structure would be removed from the Lava Lake Trailhead parking lot.

Summary Conclusion

Alternatives 2, 3, and 4 would all require temporary closures of the Moose Creek Group Site when not in use or reserved by campers. Once construction has been completed, the facilities would be returned to the condition prior to their use during construction and would be opened once construction in that segment of the transmission line is completed. Alternative 4 is the only alternative that would require permanent ROW from an existing recreational facility, as well as cause temporary disturbance to an existing recreational facility, Lava Lake Trail. All of the alternatives would be consistent with the recreation resource element objectives associated with MAs 1, 5, 8, 9, 11, 12, 17, 23, and 25. Alternative 1 is the only alternative that is currently located entirely within MA 25. Alternative 2 (Proposed Action) would be more impactive to recreational activities than Alternative 1. During the operation of the project and compared to the existing transmission line, the Proposed Action would have similar impacts, however, during the construction period, there would be an increase in construction traffic and noise near campgrounds, trailheads, and boat ramps, as well as disrupting dispersed recreational activities. Alternative 3 would decrease the direct impacts of construction and maintenance to the visitors at Cascade Creek and Lava Lake over Alternative 2, due to the line and ROW being further from the area. Alternative 3 is also less impactful than Alternative 4 because the LRO moves the line east of the Gallatin River, away from developed recreation sites and areas of dispersed recreation. Overall, Alternative 3 would have the least impacts to recreation and recreational values of the action alternatives.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

The committed Project Design Features (PDFs) and mitigation (0.2, 1.4, 1.8, and 2.4) discussed in Chapter 2 related to recreation would be implemented by NorthWestern Energy (NorthWestern) to minimize the impacts.

Consistency with Laws, Regulations, and Forest Plan

All Alternatives would be consistent with MA 25. Alternatives 2, 3, and 4 would be consistent with the recreation resource element objective of MA 1 by not creating impacts that would require permanent changes to existing recreation opportunities. These alternatives would be consistent with the recreation resource element objective of MA 5 by not creating impacts that would require permanent closure of public access for trail or boat landings. As it relates to dispersed recreation uses affiliated with MAs 8, 9, 11, 12, and 17, the project would be consistent by not creating new permanent impacts. These alternatives would be consistent with the

recreation resource element objective of MA 23 as the management of the Gallatin Riverside National Recreation Trail for either motorized or non-motorized use would not be impacted. Temporary impacts would occur during construction. These alternatives would be consistent with the recreation resource element objective of MA 23 as the management of the Gallatin Riverside National Recreation Trail for non-motorized use would not be impacted.

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3.4.2 Wild and Scenic Rivers

Description of Issue

There is concern that the Proposed Project may impact the outstandingly remarkable values (ORV) associated with the Gallatin River, a river the Forest Plan determined to meet the eligibility criteria for potential classification as a Recreational River under the Wild and Scenic Rivers Act. Potential impacts may result from taller and larger diameter transmission structures, larger conductors, and additional right-of-way (ROW) clearing that could be visible in the immediate foreground from the river corridor.

Indicator

The Gallatin River from the Gallatin National Forest (GNF) boundary on the northern portion of the analysis area to Yellowstone National Park is eligible for potential classification and inclusion in the Wild and Scenic Rivers system as a Recreation River. Indicators will be a qualitative assessment on the effects of the proposed activities to ORVs which include scenery, fisheries, and recreation.

Scale of Analysis

The spatial boundary for analysis of the Wild and Scenic Rivers issue includes the proposed transmission line ROW for the 16-mile length of the project as well as 0.25 mile from each side of the river, which is the limit of the Gallatin River's Wild and Scenic River designation where the proposed project is located. There are no segments of the Gallatin River north of the GNF northern boundary designated or eligible to be classified as a Wild and Scenic River. Other segments of the Gallatin River that are eligible for potential classification are located south of Montana State Highway 64 (MT Hwy 64) and would not be impacted by construction or operation of any of the Environmental Impact Statement (EIS) alternatives. The temporal boundary for this analysis includes the short-term impacts during construction activities, as well as long-term impacts from the operation of the transmission line.

Affected Environment

The Wild and Scenic Rivers analysis for the Proposed Project includes the Gallatin River within the analysis area. The Gallatin River is not currently included in the National Wild and Scenic Rivers System; however, it is considered to have sufficient ORVs which make it eligible for potential recreational river classification. Congress originally created The National Wild and Scenic Rivers System in 1968 (16 U.S.C. § 1271). Rivers designated as Recreation, Scenic, or Wild by the Secretary of the Interior must have outstanding natural, cultural, and recreational values and the river must be in a free-flowing condition. Designated rivers may include portions of the river as well as tributaries.

The ORVs of the Gallatin River are identified as fisheries, scenery, and recreation and are described in the following sections.

Fisheries

Criteria for Outstandingly Remarkable Value

Fish values may be judged on the relative merits of fish populations, their habitat, or a combination of these river-related conditions.

Evaluation of the Present Situation

The Gallatin River is a world-class cold water fishery for a variety of native and introduced trout species. Within the GNF, sensitive westslope cutthroat trout and fluvial arctic grayling historically inhabited the analysis area. Presently, only hybridized (<90% genetically pure) westslope cutthroat trout inhabit the area, mostly in the headwater tributary streams above the influence of the Proposed Project. Table 3.4.2-1 summarized information on fish species of interest from Montana Fish, Wildlife and Parks (MFWP) Fisheries Information System (MFWP 2011). Please see Section 3.4.9 – Wildlife; Forest Service Management Indicator Species, for more information related to the fisheries ORV.

TABLE 3.4.2-1 FISH SPECIES OF INTEREST

STREAM	FISHERY CHARACTERISTICS, SPECIES
Storm Castle Creek (also known as Squaw Creek)	Brook, Brown and Rainbow trout
Logger Creek	No data are available
Hell Roaring Creek	Rainbow, Yellowstone cutthroat (not native to the analysis area)
Cave Creek	No data available
Cascade Creek	"fishless"
Greek Creek	No surveys have been performed
Swan Creek	Brook, Rainbow, Hybridized Westslope Cutthroat
Moose Creek	Hybridized Westslope Cutthroat
Tamphrey Creek	No fished captured during surveys
Portal Creek	Hybridized Westslope Cutthroat, Golden trout
Goose Creek	Rainbow trout (redds near US Hwy 191 junction w/Gallatin River)
Deer Creek	No data available
Dudley Creek	No data available
Gallatin River	Brook, Brown, Rainbow trout, Longnose dace, Longnose sucker, Mottled sculpin, Mountain whitefish

Scenery

Criteria for Outstandingly Remarkable Value

The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

Evaluation of the Present Situation

The Gallatin River setting is generally natural in appearance with human activity, i.e., highway, private land development, historic development and recreation use, having impact to scenic character. From the river, there are views of the highway and its associated guardrails, signage, and traffic, as well as numerous private residences, the existing transmission line, and campgrounds. Currently, the existing transmission line crosses the Gallatin River eight times; three of the most visible crossings occur in the Cave Creek and Cascade Creek areas. See Section 3.3.1 – Scenery for a more detailed analysis of the visual impacts to these crossings from both the highway and river perspectives.

Recreation

Criteria for Outstandingly Remarkable Value

Recreational opportunities are, or have the potential to be, popular enough to attract visitors from throughout or beyond the region of comparison, or are rare, unusual, or unique to the region.

> Visitors are willing to travel long distances to use the river resources for recreational purposes.
>
> River-related opportunities include, but are not limited to, sightseeing, wildlife observation, camping, photography, hiking, fishing, hunting, and boating/rafting.
>
> Interpretive opportunities may be exceptional and attract or have the potential to attract visitors from outside the region of comparison.
>
> The river may provide or have the potential to provide settings for national or regional usage.

Evaluation of the Present Situation

The Gallatin Canyon and River offer a variety of land-based, dispersed, non-motorized activities including premier whitewater rafting, hunting, fishing, hiking, camping, rock climbing, and horseback riding. Additionally, land-based motorized activities are present, due to the location of U. S. Highway 191 (US Hwy 191). There are a number of trails that extend into the GNF from the Canyon, as well as along the river. Trail use is typically by foot and horse from April through October. Whitewater rafting and kayaking is by far the predominate use from April through July, with day trips the norm. There are a number of launches, both public and private along the river. The Gallatin River is world renowned in the boating community and the origin of visitors reflects an international flavor. The Gallatin River is equally renowned in the fishing community with use occurring year round with the exception of high water. The substantial size of the Gallatin Canyon and the rugged terrain of the river corridor provide high quality outdoor recreation opportunities.

While the Gallatin River exemplifies many of the values listed above, there is development which includes the US Hwy 191, private and public roads, private residences, commercial businesses, and the existing transmission line. Much of this development does not impede the natural and recreational opportunities of the river, and in some ways the development has created additional recreational opportunities in the form of boat and raft launches, designated picnicking and camping areas, and trails. This development has made the river more accessible for recreational opportunities which support the recreational ORV criteria described above.

The river attracts many visitors every year for rafting trips and fly fishing, as well as those traveling along US Hwy 191, potentially on their way to Yellowstone National Park, as it offers very unique scenic views. The river is considered Class I (Easy) per the International Scale of Difficulty water for public access, while the rapids are considered Class IV (Very Difficult), including the famous "Mad Mile," where the river winds down a picturesque canyon and contains some great whitewater. Much of the Gallatin River, including sections outside of the analysis area are considered a Blue Ribbon Trout Stream by the Montana Fish and Wildlife Department and those sections that are not, are considered a Red Ribbon Stream.

Applicable Laws, Regulations, Forest Plan Direction

Gallatin National Forest Management Plan (1987)

The Gallatin National Forest Management Plan of 1987 (Forest Plan) identifies Forest-wide Standards, which apply to GNF land that is administered by the GNF. These standards are intended to supplement, not replace, the national and regional policies, standards, and guidelines found in the Forest Service manual and handbooks, and the Northern Regional Guide. The Forest Plan's direction for the Gallatin River is to protect the river's qualities and potential classification as a recreation river under the Wild and Scenic Rivers Act.

Gallatin National Forest Summary of Forest Plan Amendments (2009)

Amendment #12, Wild and Scenic River Amendment.

Forest Plan pgs. II-2, II-29, II-28, and J-1, amended 7/2/93.

This amendment added to and modified Forest Plan direction applicable to eligible Wild and Scenic Rivers. More specifically it:

Added a new management standard (Forest Plan, page II-29) stating that "management activities will comply with the standards for Wild and Scenic Rivers from Chapter 80 of FSH 1909.12."

Forest Service Handbook Standards 1909.12 Chapter 80 Wild and Scenic Rivers (2006)

FSH pgs.14-15, 22-23, and 25.

> *Section 82.14 – Outstandingly Remarkable Values*
>
> *In order to be assessed as outstandingly remarkable, a river-related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. A river-related value would be a conspicuous example of that value from among a number of similar examples that are themselves uncommon or extraordinary.*
>
> *While the spectrum of resources that may be considered is broad, all features considered should be directly river-related. That is, they should:*
>
> *Be located in the river or on its immediate shorelands (within 0.25 mile on either side of the river;*
>
> *Contribute substantially to the functioning of the river ecosystem; and/or*
>
> *Owe their location or existence to the presence of the river.*
>
> *Section 82.14a – Eligibility Criteria*
>
> *The following eligibility criteria are offered to foster greater consistency within the agency and with other federal river-administering agencies. They are intended to set minimum thresholds to establish outstandingly remarkable values and are illustrative and not all-inclusive. These criteria may be modified to make them more meaningful in the area of comparison, and additional criteria may be included.*
>
> *Scenery. The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing*

scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed, may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

Recreation. Recreational opportunities are, or have the potential to be, popular enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region. River-related opportunities include, but are not limited to, sightseeing, interpretation, wildlife observation, camping, photography, hiking, fishing, hunting, and boating. The river may provide settings for national or regional usage or competitive events.

Section 82.5 – Interim Management of Eligible or Suitable Rivers

During interim management of eligible or suitable rivers, the following management guidelines are to be used when carrying out projects and activities for the NFS for each of the river classifications in this section.

Section 82.51 – Management Guidelines for Eligible or Suitable Rivers

The following guidelines apply to interim management of eligible or suitable rivers and Responsible Officials should apply these on NFS lands or where the Forest Service holds an interest on nonfederal lands such as rights acquired through scenic or access easements to protect river values.

A Responsible Official may authorize site-specific projects and activities on NFS lands within river corridors eligible or suitable where the project and activities are consistent with the following:

5. Utility Proposal.

a. Wild, Scenic, Recreational. New transmission lines such as gas lines, water lines, and so forth are discouraged. Where no reasonable alternative exists, additional or new facilities should be restricted to existing ROWs. Where new ROWs are indicated, the project shall be evaluated as to its effect on the river's outstandingly remarkable values and classification. Any portion of a utility proposal that has the potential to affect the river's free-flowing character shall be evaluated as a water resources project.

Methodology

Initially, base maps were prepared at a scale of 1:24,000. The Forest Plan and its amendments and other Forest Service Handbooks (FSHs) related to wild and scenic rivers were reviewed. Environmental studies in the region were reviewed, refined, and updated. Existing maps and geographic information system (GIS) data were collected and included in the inventory, as appropriate. Forest Service resource management and planning documents were reviewed for applicable data and land management regulations and policies.

During subsequent field visits by POWER Engineers, Inc. (POWER) and the United States Forest Service (Forest Service or USFS) in May and August 2010, visibility of the project from the river was reviewed from US Hwy 191, from pull outs, and from recreation areas adjacent to the river, including the Lava Lake trailhead, Moose Creek campground and Gallatin River National Recreation Trail. Locations where the Proposed Project could have the highest impact to the

scenic values of the river were identified. These locations are where the project would be viewed in close proximity, where axial views (down the center of a linear feature) of the ROW occur, where many structures are visible within a single view, and where the project is likely to be a dominant human alteration to the scenery.

Effects Analysis

The Proposed Action (Alternative 2) as well as Alternatives 3 and 4 would have direct effects on the scenery ORV related to the Gallatin River. Impacts to the recreation ORV would be impacted temporarily, during construction periods. The natural setting of the Gallatin Canyon has been developed over time with the addition of US Hwy 191 and its required signage and guardrails, commercial and residential development, campgrounds, and picnic areas. The overall setting of the Gallatin River is natural, but also has development and the existing transmission line is less obvious than the upgraded line would be with any of the action alternatives. Generally, a wider ROW due to tree clearing, taller structures with new conductors will cause new visual distraction, along the spatial boundary of the Gallatin River from the natural setting and even the developed areas.

As described in the Recreation section, Section 3.4.1 – Recreation and Recreational Values, construction will cause temporary closures for accessing the river. This will prevent short-term river-related activities and opportunities, such as rafting, kayaking, and fishing.

Alternatives 2, 3, and 4 would have no indirect effects related to the fisheries ORV. The Proposed Project is unlikely to cause water degradation or impacts to fish populations. Please see Section 3.4.9 – Wildlife; Forest Service Management Indicator Species, and Section 3.4.4 – Water Resources; Water Quality which describe the effects of the alternatives to these resource areas.

The Gallatin River is currently crossed eight times by the existing transmission line (Alternative 1) (see Table 3.4.2-2). The Proposed Action (Alternative 2) would utilize the same crossings as the existing line. Alternatives 3 and 4 would only cross the Gallatin River six times. These crossing differentiations are displayed in Table 3.4.2-2 below by crossing vicinity.

TABLE 3.4.2-2 GALLATIN RIVER CROSSINGS

RIVER CROSSING	CROSSING VICINITY	ALTERNATIVES
1	Storm Castle	1, 2, 3, and 4
2	Storm Castle	1, 2, 3, and 4
3	Welchom Spring	1, 2, and 3
4	Cascade Creek North	1 and 2
5	Cascade Creek South	1, 2, and 4
6	Goose Creek	1, 2, 3, and 4
7	Deer Creek	1, 2, 3, and 4
8	Dudley Creek	1, 2, 3, and 4

This section describes the anticipated changes in regards to the Gallatin River and its effects on the scenery and recreation ORVs for each alternative.

Alternative 1 - No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative (Alternative 1), the project would not be constructed, the existing transmission line would remain, and no additional impacts to the eligible rivers would occur that are different from the existing conditions. Maintenance of the existing line would continue.

Cumulative Effects of Alternative 1

Under the No Action Alternative, the upgraded transmission line would not be constructed and there would be no additional cumulative impacts related to the project.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2

Alternative 2, the Proposed Action, would be located within the same ROW as the existing transmission line (Alternative 1, the No Action Alternative) and would utilize the same eight crossings of the Gallatin River. This alternative would require an additional, approximately 10 feet of cleared vegetation, and is consistent with FSH Section 82.51 which suggests that new transmission lines are discouraged but if there are no other viable alternatives; they should be restricted to existing ROWs.

This Alternative would continue to visually degrade the Gallatin River's natural setting, along with other man-made visual distractions, and offer no benefit to the scenery ORV. The visual distraction from the scenery ORV would be greater due to the presence of the wider ROW associated with the upgraded line and new transmission structures, which would be approximately 5 to 10 feet taller than the existing structures, and would include new conductors. See Scenery Section 3.3.1 – Scenery for further discussion on the scenery effects analysis of Alternative 2.

This Alternative would not create permanent impacts to the recreation ORV, however temporary closures of GNF river access points are anticipated at various times during construction to accommodate construction activities and to keep recreational users safe. Visitors are less likely to travel to the Gallatin River for recreational opportunities during the construction phase and this would create a short-term degradation to the river's recreation ORV for meeting Wild and Scenic criteria. Once construction is complete, the long-term impacts to river use and recreational opportunities are expected to return to the qualities which make the river eligible for the "Recreational River" classification.

For effects to the fisheries ORV, please refer to Section 3.4.4 – Water Resources; Water Quality and Section 3.4.9 – Wildlife; Forest Service Management Indicator Species.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Alternative 3 would have similar effects to scenery and recreation ORVs as Alternative 2 where the alternatives share the same transmission line corridor. Two existing overhead transmission line crossings of the Gallatin River near Cascade Creek would be removed with this alternative. The effects to the scenery and recreation ORVs from the Local Routing Options (LROs) are described below.

Cave Creek LRO
Portions of the Cave Creek LRO would occupy the original 1950s 50 kV transmission line corridor, that remains visible from the ground, but was abandoned in the early 1970s when the current 69 kV transmission line was constructed. This is generally consistent with FSH Section 82.51 which suggests that new transmission lines be discouraged, and where no reasonable alternative exists, the new facility would be restricted to an existing Effects to the scenery ORV would be positive with this LRO, because the transmission line would be located further west of the river than where the existing transmission line and Alternative 2 are located in the Cave Creek area.

This LRO would not create or remove any river crossings and is not expected to impact the recreation ORV. Water quality or fish habitat degradation is not anticipated and the LRO are not expected to have negative impacts to the fisheries ORV.

Cascade East LRO
The Cascade East LRO removes two transmission line crossings of both US Hwy 191 and the Gallatin River within the Cascade Creek area, as well as a separate distribution line crossing which serves a flashing beacon along US Hwy 191. The Cascade East LRO would require new ROW just east of the river and US Hwy 191 for the transmission line and within the spatial boundary of the study area. This is not consistent with FSH Section 82.51 which suggests that new transmission lines be restricted to an existing ROW, if no reasonable alternative exists. If selected, this Alternative would require a Site Specific Amendment to the Forest Plan to resolve plan issues about the Wild and Scenic eligibility status of the Gallatin River even though visually, this alternative would be beneficial to the scenery ORV due to the elimination of the river crossings in the area of Cascade Creek where recreationalists and visitors use the area to enjoy the scenic views of the Gallatin River and surrounding canyon.

The line would be visible east of the river in areas where vegetation is sparse, when viewed from Lava Lake trailhead and by river users, but would not cause an overall degradation to the visual attractiveness of the river. The overhead crossings do not typically pose a danger or deterrence to recreationalist and recreational opportunities, but the removal of two crossings would be expected to enhance the enjoyment of the river, and be beneficial to the recreation ORV.

There are no anticipated effects to the fisheries ORV because water degradation is unlikely to occur with implementation of Alternative 3

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4
Alternative 4 would have similar effects to scenery and recreation ORVs as Alternative 2 where the alternatives share the same transmission line corridor. The differences in effects would occur in the areas of the LROs associated with this alternative. The effects to the scenery and recreation ORVs from the LROs are described below:

Cave Creek LRO
The effects to the scenery and recreation ORVs would be the same as Alternative 3 within the Cave Creek area.

Cascade West LRO
Alternative 4 removes two transmission line crossings, one near Welchom Springs and another north of Cascade Creek. The Cascade West LRO would require additional tree clearing for new ROW in forested lands, west of the Gallatin River and US Hwy 191, due to the alignment moving approximately 500 feet upslope from the existing 69 kV transmission line. This is not consistent

with FSH Section 82.51 which suggests that new transmission lines be restricted to an existing ROW, if no reasonable alternative exists. If selected, this Alternative would require a Site Specific Amendment to the Forest Plan to resolve plan issues about the Wild and Scenic eligibility status of the Gallatin River. Visually, the alternative would be beneficial to the scenery ORV due to the elimination of the river crossings in the area of Cascade Creek where recreationalists and visitors use the area to enjoy the scenic views of the Gallatin River and surrounding canyon. The transmission line would be further out of sight of river users due to the complexity of the waterway through the Cascade Creek area and the visual impediments of the US Hwy 191, forest, and developed areas.

There are no anticipated effects to the fisheries ORV with Alternative 4 because water degradation is unlikely to occur.

Cumulative Effects of Action Alternatives 2, 3, and 4

Cumulative effects would be similar for all action Alternatives (2, 3, and 4). Planned transportation improvements along US Hwy 191 include safety projects, addition of turn lanes and other enhancements within the existing corridor. Montana Opticom is planning to install an underground fiber optic line between Bozeman and Big Sky. Coupled with this alternative, these projects would not cumulatively affect the long-term scenic and recreation ORVs associated with the Gallatin River's wild and scenic river designation. During construction, other projects may temporarily affect these ORVs.

Comparison of Alternatives

Alternative 2, the Proposed Action, would continue to use the existing transmission line ROW and would be the most consistent with FSH Section 82.51, as previously described. Adverse impacts to the recreation ORV would be short-term as it relates to access of recreation facilities on and adjacent to the river for Alternatives 2, 3, and 4, and during the phase construction only. Once construction is completed, access to the river and/or river-related recreation area, would be opened.

Alternatives 3 and 4, where their respective LROs are located, would require a small amount of new ROW. However, a Site Specific Amendment to the Forest Plan would be required if this Alternative is selected, even though Alternatives 3 and 4 would remove two transmission line river crossings, actually enhancing the qualities of the recreation and scenery ORVs. The Cascade East LRO (Alternative 3) would also remove an additional distribution line crossing. Alternative 3, however, moves a section of the transmission line to a more noticeable area where vegetation is sparse along the eastern edge of the rocks above the river. The Cascade West LRO (Alternative 4) moves the line west of the existing line and into areas which may be more noticeable to the recreationalist on trails. The Cascade West LRO would not be as noticeable to river users as Alternative 3, however, the vegetation clearing required for the route would be noticeable and could detract from the scenic integrity of the surrounding canyon. Overall, this gives Alternative 3 a greater net benefit to the scenery ORV.

Summary Conclusion

The No Action Alternative (Alternative 1) would have no additional effect on the wild and scenic ORVs of the Gallatin River, in the short-term or long-term. Alternatives 2, 3, and 4 would have potential impacts, in the short-term, to the recreation and scenery ORVs, due to temporary closures of river access and recreational opportunities during certain phases of construction. Construction activities would also temporarily deter visitors from enjoying the River's scenic

qualities and would create an impact to the scenery ORV. There is no anticipated impact to the fisheries ORV during construction or operation of the project with any of the action alternatives.

Alternative 3, with the Cascade East LRO, would create the greatest net benefit to the recreation and scenery ORVs and would require a Site Specific Forest Plan Amendment to allow for the new portion of transmission line ROW. The Forest Plan Amendment would state that Alternative 3 is preferred because it offers the greatest net benefit to the recreation, scenery, and fisheries ORVs and thus enhances the integrity of the Gallatin River's Wild and Scenic Designation more so than Alternatives 1, 2, and 4.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

The committed Project Design Features (PDFs) (0.2, 1.8, and 2.4), as discussed in Chapter 2, related to land use and recreation would be implemented by NorthWestern Energy (NorthWestern) to minimize the impacts. No additional PDFs or mitigation are recommended.

Consistency with Laws, Regulations, and Forest Plan

Alternatives 3 and 4 are not consistent with the Forest Plan and FSH Standards 1909.12 Chapter 80. Alternatives 3 and 4 would require two Site Specific Forest Plan Amendments to comply with FSH Standards 1909.12 Chapter 80. One Forest Plan Amendment would change the location of Management Area 25 to correspond with the portion of new ROW that would be different that the existing 69 kV ROW. The second would allow for new transmission line ROW within the LRO while enhancing the ORVs of the eligible Wild and Scenic Gallatin River. Alternatives 1 and 2 would not require a Site Specific Forest Plan Amendment as these alternatives would be within the existing 69 kV transmission line corridor. Additional ROW for Alternative 2 would be added to the existing ROW and not on a new ROW.

3.4.3 Inventoried Roadless Areas

Description of Issue

Within the Gallatin National Forest (GNF), the current 69 kilovolt (kV) transmission line right-of-way (ROW) and the proposed alternative ROWs are identified as passing through four segments of the Madison inventoried roadless area (IRA). In addition, the Gallatin Fringe IRA is within approximately 0.25 mile of the project, and there are a few areas of unroaded lands that lay between the existing transmission line and the Madison IRA. Concerns have been raised during scoping that transmission line improvements would diminish the character of these IRAs.

Indicator

The No Action Alternative (Alternative 1), the Proposed Action (Alternative 2), and Alternatives 3 and 4 were reviewed to determine if any of those actions would significantly affect the roadless or wilderness characteristics of the Madison or Gallatin Fringe IRAs, or adjacent unroaded lands.

Affected Environment

The Madison and Gallatin Fringe IRA are located within or near the project area (see Figure 3.4.3-1). IRAs are special management areas unique to the US Forest Service (Forest Service or USFS). As such, they are only located on National Forest System (NFS) lands.

The Madison IRA includes nearly all of the NFS lands that surround the Spanish Peaks Unit of the Lee Metcalf Wilderness Area. The 149,259 acre Madison IRA was released from protection as a Wilderness Study Area in the 1983 Lee Metcalf Wilderness bill (P.L. 98-140). This wilderness bill included “soft release” language which dropped the undesignated portion of the Madison IRA from further consideration as wilderness in the forest planning processes which were on going in the 1980s. As a result of this “soft release”, the Gallatin National Forest Management Plan of 1987 (Forest Plan) did not evaluate the undesignated lands of the Madison IRA for wilderness designation and did not include the Madison IRA in the forest’s inventory of roadless areas to be considered for wilderness designation. This roadless area inventory is found in Appendix C of the Forest Plan Environmental Impact Statement (EIS). However, the 1983 Lee Metcalf Wilderness bill did not remove the inventoried roadless status from this area and thus the project within the remaining Madison IRA must be evaluated for their potential effects to the roadless character of the area.

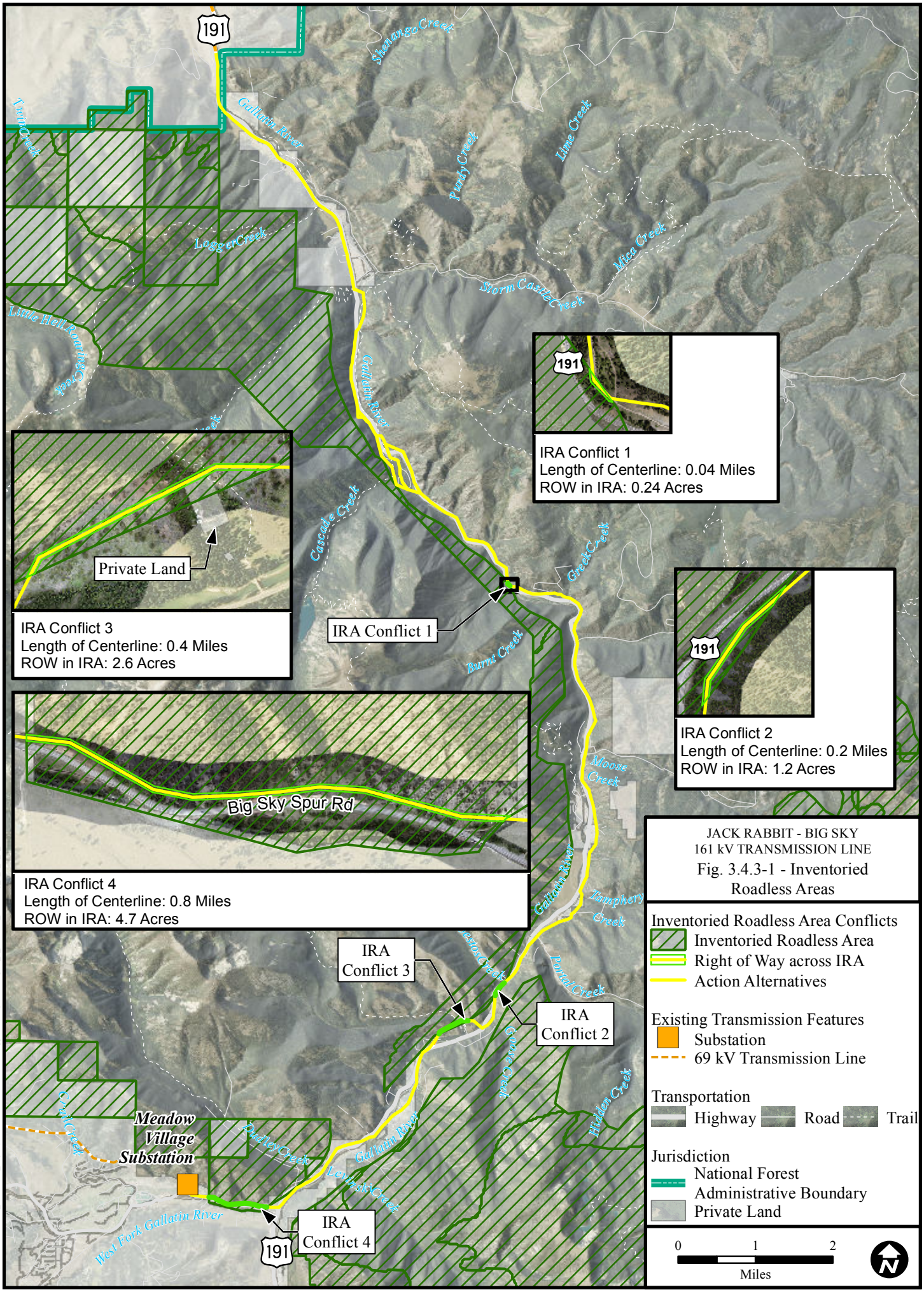
As result of using unsophisticated mapping techniques to identify roadless areas boundaries during the roadless inventory processes in the early 1970s, there are several places in the Madison IRA where United States Highway 191 (US Hwy 191), and Montana State Highway 64 (MT Hwy 64), as well as the existing 69 kV transmission line were included in this IRA. The existing line was established in its current location in the early 1970s and occupies much of the original ROW established in the 1950s. US Hwy 191 and MT Hwy 64 were established well before the IRA boundaries where identified.

In areas where the highways and transmission line overlaps the Madison IRA, the IRA does not hold any roadless area characteristics; there is no sense of solitude or remoteness; the area is highly modified and lacks naturalness; does not provide for any primitive recreation opportunities; and could not be managed for roadless values because of the existing highways.

For this Final Environmental Impact Statement (FEIS) analysis, the areas where the Madison IRA is crossed by the transmission line are referred to as "IRA conflicts," refer to Figure 3.4.3-1 for location of the IRA conflict areas. The total miles of Madison IRA crossed by the existing transmission line is 1.45 miles.

The Gallatin Fringe is located to the south and east of the project. This IRA is not crossed or impacted by the existing transmission line. The Proposed Action and alternatives to the proposed action also do not cross or impact the Gallatin Fringe IRA.

There are several areas of unroaded lands that lie between the existing transmission line and/or US Hwy 191 and the Madison IRA boundary. These areas are included in the roadless analysis as they are currently unroaded and would make logical extensions to the existing inventoried roadless or designated wilderness areas.


191
Shelango Creek
Gallatin River
Twin Creek
Purdy Creek
Lime Creek
Logger Creek
Mica Creek
Storm Castle Creek
Little Hell Roaring Creek
Gallatin River
Cascade Creek
Greek Creek
Burns Creek
Moose Creek
Gallatin River
Tempphery Creek
Portal Creek
Cascade Creek
Hidden Creek
Gallatin River
Dudley Creek
Lennick Creek
West Fork Gallatin River
Meadow Village Substation
IRA Conflict 1
Length of Centerline: 0.04 Miles
ROW in IRA: 0.24 Acres
IRA Conflict 2
Length of Centerline: 0.2 Miles
ROW in IRA: 1.2 Acres
IRA Conflict 3
Length of Centerline: 0.4 Miles
ROW in IRA: 2.6 Acres
Private Land
IRA Conflict 4
Length of Centerline: 0.8 Miles
ROW in IRA: 4.7 Acres
Big Sky Spur Rd
IRA Conflict 1
IRA Conflict 2
IRA Conflict 3
IRA Conflict 4
JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE
Fig. 3.4.3-1 - Inventoried Roadless Areas
Inventoried Roadless Area Conflicts
Inventoried Roadless Area
Right of Way across IRA
Action Alternatives
Existing Transmission Features
Substation
69 kV Transmission Line
Transportation
Highway
Road
Trail
Jurisdiction
National Forest
Administrative Boundary
Private Land
0
1
2
Miles
6/26/2012 W:\113792_Jackrabbit_BigSky\PER\Environmental\GIS\Apps\EIS\Figures\Chapter_3_Summer_2012\Fig_3_4_3_1_IRA.mxd

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Analysis Area

The analysis area includes the portion of Madison IRA affected by the proposed transmission line, including the area affected by the proposed transmission line ROW for the 16 mile length of the Proposed Project, and areas of potential ground disturbance. IRAs are special management areas unique to the Forest Service . As such, they are only located on NFS lands. The Gallatin Fringe IRA is nearby but is not included in the analysis because the transmission line does not enter the IRA in any alternative.

Unroaded areas were evaluated to determine if they were of the size and scale to have any roadless/wilderness attributes. These areas are located between the existing powerline, US Hwy 191 and/or the IRA boundary. These are narrow strips of lands between the transmission line and IRA boundary but these are narrow corridors in a developed area that do not display any roadless/wilderness characteristics such as being able to provide a sense of solitude, primitive recreation, etc; therefore they will not be considered further.

The temporal boundary for the effects analysis covers the period of active construction, and the life of the Special Use Permit (SUP).

Applicable Laws, Regulations, Forest Plan Direction

The National Forest Management Act (NFMA), and associated agency policy directs the agency to evaluate all unroaded and IRA lands for their suitability for designation as wilderness within the Wilderness Preservation System. The Final EIS for the Forest Plan, approved in 1987, evaluated roadless characteristics for all IRAs in the forest, and made recommendations for future inclusion into the wilderness preservation system. As previously noted, the remaining portion of the Madison IRA was released from wilderness consideration in the forest planning process on going in the late 1980s. However, these lands where not released from inventoried roadless status and will be evaluated for impacts to the roadless character.

Gallatin National Forest Management Plan (1987)

The Final EIS for the Forest Plan approved in 1987 evaluated roadless characteristics of IRAs on the forest, and made recommendations for future inclusion in the wilderness preservation system. As previously noted, the remaining portion of the Madison IRA was released from wilderness consideration in the forest planning process on going in the late 1980s and thus was not evaluated in the Final EIS for the Forest Plan. The Forest Plan did not recommend including any of Gallatin Fringe or Madison IRAs into the wilderness system.

2001 Roadless Area Conservation - Final Rule, 36 CFR 294

In 2001, the Roadless Conservation Rule (USFS 2001) was established. The 2001 rule applies to areas identified in a set of maps contained in Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps. Both the Madison and Gallatin Fringe IRAs are included in the set of maps.

The 2001 rule prohibited road construction, road reconstruction and timber cutting, sale and removal in inventoried roadless areas with some exceptions. The construction of roads associated with ROW projects within IRAs is prohibited. However, cutting of timber is limited to incidental cutting associated with administration of existing permitted use of NFS lands (i.e., SUP issued to NorthWestern Energy [NorthWestern] for electrical transmission lines).

Methodology

The following five "wilderness" attributes are the basis for evaluation of the effects of the alternatives (FSH 1909.12 (72.1)). These characteristics are those used to define wilderness attributes of an area and are the basis for evaluating the proposal and its alternatives which could affect roadless characteristics.

Naturalness - the extent to which long-term ecological processes are intact and operating.

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

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation-

The ability for an area to provide a wide range of experimental opportunities such as: physical and mental challenge, adventure and self-reliance, feelings of solitude, isolation, self-awareness and inspiration.

Solitude is the opportunity to experience isolation from the sights, sounds, and presence of others and development of man.

Primitive-type recreation measures include the ability to experience isolation from the evidence of humans, to feel a part of nature, to have a vastness of scale, and a degree of challenge and risk while using outdoor skills.

Special Features and Values - unique geological, biological, ecological, scientific, educational, historical, and cultural or scenic features.

Manageability and Boundaries - ability to manage a roadless area to meet the minimum size criteria, which is 5,000 acres, for wilderness.

Roadless areas also support other values such as wildlife, water, scenery, and soils. The effects to these values are disclosed in other sections of the FEIS.

Initially, base maps were prepared at a scale of 1:24,000. A review of the Forest Plan and other environmental studies in the region were reviewed, refined, and updated. Existing maps and geographic information system (GIS) data were collected and included in the inventory, as appropriate. Forest Service resource management and planning documents were reviewed for applicable data and land management regulations and policies.

The study used National Agriculture Imagery Program (NAIP) 2009 color aerial photography, and national, state, and local agency GIS data layers, points, and lines to identify and more accurately assess surface land uses. Additionally, along the existing 69 kV transmission line ROW, features were identified using aerial imagery at 1/3 foot resolution with the Light Detection and Ranging (LiDAR) data at a scale of 1:1,200.

An initial windshield survey was conducted by POWER Engineers, Inc. (POWER) and GNF personnel as part of the FEIS project kickoff meeting in April 2010. A subsequent field investigation of the analysis area was conducted by POWER to verify and supplement selected existing land uses between June and August 2010. Ground and aerial reconnaissance was aided by the use of selected global positioning system (GPS) readings and GIS mapping. Continued

correspondence with GNF personnel, Teri Seth and Fred Haas, was conducted between June 2010 and August 2011.

Effects Analysis

The Madison IRA is currently crossed four times by Alternative 1, the No Action Alternative. Alternatives 2, 3, and 4 would have minimum additional impacts as a result of using the alignment of the existing ROW but with an approximately 10 foot wider clearing. The increase in ROW acreage within the Madison IRA is due to the increase in ROW width. Within this IRA, no new conflict areas would be created. A summary of the NFS acres, using GIS data, impacted are shown in Table 3.4.3-1 below:

TABLE 3.4.3-1 SEGMENTS AND RELATED DISTURBED AREA

Alternative	Estimated Total Mileage	Estimated Total ROW Acreage	ROW Mileage within IRA	ROW Acreage within IRA
Alternative 1	16	77.6	1.5	7.0
Alternative 2	16	96.8	1.5	8.8
Alternative 3	16	96.8	1.5	8.8
Alternative 4	16	96.8	1.5	8.8

The Gallatin Fringe IRA is not impacted by Alternative 1, the No Action Alternative, or Alternatives 2, 3, and 4.

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1 (No action)

Under the No Action Alternative (Alternative 1), the upgraded transmission line would not be constructed and no additional impacts to the Madison IRA would occur. The four crossing (conflict areas) of this IRA would continue. The existing line currently disturbs 7.0 acres. Transmission line ROW maintenance, including clearing, currently occurs within and adjacent to this IRA. The area in the immediate vicinity of conflict areas 1, 2, and 4 appears heavily altered to casual viewers as the transmission line ROW parallels US Hwy 191 and MT Hwy 64. The conflict area 3 is adjacent to the Deer Creek Trailhead, private residences and less than 0.25 mile of US Hwy 191. The No Action Alternative would not further diminish the roadless character of the Madison IRA.

Cumulative Effects of Alternative 1 (No Action)

Under the No Action Alternative, the upgraded transmission line would not be constructed and continued use of the current line would not add to any cumulative impacts.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2 (Proposed Action)

The Proposed Action (Alternative 2), within the Madison IRA, uses the existing transmission line ROW alignment. This alternative would require an additional approximately 10 feet ROW width compared to the existing transmission line ROW. The approximate total amount of disturbance is 8.7 acres (7.0 acres existing plus 1.7 acres new disturbance). The widened ROW would require additional clearing of trees and undergrowth to safely construct and maintain the upgraded transmission line. To widen the ROW within the IRA, tree and vegetation removal is necessitated and would be cut or felled by hand using chainsaws or non-powered hand held equipment and

removed using ground based equipment or helicopters where safely feasible. During construction of the new transmission line, machinery would have to be brought to the area by work crews or dropped down with helicopter. Vehicles, which require roads to operate from, would be prohibited from bringing equipment or workers in to the area. Transmission structures would be brought to the area via helicopter and then guided and placed by workers on the ground.

Construction Impacts (Short-Term)

Natural and Undeveloped
Widening the ROW approximately 10 feet would result in stumps and bare ground from the removal of trees and vegetation during clearing operations. This impact would persist three to five years until the disturbed ROW was revegetated, hiding stumps and bare ground. As the vegetation recovers, the construction impacts would become less evident and the area would appear more natural, however the wider, cleared ROW would remain.

Opportunities for Solitude or Primitive Recreation
Within the immediate vicinity of the project construction, noise from chainsaws, workers, helicopters, and other equipment would affect people's opportunity for solitude.

Special Features
There are no special features within this section of the Madison IRA; however the Gallatin River and the Canyon's recreational opportunities do make the IRA a unique place to visit. Impacts related to the River and Canyon, as well as all associated activities, are discussed in Sections 3.3.1 – Scenery, 3.4.1 – Recreation, and 3.4.2 – Wild and Scenic Rivers.

Manageability
Short-term construction activities would not affect the future inclusion of the Madison IRA into the wilderness system.

Operational Impacts (Long-Term)

Natural and Undeveloped
The Proposed Action would consist of widening the ROW 10 feet, installing up to 80 feet tall wooden structures, installing new conductors, and reenergizing the line at 169 kV. The wider ROW, larger structures, and thicker line would be more noticeable and the cleared ROW would have the feel of being developed and unnatural. The Proposed Action within conflict areas 1, 2, and 4, would not diminish the natural or undeveloped character of the Madison IRA further, as the Proposed Action parallels the existing transmission line ROW and these areas would continue to be significantly impacted by US Hwy 191 and MT Hwy 64 ROWs. For conflict area 3, the natural and undeveloped character would be diminished to some degree; however since the proposed action follows the existing ROW in this area the impact would not be as great as compared to establishing a new ROW in an undeveloped area.

Opportunities for Solitude or Primitive Recreation
The portion of the Madison IRA, including conflict areas 1, 2, 3, and 4, adjacent to the proposed ROW does not offer opportunities for solitude or primitive recreation as the area is already heavily impacted by US Hwy 191 and MT Hwy 64 ROWs, developments on adjacent private lands, developed campgrounds and trailheads, and permitted recreation residences on NFS lands. Thus the Proposed Action will not further diminish the lack of opportunities for solitude or primitive recreation in this area.

Special Features
There are no special features within this section of the Madison IRA; however the Gallatin River and the Canyon's recreational opportunities do make the IRA a unique place to visit. Impacts

related to the River and Canyon, as well as all associated activities are discussed elsewhere in this FEIS.

Manageability

The Proposed Action would not affect the manageability of the Madison IRA as wilderness due to the existing conditions. The Madison IRA is approximately 129,259 acres; approximately 1.7 acres would be additionally impacted by the Proposed Action. The existing transmission line, US Hwy 191, MT Hwy 64, and adjacent developed areas have already significantly decreased the potential for this portion of the Madison IRA to be considered for wilderness designation. The Proposed Action would not further diminish the potential designation of that portion of the Madison IRA (and adjacent unroaded lands) which is adjacent or crossed by the Proposed Action.

Cumulative Effects of Alternative 2 (Proposed Action)

Alternative 2 would minimize the impact on Madison and Gallatin Fringe IRAs because it uses the same alignment as the existing transmission line ROW. Other proposed projects in the area may result in increased impacts depending on the location of the project improvements in relation to the designated IRAs. Other planned projects include the US Hwy 191 Gallatin Canyon Safety Improvements (tentative completion date of 2013), and Montana Opticom proposal to bury fiber optic line (construction date unknown) from Four Corners to Big Sky. The Gallatin Canyon US Hwy 191 Safety Improvements include the following components: adding turn lanes in the Karst Stage area, Moose Creek Flat Campground, Greek Creek Campground, and the Storm Castle Inn area; as well as slope flattening, widening of shoulders, improving clear zones, improving site distance, installing new and upgraded guardrails. The impacts of the existing highway, Proposed Action, US Hwy 191 improvements, and the potential for a new underground utility would impact the IRAs by making them temporarily less accessible during construction of the projects, but also create more developed areas and encroach closer to the IRA boundaries which may lessen the perceived benefits of the IRAs to users.

Alternative 3 – Cave Creek and Cascade East LROs, and Alternative 4 – Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternatives 3 and 4

The direct and indirect effects to the IRAs of Alternatives 3 and 4 would be similar to those associated with Alternative 2, the Proposed Action. The total approximate amount of disturbance would be 8.7 acres, which is a 1.7 acre increase over the existing ROW.

The impact to the IRAs from overland travel would be the same as described under the effects of Alternative 2.

Cave Creek LRO

The Cave Creek LRO would not be located within a designated IRA; therefore, the LRO would have no additional impacts for either Alternative 3 or 4.

Cascade East LRO

The Cascade East LRO would not be located within a designated IRA; therefore, Alternative 3 with this LRO would have no additional impacts.

Cascade West LRO

The Cascade West LRO would not be located within a designated IRA; therefore, Alternative 4 with this LRO would have no additional impacts.

Cumulative Effects of Alternatives 3 and 4

The cumulative effects of Alternatives 3 and 4 are similar to those described in Alternative 2; there would be additional impacts from either alternative and/or other projects within the area. The overall effects would be low once construction has been completed.

Comparison of Alternatives

Within the Madison and Gallatin Fringe IRAs, Alternatives 2, 3, and 4 would have the same impacts because all of these alternatives use the same proposed facility, ROW alignment and width. The impacts of these three alternatives are greater than Alternative 1, the No Action Alternative, due to the approximately 10 foot wider ROW, larger structures, thicker line, and construction activities necessary to install the new line.

Summary Conclusion

The Gallatin Fringe IRA is not affected by the Alternatives 1, 2, 3, or 4. Alternative 2 (Proposed Action), Alternatives 3 and 4 impact the Madison IRA more than Alternative 1. However, these impacts do not significantly further diminish the roadless character of the Madison IRA as the existing US Hwy 191 and MT Hwy 64 and other human developments within or adjacent to this IRA have already diminished the roadless character of the area. Most of this human development existed prior to the boundary of the Madison IRA being established.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Project Design Features (PDFs) that are described in Chapter 2 that are applicable to the IRA include 1.1, 1.3, 1.4, 1.6, 1.8, and 2.1.

Consistency with Laws, Regulations and Forest Service Plan

The alternatives are consistent with the 2001 Roadless Area Conservation Final Rule as road construction would not be permitted and the cutting of timber is incidental to the implementation of a management activity not otherwise prohibited. There are no standards or guidelines applicable to IRA management in the Forest Plan. The NFMA, and associated agency policy directs the agency to evaluate all unroaded and IRA lands for their suitability for designation as wilderness within the Wilderness Preservation System. The analysis considered whether there were impacts to unroaded lands. The Forest Plan (1987) determined these IRA lands were not suitable for wilderness designation. The alternatives would not impact wilderness potential of these lands due to the lack of wilderness characteristics.

3.4.4 Water Resources

This water resources section reviews the existing condition and direct, indirect and cumulative effects on floodplains, water quality, and wetlands. Floodplains are land areas adjacent to rivers and streams that are subject to recurring inundation. Water quality refers to the chemical, physical, and biological characteristics of water. Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year.

Floodplains

Description of Issue

Floodplains associated with the Gallatin River could potentially be affected by the Proposed Project. Locating proposed structures and/or access roads in or next to floodplains may have a negative impact on floodplain functions which include decreasing run-off velocity, reducing flood peaks, and distributing storm flows over longer time periods, causing tributary and main channels to peak at different times. Floodplain habitats associated with riparian and wetland systems may also be negatively impacted. Locating proposed structures and/or access roads in or next to floodplains may result in increased run-off velocity or base flood elevations due to fill, if fill is required. Engineering design, structure spotting, best management practices (BMPs), and compliance with Executive Order (E.O.) 11988 would minimize or eliminate impacts to floodplains.

Indicators

In order to evaluate impacts to floodplains, the following indicators were established for analysis:

- Nature and extent of fill and/or structures placed in regulatory floodplain.
- Whether such structures/fill would cause an adverse effect to floodplain function or negatively alter flood flows.
- Compliance with E.O. 11988 and Gallatin County Floodplain Regulations.

Table 3.4.4-1 describes the relative degree and temporal duration by which impacts to water resources were assessed.

TABLE 3.4.4-1 DESCRIPTION OF WATER RESOURCES IMPACT LEVELS

ATTRIBUTE OF EFFECT		DESCRIPTION RELATIVE TO WATER RESOURCES
Magnitude	Negligible	A change in current conditions that is too small to be physically measured using normal methods or perceptible to a trained human observer. There is no noticeable effect on the natural or baseline setting. There are no required changes in management or utilization of the resource.
	Minor	A change in current conditions that is just measurable with normal methods or barely perceptible to a trained human observer. The change may affect a small (<10%) portion of a resource but does not result in a modification of the overall value or productivity of the resource.
	Moderate	An easily measurable change in current condition that is readily noticeable to a trained human observer. The change affects between 25% and 75% of the resource, which may lead to modification or loss in viability or productivity of the resource. There are some required changes in management or utilization of the resource.

ATTRIBUTE OF EFFECT		DESCRIPTION RELATIVE TO WATER RESOURCES
	Major	A large measurable change in current conditions that is easily recognized by all human observers. The change affects more than 75% of the resource, which leads to significant modification in the value or productivity of the resource. There are profound or complete changes in management or utilization of the resource.
Duration	Short-term	10 years or less (including during construction)
	Long-term	More than 10 years

Scale of Analysis

The Gallatin River parallels the US Hwy 191 corridor and the existing transmission line for 16 miles through National Forest System (NFS) lands. The Gallatin River includes these main tributaries within the Proposed Project Area: West Fork Gallatin River, Deer Creek, Portal Creek, Moose Creek, Swan Creek, Cascade Creek, Hell Roaring Creek, Storm Castle Creek (also known as Squaw Creek), and Logger Creek. The spatial boundary for the analysis of direct and indirect effects includes the subwatersheds for these tributaries at the 12th Hydrologic Unit Code (HUC) level within the 16 mile Project Area on NFS lands and the approximate five miles of private inholdings between the United States Forest Service (Forest Service or USFS) boundary north of Spanish Creek to the Meadow Village Substation. These watersheds total 171,636 acres that are crossed by the transmission line corridor (USGS n.d.). See Figure 3.4.4-1 Watersheds and Designated Floodplains. The entire 37-mile corridor was considered for assessment of cumulative effects.

See Indicators and Methods in this section.

Affected Environment

The Gallatin River floodplain is the area on the sides of the river subject to periodic flooding. The extent of the floodplain is dependent on soil type, topography, and water flow characteristics. Within the Proposed Project, the Gallatin River floodplain is restricted by steep canyon walls and the embankment created by United States Highway 191 (US Hwy 191), so floodplains are created in areas where the canyon widens and there are relatively flat areas for overland water flow. The Gallatin River tributaries may have small floodplains if the topography flattens out before the tributary enters the river such as with Swan Creek.

Since US Hwy 191 parallels the Gallatin River, the road embankment may restrict the floodplain and may have eliminated it in some areas. Despite presence of the highway, the floodplain in this section of the Gallatin River is able to function is relatively natural manner as there are no water diversions and the river is not impounded or damned in this section or downstream.

One type of floodplain was identified in the Project Area by the Federal Emergency Management Agency (FEMA): 100-year floodplains (Zone A). Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. Zone A includes areas with a one percent annual chance of flooding. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones. Data was available for approximately 22 percent (4.6 miles) of the Gallatin River within the Proposed Project (FEMA 2011). The remaining 78 percent of the Gallatin River is unmapped by FEMA and therefore unregulated. There are two areas where 100-year floodplains have been designated along the Gallatin River (Figure 3.4.4-1 Watersheds and Designated Floodplains). The northern 100-year floodplain extends from Moose Creek to Tamphery Creek. The southern 100-year floodplain extends from a point south of Deer Creek to the Big Sky turnoff. These areas were designated because there are significant private lands with improvements located in these sections.

High surface water flows and potential flooding occur in the spring and early summer months with the melting of the winter snowpack. Heavy rains falling during the spring thaw constitute a serious flood threat. Flash floods, although restricted in scope, are probably the most numerous type of flooding and result from locally heavy rainstorms in the spring and summer.

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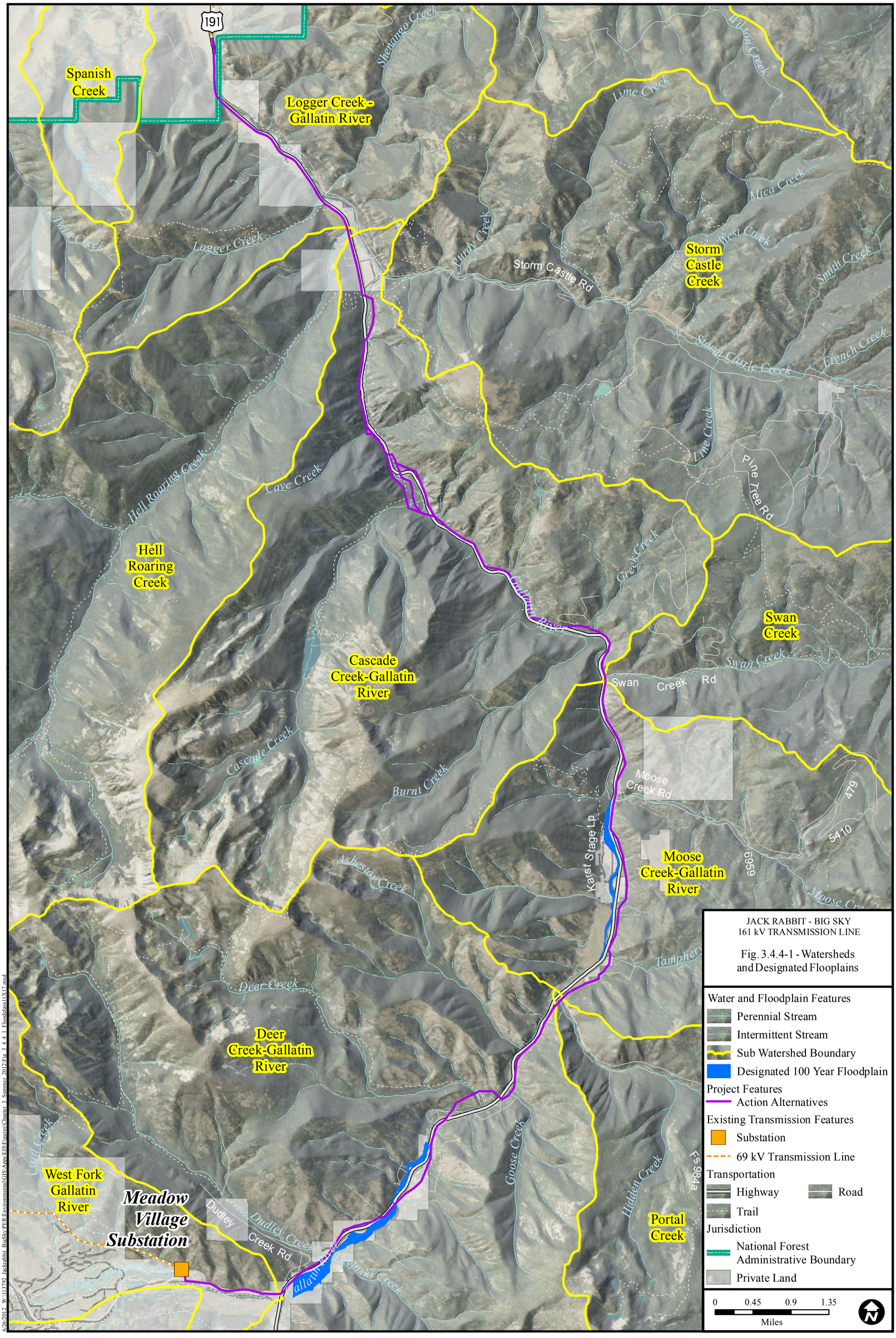
JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE
Fig. 3.4.4-1 - Watersheds and Designated Flooplains
Water and Floodplain Features
Perennial Stream
Intermittent Stream
Sub Watershed Boundary
Designated 100 Year Floodplain
Project Features
Action Alternatives
Existing Transmission Features
Substation
69 kV Transmission Line
Transportation
Highway
Road
Trail
Jurisdiction
National Forest Administrative Boundary
Private Land
0
0.45
0.9
1.35
Miles
191
Spanish Creek
Logger Creek - Gallatin River
Shenango Creek
Lime Creek
Mica Creek
Purdy Creek
Storm Castle Rd
Storm Castle Creek
West Creek
Smith Creek
French Creek
Twin Creek
Logger Creek
Hell Roaring Creek
Cave Creek
Hell Roaring Creek
Pine Tree Rd
Greek Creek
Gallatin River
Swan Creek
Swan Creek Rd
Cascade Creek-Gallatin River
Cascade Creek
Burnt Creek
Moose Creek Rd
Moose Creek-Gallatin River
Karist Stage Lp
Asbestos Creek
Tamphen
Deer Creek
Deer Creek-Gallatin River
Goose Creek
Hidden Creek
Portal Creek
Fs 9842a
West Fork Gallatin River
Meadow Village Substation
Dudley Creek Rd
Dudley Creek
Gallatin River
Levinski Creek
479
5410
6969

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Applicable Laws, Regulations, Forest Plan Direction

Executive Order 11988 – Floodplain Management

The requirements for all regulatory actions specified in E.O. 11988 are summarized in Section 1 from the order: "*Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.*"

NorthWestern Energy (NorthWestern) would comply with requirements of E.O. 11988.

Gallatin County Floodplain Regulation

Gallatin County has a floodplain ordinance that requires a permit for construction of buried or suspended utility lines in a mapped 100-year floodplain (FEMA must approve any floodplain maps for the floodplain to be regulated, which triggers permit requirements). Utility lines may be constructed in a regulatory floodplain subject to the issuance of a permit by the Floodplain Administrator if the cumulative effect of such uses combined with allowable Floodway Fringe encroachments does not result in any increase (greater than or equal to one one-hundredth of one foot) to the unobstructed elevation of the Base Flood.

Gallatin County floodplain standards for buried or suspended utility transmission lines include:

a. suspended utility transmission lines are designed such that the lowest point of the suspended line is at least six (6) feet higher than the Base Flood Elevation;
b. towers and other appurtenant structures are designed and placed to withstand and offer minimal obstruction to Flood flows; and
c. utility transmission lines carrying toxic or flammable materials are buried to a depth at least twice the calculated maximum depth of scour for the Base Flood. The maximum depth of scour may be determined from any of the accepted hydraulic engineering methods, but the final calculated figure shall be subject to approval by the Floodplain Administrator.

NorthWestern would comply with applicable floodplain regulations and obtain the appropriate Gallatin County floodplain permit prior to construction.

Methodology

Paper maps of floodplain data were available from the FEMA for approximately 22 percent (4.6 miles) of the Gallatin River for the 16 mile Project Area on NFS lands and the approximate five miles of private inholdings between the Forest Service boundary north of Spanish Creek to the Meadow Village Substation. The entire 37-mile corridor was considered for the assessment of cumulative effects below. These maps were digitized and analyzed by the geographic information system (GIS). One type of floodplain was identified in the Project Area: 100-year floodplains (Zone A). Flood Insurance Risk Zone A areas are subject to inundation by the 1-percent-annual-chance flood event. Because detailed hydraulic analyses have not been performed, no base flood elevation or depths are available. Water course crossing data was obtained from the US Geological Survey (USGS) national hydrologic database. Water course crossings for the Cascade Creek area were field reviewed on August 23-26, 2010 (W9 –Wetland Inventory Report in the Project Record).

In order to evaluate impacts to floodplains, an assessment was completed to determine whether any structures/fill to be placed in the floodplain would raise the base flood elevation or otherwise affect floodplain function.

Effects Analysis

This section describes the anticipated changes in floodplains for each alternative.

Alternative 1 - No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and no floodplain impacts would occur. Floodplains would be unchanged from existing conditions.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2

The Proposed Action – Alternative 2 ROW would cross 0.25 mile of designated 100-year floodplain for the entire length of the Proposed Project, including public and private lands. The majority of floodplains are located on NFS lands (0.2 mile), with the remaining 0.05 mile on private lands. In addition, the Proposed Action – Alternative 2 would have eight crossings of the Gallatin River, and there is the potential for most, if not all, of these crossings to have floodplains associated with them. Transmission line poles may be placed both in regulatory floodplain (triggering permitting requirements) and unmapped, and nonregulated floodplain.

While the ROW of the Proposed Action – Alternative 2 crosses 0.25 mile of designated floodplains and crosses the Gallatin River eight times, the impacts would be negligible due to the ability to span floodplains. Transmission structures will be located in the floodplain; however, the impacts from these structures will be negligible because they will not change flooding patterns or flood flows, the base flood elevation will not increase, and floodplain functions will remain intact. There would be a negligible amount of fill associated with placing these structures in the ground and improving access roads. Access road improvement may include slight widening and or smoothing.

There would be negligible impact to floodplains from access roads, overland travel to structures, and the staging area east of Portal Creek. The following factors would result in negligible impacts: there would be a negligible amount of fill from structures; there would be no elevation change due to access roads or overland travel; the staging area would be accessed via an existing assess road; and the staging area is located on a bench above the Gallatin River, approximately 555 feet from the river's edge.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

The Alternative 3 ROW would cross 0.25 mile of designated 100-year floodplain for the entire length of the Proposed Project, including public and private lands. The majority of floodplains are located on NFS lands (0.2 mile), with the remaining 0.05 mile on private land. In addition, Alternative 3 would have six crossings of the Gallatin River, and there is the potential for most, if not all, of these crossings to have floodplains associated with them. Transmission line poles may be placed in the floodplain.

While the ROW of Alternative 3 crosses 0.25 mile of designated floodplains and crosses the Gallatin River six times, the impacts would be negligible due to the ability to span floodplains. The impacts from structures would be negligible because they will not change flooding patterns

or flood flows, the base flood elevation will not increase, and floodplain functions will remain intact. There would be a negligible amount of fill associated with placing these structures in the ground and improving access roads. Access road improvement may include slight widening and or smoothing.

The impact to floodplains from access roads, overland travel, and the Portal Creek staging area would be the same as described under direct and indirect effects of the Proposed Action – Alternative 2.

Cave Creek LRO

There would be no difference in impact to floodplains between the Proposed Action – Alternative 2 and the Cave Creek LRO. Neither route crosses any designated floodplains. Because this Local Routing Option (LRO) is located on the canyon slope, there would be no Gallatin River floodplains crossed by this LRO.

Cascade East LRO

Neither the Proposed Action – Alternative 2 nor the Cascade East LRO crosses any designated floodplains, but the Proposed Action – Alternative 2 crosses the Gallatin River three times in this section and the Cascade East LRO crosses the Gallatin River one time in this section. The Cascade East LRO would only cross potential floodplains at the one Gallatin River crossing because the remaining section is located on the canyon slope above the river and US Hwy 191. The Proposed Action – Alternative 2 would cross three potential floodplains at the three Gallatin River crossings and there would potentially be more transmission structures in the floodplain as a result of these crossings than for the Cascade East LRO.

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

The Alternative 4 ROW would cross 0.25 mile of designated 100-year floodplain for the entire length of the Proposed Project, including public and private lands. The majority of floodplains are located on NFS lands (0.2 mile), with the remaining 0.05 mile on private land. In addition, Alternative 4 would have six crossings of the Gallatin River, and there is the potential for most, if not all, of these crossings to have floodplains associated with them. Transmission line poles may be placed in the floodplain.

While the ROW of Alternative 4 crosses 0.25 mile of floodplains and crosses the Gallatin River six times, the impacts would be negligible due to the ability to span floodplains. The impacts from structures would be negligible because they will not change flooding patterns or flood flows, the base flood elevation will not increase, and floodplain functions will remain intact. There would be a negligible amount of fill associated with placing these structures in the ground and improving access roads. Access road improvement may include slight widening and or smoothing.

The impact to floodplains from access roads, overland travel, and the Portal Creek staging area would be the same as described under direct and indirect effects of the Proposed Action – Alternative 2.

Cave Creek LRO

There would be no difference in impact to floodplains between the Proposed Action – Alternative 2 and the Cave Creek LRO. Neither route crosses any designated floodplains. Because this LRO is located on the canyon slope, there would be no Gallatin River floodplains crossed by this LRO.

Cascade West LRO

Neither the Proposed Action – Alternative 2 nor the Cascade West LRO crosses any designated floodplains, but the Proposed Action – Alternative 2 crosses the Gallatin River three times in this section and the Cascade West LRO crosses the Gallatin River one time in this section. The Cascade West LRO would only cross potential floodplains at the one Gallatin River crossing because the remaining section is located on the canyon slope above the river. The Proposed Action – Alternative 2 would cross three potential floodplains at the three Gallatin River crossings and there would potentially be more transmission structures in the floodplain as a result of these crossings than for the Cascade West LRO.

Cumulative Effects

The cumulative effects for all action alternatives would be similar. The current condition described in the affected environment section above reflects cumulative effects of past projects in the analysis area. While the impact on floodplains from Alternatives 2, 3, and 4 would be negligible due to the ability to span floodplains, other proposed projects in the area may result in an impact to floodplains depending on the location of the project improvements in relation to existing floodplains. Other planned or current projects which may impact floodplains include US Hwy 191 projects,Montana Opticom proposal to bury fiber optic line (date unknown) from Four Corners to Big Sky, and the approximate 15 miles of transmission line construction on private land from the Forest Service boundary near Spanish Creek to Four Corners (Phase 1). Floodplain data was available from the FEMA for approximately 50 percent (seven miles) of Phase 1. The 15 miles of transmission line route on private land would cross approximately one acre of designated 100-year floodplain associated with the Gallatin River near Four Corners. For this crossing, NorthWestern obtained a floodplain permit from Gallatin County. Cumulative effects are similar across the entire route because the transmission line is not expected to raise the base flood elevation (BFE) or effect floodplain functions and values, and because NorthWestern obtained a floodplain permit for crossing designated floodplain.

Comparison of Alternatives

The transmission centerline for Alternatives 2, 3, and 4 would cross 0.25 mile of designated 100-year floodplains compared to 0.25 mile for the No Action alternative. This is because the 0.25 mile of designated floodplain is located along a stretch of the transmission line right-of-way (ROW) common to all alternatives. The No Action alternative and the Proposed Action – Alternative 2 would have eight crossings of the Gallatin River compared to six Gallatin River crossings for Alternatives 3 and 4, all of which potentially include crossings of floodplains. Transmission line poles would be placed in the floodplain. The impacts from all alternatives would be very small because of the ability to span floodplains and because any transmission structures located in floodplains will not change flooding patterns or flood flows, the base flood elevation will not increase, and floodplain functions will remain intact. There would be a negligible amount of fill associated with placing these structures in the ground and improving access roads. Access road improvement may include slight widening and or smoothing.

The impact to floodplains from access roads and overland travel would be the same for all alternatives, which would be negligible. There would be no impact to floodplains for any of the alternatives from staging areas, fly yards, or deck areas.

Summary Conclusion

The transmission centerline for each alternative crosses 0.25 mile of designated 100-year floodplains. This is because the 0.25 mile of designated floodplain is located along a stretch of the transmission line ROW common to all alternatives. The No Action alternative and the Proposed Action – Alternative 2 would have eight crossings of the Gallatin River and any potential associated floodplains. Alternatives 3 and 4 would have six crossings of the Gallatin River and any potential associated floodplains. The impacts would be negligible for all of the alternatives

due to the ability to span floodplains and because the presence of transmission structures in the floodplain would not change flooding patterns or flood flows, the base flood elevation will not increase, and floodplain functions will remain intact. The impact to floodplains from access roads and overland travel would be the similar for all alternatives, which would be negligible. There would be no impact to floodplains from staging areas, fly yards, or deck areas.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

In addition to compliance with E.O. 11988 and implementation of the BMPs listed in Appendix D, impacts to floodplains would be reduced to negligible levels.

Water Quality

Description of Issue

Effects to water quality were identified as an analysis issue, including effects of proposed activities on sedimentation, and channel, floodplain, and wetland function. There is a concern that construction, operation, and maintenance for the Proposed Project could negatively affect water quality within the Project Area resulting in increased turbidity and channel sedimentation. There is also a concern that impacts to water quality could result from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line.

Indicators

In order to evaluate impacts to water quality, the following indicators were established for analysis:

Number and types of drainage crossings by the Proposed Project.

Acreage of surface disturbance in highly erodible soils within 300 feet of a drainage, which may contribute to erosion and degradation of water quality.

Compliance with applicable state and federal water quality regulations, including discharge regulations.

See the Indicators section at the beginning of the Water Resources section for a description of water resource impact levels. Table 3.4.4-1 describes the relative degree and temporal duration by which impacts to water resources were assessed.

Scale of Analysis

The Gallatin River parallels the US Hwy 191 corridor and the existing transmission line for 16 miles through NFS lands. The Gallatin River includes these main tributaries within the Project Area: West Fork Gallatin River, Deer Creek, Portal Creek, Moose Creek, Swan Creek, Cascade Creek, Hell Roaring Creek, Storm Castle Creek (also known as Squaw Creek), and Logger Creek. The spatial boundary for these analysis includes the sub watersheds for these tributaries at the 12th HUC level. These watersheds total 162,645 acres that are crossed by the transmission line corridor (USGS n.d.). See Figure 3.4.4-1 Watersheds and Designated Floodplains. Direct and indirect effects are analyzed for 16 mile Project Area across NFS lands including approximately five miles of private inholdings between the Forest Service boundary near Spanish Creek to the Meadow Village Substation. The entire 37-mile route was considered for cumulative effects.

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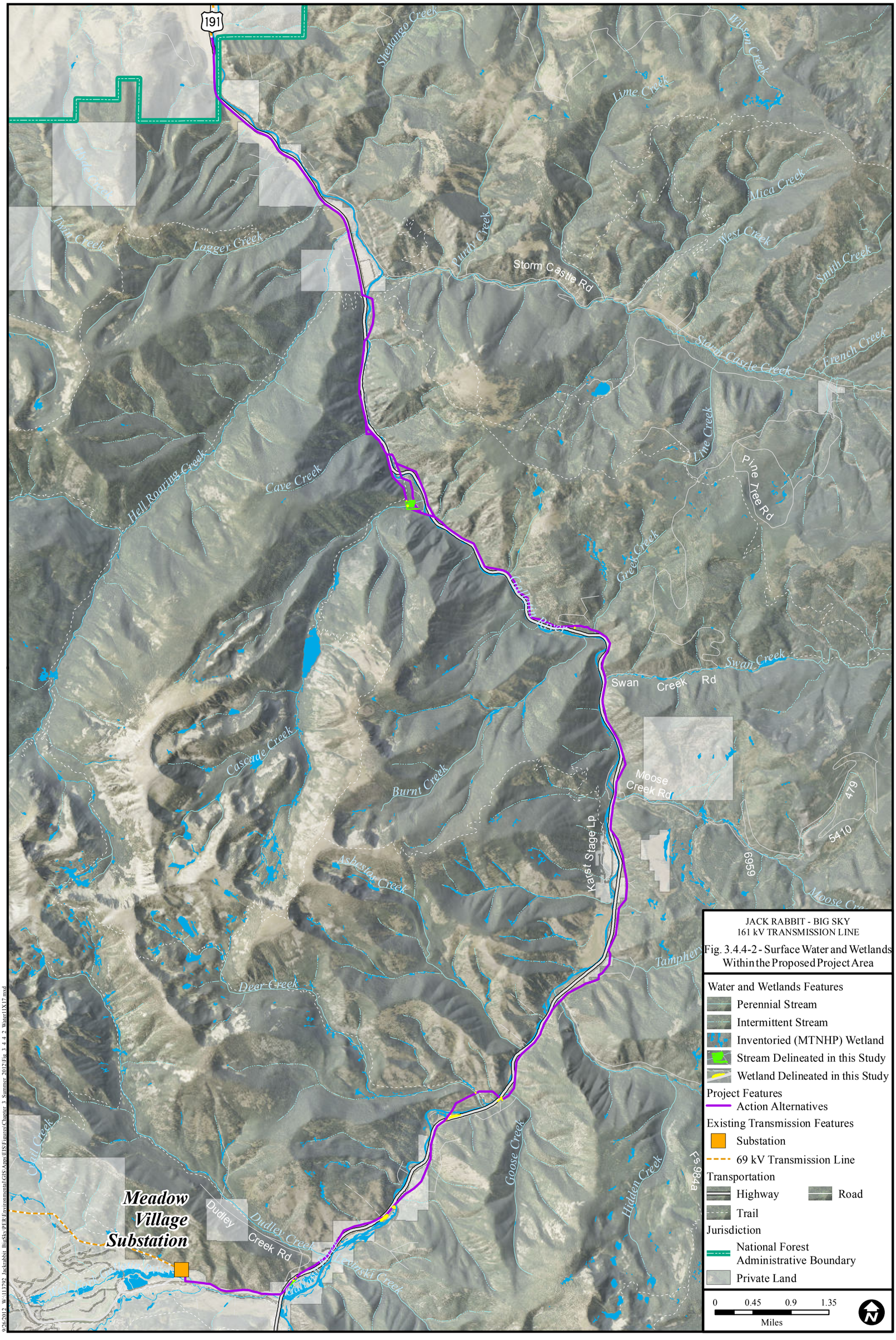
JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE
Fig. 3.4.4-2 - Surface Water and Wetlands Within the Proposed Project Area
Water and Wetlands Features
Perennial Stream
Intermittent Stream
Inventoried (MTNHP) Wetland
Stream Delineated in this Study
Wetland Delineated in this Study
Project Features
Action Alternatives
Existing Transmission Features
Substation
69 kV Transmission Line
Transportation
Highway
Road
Trail
Jurisdiction
National Forest Administrative Boundary
Private Land
0
0.45
0.9
1.35
Miles
191
Shenango Creek
Wilson Creek
Lime Creek
Mica Creek
West Creek
Smith Creek
Purdy Creek
Storm Castle Rd
Storm Castle Creek
French Creek
Twin Creek
Logger Creek
Hell Roaring Creek
Cave Creek
Lime Creek
Pine Tree Rd
Gallatin River
Swan Creek
Swan Creek Rd
Moose Creek Rd
Cascade Creek
Burnt Creek
Asbestos Creek
Karist Stage Lp
479
5410
6969
Tampher
Deer Creek
Goose Creek
Hidden Creek
Fs 9874
Meadow Village Substation
Dudley Creek Rd
Dudley Creek
Taylor Creek
Wapiti Creek

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Affected Environment

Snowmelt, rainfall, and ground water discharge are the main sources of hydrology to streams and rivers in the analysis area. Precipitation in the analysis area averages 20.3 inches per year. The highest precipitation occurs April through October. High surface water flows occur in the spring and early summer months with the melting of the winter snowpack. Heavy rains falling during the spring thaw constitute a serious flood threat. Flash floods, although restricted in scope, are probably the most numerous and result from locally heavy rainstorms in the spring and summer.

The primary water course in the analysis area is the Gallatin River. The Gallatin River flows from south to north and within the analysis area, the river is primarily restricted to a relatively narrow, winding channel in a mountain canyon. Much of the river banks are forested with stretches of meadows and steep rocky slopes. US Hwy 191 parallels the river for the length of the project.

The Gallatin River system is within the Gallatin watershed. The Gallatin watershed is part of the Upper Missouri River Basin. The Gallatin watershed originates high on the Yellowstone Plateau in Yellowstone National Park and covers nearly 1.2 million acres. It is driven by its climatic diversity, with the upper portion of the watershed receiving, on average, 300 inches of snow each year (approximately 50 inches of rain), while the lower watershed near Logan averages about 12 inches of rain per year.

The Gallatin watershed consists of two main river systems: Gallatin River (also referred to as the West Gallatin River) and the East Gallatin River. The Gallatin River is a tributary of the Missouri River, and is approximately 120 miles long in the states of Wyoming and Montana. The Gallatin River originates in Yellowstone National Park at an elevation of 8,000 feet and converges with the Jefferson and Madison Rivers to form the Missouri River at an elevation of 4,100 feet. The East Gallatin River, which is 41 miles in length, originates in the Bridger Mountain Range on the eastern edge of the watershed. The watershed consists of 23 major water bodies totaling 394 miles of stream.

The sub watersheds of the Gallatin watershed which are crossed in the Project Area include: Logger Creek – Gallatin River, Storm Castle Creek (also known as Squaw Creek), Hell Roaring Creek, Cascade Creek – Gallatin River, Swan Creek, Moose Creek – Gallatin River, Deer Creek – Gallatin River, Portal Creek, and West Fork Gallatin River. These sub watersheds total 162,645 acres (USGS n.d.). See Figure 3.4.4-1 - Watersheds and Designated Floodplains.

There are no lakes, but there are numerous perennial and intermittent streams and three rivers within the sub watershed analysis area. The analysis area is drained by the Gallatin River and its tributaries. Within the sub watershed analysis area, the primary tributaries to the Gallatin River include: West Fork Gallatin River, Deer Creek, Portal Creek, Moose Creek, Swan Creek, Cascade Creek, Hell Roaring Creek, Storm Castle Creek (also known as Squaw Creek), and Logger Creek. Numerous unnamed intermittent streams and ephemeral drainages also drain the area.

The Montana Department of Environmental Quality (Montana DEQ) is responsible for protecting and regulating the beneficial uses of the state's surface water and they rely on the water quality standards set forth by the Environmental Protection Agency (EPA) for identifying potential causes of impairment. Montana DEQ designates uses for specific water bodies in the state. The degree of support or attainment of a designated use for a particular stream is determined by an analysis of biological, physiochemical, physical-habitat, and toxicity data. Each designated use is assessed as full support (good), partial support (fair), or nonsupport (poor). Streams in which at least one designated use is not fully supported are considered "impaired" and submitted to the EPA under Section 303(d) of the Clean Water Act (CWA) as a prioritized list of impaired waters or 303(d) list (see Figure 3.4.4-2 – Surface Water and Wetlands within the Project Area). Table

3.4.4-2 provides a summary of the designated uses, impairment causes, and impairment source for rivers and streams on Montana's 303(d) list potentially affected by the transmission line route alternatives.

TABLE 3.4.4-2 DESIGNATED USES AND WATER QUALITY IMPAIRMENTS OF PERENNIAL STREAMS IN THE ANALYSIS AREA (MONTANA 303(D) LIST)

STREAM NAME	DESIGNATED USES PARTIALLY OR NOT SUPPORTING	IMPAIRMENT CAUSE	IMPAIRMENT SOURCE
Storm Castle Creek (also known as Squaw Creek)	Aquatic life Cold water fishery	Alteration in stream-side or littoral vegetative covers Phosphorus Physical substrate habitat alterations	Forest roads/ silviculture practices Natural sources
West Fork Gallatin River (area near Big Sky)	Aquatic life Cold water fishery Primary contact recreation	Chlorophyll-a Nitrogen (Total) Phosphorus (Total) Sedimentation/ Siltation	On-site treatment systems (septic systems or similar) Site clearance (land development or redevelopment) Silviculture activities
South Fork West Fork Gallatin River	Aquatic life Cold water fishery Primary contact recreation	Alteration in stream-side or littoral vegetative covers Chlorophyll-a Phosphorus (Total) Physical substrate habitat alterations Sedimentation/ siltation	Forest roads (construction and use) Silviculture activities Site clearance (land development or redevelopment On-site treatment systems (septic systems or similar)

Source: Montana DEQ 2010.

The upper Gallatin River watershed geology and soils are largely Tertiary Volcanic. During periods of low flow, deposition of gray clay particles is noticeable in some sections of the river, but overall this segment of the Gallatin River transports sediment well (Montana DEQ 2011). Numerous tributaries are situated on this river segment, increasing the discharge volume and the scale of the river in a downstream direction.

The West Fork Gallatin River is a concern as a source of sediment to the main stem Gallatin River because development in this drainage has increased the potential for higher sediment loads (Montana DEQ 2011). The West Fork Gallatin drainage is also a source of elevated nutrient loading to the main stem river (Table 3.4.4-2). The South Fork West Fork Gallatin River is a tributary of the West Fork Gallatin River and contributes sediment and nutrient loading to the West Fork Gallatin River.

Storm Castle Creek (also known as Squaw Creek) are listed as impaired in Table 3.4.4-2, but at this point its impact on Gallatin River water quality did not warrant concern per the Montana DEQ 2011 Assessment Record: MT41H001_021 (Montana DEQ 2011). Also, once the smaller volume of water in the three impaired tributaries listed in Table 3.4.4-2 combines with the larger

volume of water in the Gallatin River, the water quality impairments are diluted to the degree they are currently not an impairment issue for the river.

The Gallatin River supports a good population of rainbow trout with lesser numbers of brown trout. The Jack Smith Bridge section had estimated rainbow trout numbers of almost 5,000 fish per mile in 2004 and brown trout numbers are often about 80 fish per mile in this section (Montana DEQ 2011). Overall, habitats are good and the river has adequate flow volume and cold water temperatures.

Another indicator of water quality is the fisheries habitat classifications provided by the Montana Fish, Wildlife, and Parks. In general, the higher the fisheries habitat classification the higher the water quality would be. The upper or southern portion of the Gallatin River is rated as outstanding (Class I) for fisheries habitat and the lower or northern portion (start point just north of Gallatin Gateway) is rated as significant (Class II) for fisheries habitat (MNWP 2000).

The most recent macroinvertebrate data from sampling conducted in 2000 indicated full support of aquatic life uses at all sampling sites (Montana DEQ 2011). All reported chlorophyll-a values are in the range of reference condition, indicating that aquatic life, cold water fishery, and primary contact/recreation uses are not impaired by algal growth (Montana DEQ 2011). Additionally, no exceedences of human health or aquatic life standards were reported for the sampling results for the six 2000 Montana DEQ sites (Montana DEQ 2011).

See Floodplains Affected Environment for a description of the existing condition of floodplain functions. The relatively natural Gallatin River floodplain system decreases run-off velocity, reduces flood peaks, and distributes storm flows over longer time periods, causing tributary and main channels to peak at different times. The Gallatin River floodplains also aid in reducing sediment transport and allow sediment to be distributed across the floodplain which enhances water quality.

See Wetlands Affected Environment for a description of the existing condition of wetlands. Two of the numerous wetland functions are pollutant removal and sediment transport and storage, both of which improve water quality. The analysis area is dominated by upper and lower riverine wetlands adjacent to the Gallatin River, with some palustrine wetlands located in depressions and adjacent to streams. These riparian wetlands serve to reduce sediment transport during floods which enhances water quality. The riparian vegetation also provides shading of the water resource which aids in maintaining appropriate water temperatures, thereby enhancing water quality conditions and habitat for fish and water-dependent species.

Applicable Laws, Regulations, Forest Plan Direction

Federal and state laws regulate the quality of surface waters in Montana, including the Federal CWA and Montana Code Annotated (MCA) Title 75, Environmental Protection. The Montana DEQ is responsible for enforcing compliance with water quality laws on all lands in Montana, excluding Tribal lands. The Forest Service has a Memorandum of Understanding (MOU) with the State that allows the Forest Service and Montana DEQ to work collaboratively to address water quality issues on NFS lands.

Clean Water Act Section 404

Waters of the United States (Waters of the US), including wetlands, are subject to the United States Army Corps of Engineers (USACE) jurisdiction under Section 404 of the CWA. A Section 404 permit is required for the discharge of dredged or fill material into Waters of the US. The regulatory definition of Section 404 CWA jurisdictional wetlands according to the EPA and USACE are “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." The Helena Office of the Omaha District of the USACE would provide regulatory review and permitting services for this project.

Clean Water Act Section 401

Pursuant to Section 401 of the CWA and the Montana DEQ, provide water quality certification to determine if a Proposed Project would violate applicable state water quality standards. Water quality certification is mandatory for all projects requiring a Section 404 permit.

NorthWestern would obtain a Section 401 water quality certification from the Montana DEQ for any Section 404 permit activities to certify the discharge complies with state water quality standards.

Construction Storm Water Program

Construction activities in Montana must comply with the National Pollutant Discharge Elimination System (NPDES) for discharges of storm water runoff associated with a construction activity. The Montana DEQ Water Protection Bureau regulates storm water requirements for construction activity. The Montana Water Protection Bureau requires permitting for discharge of storm water from construction activities including clearing, grading, and excavation that result in disturbance of equal to or greater than one acre of total land area within 100 feet of streams, rivers, or lakes (General Permit for Storm Water Discharges Associated with Construction Activity, Permit No.: MTR100000).

An NPDES permit would be required because the Proposed Project will disturb more than one acre of total land area within 100 feet of streams and rivers. As part of this permitting process, a Stormwater Pollution Prevention Plan (SWPPP) would be developed and implemented that utilizes standard engineering practices and lists BMPs that will be used to minimize or prevent "significant sediment" from leaving the construction site.

Nondegradation

The Montana Water Quality Act requires the Montana DEQ to protect high quality waters from degradation. The current nondegradation rules were adopted in 1994 in response to amendments to Montana's nondegradation statute in 1993 and apply to any activity resulting from a new or increased source that may degrade a high quality water. The Proposed Project would have to comply with the current nondegradation rules because of its location next to high quality waters.

Total Maximum Daily Loads

Section 303(d) of the federal CWA requires states to assess the condition of state waters to determine where water quality is impaired (does not fully support uses identified in the stream classification or does not meet all water quality standards) or threatened (is likely to become impaired in the near future). The result of this review is the compilation of a 303(d) list, which states must submit to the EPA biannually.

There are three Gallatin River tributaries on the 303(d) list and the regulations specify no further impairment to these water courses as a result of the Proposed Project.

State Permits and Plans

Permits that may be applicable to projects affecting stream beds and banks are listed below. NorthWestern would obtain the appropriate state permits as applicable.

Natural Streambed and Land Preservation Act (310 Permit)

This permit is required for any private, non-governmental person or entity that proposes to work in or near a perennial stream on public or private land. The permit is necessary for any activity that physically alters or modifies the bed or immediate banks of a perennially flowing stream. Permits are issued by the Montana Association of Conservation Districts of the Montana Department of Natural Resources and Conservation (DNRC).

Short-term Turbidity Standard (318 Permit)

This permit is required for any person, agency, or entity, either public or private, initiating a short-term activity that may cause unavoidable short-term violations of state surface water quality standards. The major application of this law is related to sediments and turbidity caused by construction or other activities. Permits are issued by the Water Protection Bureau of the Montana DEQ.

West Fork Gallatin River Watershed TMDLs and Framework Watershed Water Quality Improvement Plan

The West Fork Gallatin River Watershed Total Maximum Daily Loads (TMDLs) and Framework Watershed Water Quality Improvement Plan (Montana DEQ 2010a) presents a TMDL and framework water quality restoration plan for three impaired streams in the West Fork Gallatin River watershed: the West Fork Gallatin River, the Middle Fork West Fork Gallatin River and the South Fork West Fork Gallatin River. One of these rivers is crossed by the Proposed Project: West Fork Gallatin River. Two of these rivers are within the Project Area: West Fork Gallatin River and South Fork West Fork Gallatin River.

The Montana DEQ has performed assessments determining that the above streams do not meet the applicable water quality standards and have placed them on the 303(d) list. The scope of the TMDLs in the document address sediment, nutrients, and E. coli related problems on the three streams mentioned above. The document provides an evaluation of existing water quality data, assesses pollutant sources contributing to impairment conditions, and estimates pollutant loading reductions and allocations that would result in attainment of water quality standards. The described actions in this section, including Project Design Features (PDFs) specified in Chapter 2 and the BMPs outlined in Appendix D, would be in compliance with this document.

Methodology

Water quality information and 303(d) listing for streams and rivers in the Project Area was obtained from the Montana DEQ and was used to determine compliance of the project with applicable state and federal water quality regulations, including discharge regulations. Water course crossing data was obtained from the USGS national hydrologic database. Water course crossings for the Cascade Creek area were field reviewed on August 23-26, 2010 (W9 –Wetland Inventory Report in the Project Record). Highly erodible digital soil data for the Soil Survey Geographic was obtained from the National Resource Conservation Service (NRCS). The number and types of drainage crossings by the project were identified and totaled and the acreage of surface disturbance in highly erodible soils within 300 feet of a drainage, which may contribute to erosion and degradation of water quality, were totaled to evaluate impacts.

Effects Analysis

This section describes the anticipated changes in water quality for the alternatives.

Alternative 1 - No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and no water quality impacts would occur. Water quality would be unchanged from existing conditions.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2

The Proposed Action-Alternative 2 ROW would cross 36 water courses for the entire length of the Proposed Project, including public and private lands. There are 27 water course crossings located on NFS lands and nine water course crossings for private land. Disturbance of water course crossings and associated riparian vegetation may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation. Disturbance or removal of riparian vegetation may also increase water temperatures.

The majority of the water course crossings for the Proposed Action - Alternative 2 are perennial streams. There are eight crossings of the Gallatin River and 18 crossings of perennial tributary streams for a total of 26 perennial stream crossings (six perennial streams are located on private lands). The Proposed Action - Alternative 2 would also cross a total of 10 intermittent streams (seven on NFS lands and three on private lands). All water courses would be spanned. Since water courses and their associated floodplains and riparian vegetation would be spanned, there would be no long term, negligible impact to water quality from the Proposed Action-Alternative 2. Table 3.4.4-3 and Figure 3.4.4-2 (Surface Water and Wetlands), shows the number of water course crossings for each alternative.

In instances where streams do not have an existing crossing, the stream would not be disturbed. For example: a stream is encountered during tree removal. Equipment would approach the stream from both sides but not cross in accordance with Montana Streamside Management Zone (SMZ) rules. Existing roads with stream crossings may need improvements to support access for construction and tree removal. Implementation of environmental PDFs and BMPs would reduce impacts to negligible levels.

There would be 34.6 acres of highly erodible soils within 300 feet of a drainage for the Proposed Action-Alternative 2 for the length of the Proposed Project on NFS lands only. The majority of these soils (33 acres) would be located within the Proposed Action-Alternative 2 ROW, with the remaining soils associated with improvement in access roads (0.1 acre) and staging areas (1.6 acres). Disturbance of these highly erodible soils may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation.

Soils within the ROW may be disturbed from vROW clearing, overland travel, transmission structure installation, and sites for splicing and pulling/tensioning. The primary soil disturbance activity in the ROW will be installation of the primary transmission structures resulting in 100 x 100 feet (0.2 acre) of soil disturbance per site for vehicular construction and 20 x 20 feet (0.01 acre) of soil disturbance per site for helicopter construction. Soil disturbance of highly erodible soils within the ROW may also be a result of splicing sites (100 x 100 feet or 0.2 acre per site), or pulling/tensioning sites for tangent structures (150 x 150 feet or 0.5 acre per site). The exact number of sites and structures in highly erodible soils within 300 feet of a drainage cannot be determined due to incomplete data regarding site and structure locations, and quantities.

The impacts to water quality from disturbance of highly erodible soils would be short term, and minor to negligible during construction as a SWPPP would be developed and implemented that utilizes standard engineering practices and lists BMPs that will be used to minimize or prevent

"significant sediment" from leaving the construction site. Monitoring of BMPs during and after construction until permanent stabilization has occurred will ensure impacts to water quality from disturbance of highly erodible soils would be negligible over the long term.

Table 3.4.4-4 shows the acres of highly erodible soils within 300 feet of a drainage for each alternative.

Impacts to water quality could also result from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line. Implementation of PDFs and BMPs described in Chapter 2 would reduce impacts to water quality to negligible levels from accidental spills and leaks.

Additionally, the Forest Service BMP manual would be followed which would, in combination with the above actions, reduce the water quality impacts to negligible.

Alternative 3

Direct and Indirect Effects of Alternative 3

The Alternative 3 ROW would cross 30 water courses for the entire 16 mile length of the Project Area, including public and private lands. There are 21 water courses crossings located on NFS lands and nine water course crossings for private land. Disturbance of water course crossings and associated riparian vegetation may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation.

The majority of the water course crossings for Alternative 3 are perennial streams. There are six crossings of the Gallatin River and 14 crossings of perennial tributary streams for a total of 20 perennial stream crossings (six perennial streams are located on private lands). Alternative 3 would also cross a total of 10 intermittent streams (seven on NFS lands and three on private lands). All water courses would be spanned. Since water courses and their associated floodplains and riparian vegetation would be spanned, there would be no long term, negligible impact to water quality from Alternative 3. Table 3.4.4-3 and Figure 3.4.4-2 Surface Water and Wetlands within the Proposed Project Area, shows the number of water course crossings for each alternative.

In instances where streams do not have an existing crossing, the stream would not be disturbed. For example: a stream is encountered during tree removal. Equipment would approach the stream from both sides but not cross in accordance with Montana SMZ rules. Existing roads with stream crossings may need improvements to support access for construction and tree removal. Implementation of environmental PDFs and BMPs would reduce impacts to negligible levels.

There would be 35.4 acres of highly erodible soils within 300 feet of a drainage for Alternative 3 for the 16 mile length of the Project Area on NFS lands only. The majority of these soils (33.8 acres) would be located within the Alternative 3 ROW with the remaining soils associated with improvement in access roads (0.1 acre) and staging areas (1.6 acres). Disturbance of these highly erodible soils may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation. Although Alternative 3 has more acres of highly erodible soils than the other alternatives, it has fewer water crossings therefore reducing the chance for erosion to enter the streams. Table 3.4.4-4 under the Proposed Action – Alternative 2 section shows the acres of highly erodible soils within 300 feet of a drainage for each alternative.

Soils disturbed with the ROW would be the same as described in the Proposed Action – Alternative 2 section.

The impacts to water quality from disturbance of highly erodible soils would be short term and minor to negligible during construction as a SWPPP would be developed and implemented that utilizes standard engineering practices and lists BMPs that will be used to minimize or prevent "significant sediment" from leaving the construction site. Monitoring of BMPs during and after construction will ensure that impacts to water quality from disturbance of highly erodible soils would be negligible over the long term.

Impacts to water quality could also result from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line. Implementation of PDFs and BMPs described in Chapter 2 and Appendix D would reduce impacts to water quality to negligible levels from accidental spills and leaks.

Additionally, the Forest Service BMP manual would be followed which would, in combination with the above actions, reduce the water quality impacts to negligible.

Cave Creek LRO

There is one water course crossing (intermittent stream) for the Cave Creek LRO as well as for the Proposed Action – Alternative 2.

There are 1.9 acres of highly erodible soils within 300 feet of streams for the Cave Creek LRO, and 1.7 acres of highly erodible soils within 300 feet of streams for the Proposed Action – Alternative 2.

Cascade East LRO

There are two water course crossings (one perennial and one intermittent) for the Cascade East LRO, and there are eight water course crossings (seven perennial and one intermittent) for the Proposed Action – Alternative 2.

There are 2.7 acres of highly erodible soils within 300 feet of streams for the Cascade East LRO, and 2.2 acres of highly erodible soils within 300 feet of streams for the Proposed Action – Alternative 2.

Alternative 4

Direct and Indirect Effects of Alternative 4

The Alternative 4 ROW would cross 36 water courses for the entire length of the Project Area, including public and private lands. There are 27 water courses crossings located on NFS lands and nine water course crossings for private land. Disturbance of water course crossings and associated riparian vegetation may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation.

The majority of the water course crossings for Alternative 4 are perennial streams. There are six crossings of the Gallatin River and 20 crossings of perennial tributary streams for a total of 26 perennial stream crossings (six perennial streams are located on private lands). Alternative 4 would also cross a total of 10 intermittent streams (seven on NFS lands and three on private lands). All water courses would be spanned. Since water courses and their associated floodplains and riparian vegetation would be spanned, there would be no long term, negligible impact to water quality from Alternative 4. Table 3.4.4-3 and Figure 3.4.4-2 Surface Water and Wetlands within the Proposed Project Area, shows the number of water course crossings for each alternative.

In instances where streams do not have an existing crossing, the stream would not be disturbed. For example: a stream is encountered during tree removal. Equipment would approach the stream from both sides but not cross in accordance with Montana SMZ rules. Existing roads with stream crossings may need improvements to support access for construction and tree removal. Implementation of environmental PDFs and BMPs would reduce impacts to negligible levels.

There would be 35.2 acres of highly erodible soils within 300 feet of a drainage for Alternative 4 for the length of the Proposed Project on NFS lands only. The majority of these soils (33.6 acres) would be located within the Alternative 4 ROW with the remaining soils associated with improvement in access roads (0.1 acre) and staging areas (1.6 acres). Disturbance of these highly erodible soils may accelerate erosion and increase sediment in storm water runoff to receiving waters causing increased turbidity and channel sedimentation. Table 3.4.4-4 under the Proposed Action – Alternative 2 section shows the acres of highly erodible soils within 300 feet of a drainage for each alternative.

Soils disturbed with the ROW would be the same as described in the Proposed Action – Alternative 2 section.

The impacts to water quality from disturbance of highly erodible soils would be short term and minor to negligible during construction as a SWPPP would be developed and implemented that utilizes standard engineering practices and lists BMPs that will be used to minimize or prevent "significant sediment" from leaving the construction site. Monitoring of BMPs during and after construction will ensure impacts to water quality from disturbance of highly erodible soils would be negligible over the long term.

Impacts to water quality could also result from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line. Implementation of PDFs described in Chapter 2 and BMPs described in Appendix D would reduce impacts to water quality to negligible levels from accidental spills and leaks.

Additionally, the Forest Service BMP manual would be followed which would, in combination with the above actions, reduce the water quality impacts to negligible.

Cave Creek LRO

There is one water course crossing (intermittent stream) for the Cave Creek LRO as well as for the Proposed Action – Alternative 2.

There are 1.9 acres of highly erodible soils within 300 feet of streams for the Cave Creek LRO, and 1.7 acres of highly erodible soils within 300 feet of streams for the Proposed Action – Alternative 2

Cascade West LRO

There are eight water course crossings (seven perennial and one intermittent) for the Cascade West LRO and there are eight water course crossings (seven perennial and one intermittent) for the Proposed Action – Alternative 2.

There are 2.5 acres of highly erodible soils within 300 feet of streams for the Cascade West LRO, and 2.2 acres of highly erodible soils within 300 feet of streams for the Proposed Action – Alternative 2.

Cumulative Effects

The current condition described in the affected environment section above reflects cumulative effects of past projects in the analysis area. While the impact on water quality from all

alternatives would be negligible due to adherence to federal and state regulations, and implementation of PDFs and BMPs, other proposed projects in the area may result in temporary degradation of water quality depending on the location of the project improvements in relation to surface water resources. Other planned projects which may impact water quality include the US Hwy 191 Gallatin Canyon Safety Improvements (tentative construction date of 2013). Montana Opticom proposal to bury fiber optic line (date unknown) from Four Corners to Big Sky, and the approximate 15 miles of transmission line route on private land from the Forest Service boundary north of Spanish Creek to Four Corners (Phase 1). Along Phase 1 there are seven named streams and 26 unnamed streams crossed by the transmission line, none of which are listed as impaired by the Montana DEQ. Phase 1 does not require any stream crossings or in-stream work for construction. There was approximately 13,000 feet (2.46 miles) of temporary landings and access roads constructed on the 15 miles of route on private land for Phase 1. All landings and roads were on private lands and they consisted of plowing a landing or road to support line trucks, cranes and other equipment to dig and set poles as well as access the structure for stringing purposes (i.e., connecting conductor to the insulators). All landings were approximately 20 feet wide near the base of a pole and all roads were approximately 12 feet wide. All landings and roads were reclaimed and restored to their existing condition except for one area where a road will be left as is but the area will be reseeded. NorthWestern obtained a Stormwater Permit from the Montana DEQ for this phase of the project and environmental inspectors were on site monitoring BMP installation and maintenance. Therefore, project related activities are not anticipated to add measurable cumulative effects.

Comparison of Alternatives

The Proposed Action-Alternative 2 ROW would cross 36 water courses and 34.6 acres of highly erodible soils within 300 feet of a drainage, compared to 36 water courses and 26.4 acres of highly erodible soils within 300 feet of a drainage for the No Action alternative. The Alternative 1 – No Action ROW is 40 feet in width versus 50 feet in width for Alternatives 2, 3, and 4, which is the primary reason Alternative 1 – No Action has fewer highly erodible soil acres than Proposed Action-Alternative 2 despite identical routes. For comparison of alternatives, refer to Tables 3.4.4-3 and 3.4.4-4 below.

TABLE 3.4.4-3 NUMBER OF WATER COURSES CROSSED FOR EACH ALTERNATIVE

Type of Water Course	Alternative 1 No Action		Alternative 2 Proposed Action		Alternative 3		Alternative 4	
	GNF	Private	GNF	Private	GNF	Private	GNF	Private
Gallatin River	8	0	8	0	6	0	6	0
Perennial streams (not including Gallatin River)	12	6	12	6	8	6	14	6
Intermittent streams	7	3	7	3	7	3	7	3
Total	27	9	27	9	21	9	27	9
Total – All Lands	36		36		30		36	

TABLE 3.4.4-4 ACRES OF HIGHLY ERODIBLE SOILS WITHIN 300 FEET OF A DRAINAGE FOR EACH ALTERNATIVE (NFS LANDS ONLY)

TYPE OF SOIL DISTURBANCE	ALTERNATIVE 1 40-FOOT ROW	ALTERNATIVE 2 50-FOOT ROW	ALTERNATIVE 3 50-FOOT ROW	ALTERNATIVE 4 50-FOOT ROW
ROW	26.4	33.0	33.8	33.6
Access Roads to Improve (added width)	0	0.1	0.1	0.1
Staging Areas	0	1.6	1.6	1.6
Total	26.4	34.6	35.4	35.2

The potential impact to water quality from accidental spills and leaks of petroleum, oil, and lubricants from equipment and vehicles used during construction of the transmission line would be the same for Alternatives 2, 3, and 4.

Summary Conclusion

Under the No Action Alternative, the project would not be constructed and no water quality impacts would occur. Water quality would be unchanged from existing conditions. While there would be similarly negligible water quality impacts for Alternatives 2, 3, and 4, there is the potential for increased impacts from Alternatives 2 and 4 because of the number of water course crossings for the Cascade Creek area. The Cascade Creek area has the potential for increased impacts due to the number of crossings in a relatively small distance, which is approximately 1,000 linear feet for Alternative 2 and approximately 875 feet for Alternative 4. Water course crossings in the Cascade Creek area are as follows: Proposed Action – Alternative 2 – eight crossings; Cascade East LRO (Alternative 3) – two crossings; Cascade West LRO – eight crossings (Alternative 4).

There would be no further impairment of the three identified impaired waters (Storm Castle Creek (also known as Squaw Creek), West Fork Gallatin River, and South Fork West Fork Gallatin River. The project will be consistent with developed TMDLs for these impaired waters and the Proposed Project will not degrade high quality waters as a result of implementation of PDFs and BMPs.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

There are no resource specific PDFs for water quality. Implementation of PDFs described above and in Chapter 2 and BMPs described in Appendix D would reduce impacts to water quality to negligible levels. There would be monitoring of BMPs during and after construction until permanent stabilization has been achieved as described by the SWPPP, Forest Plan, and other applicable permits and regulations.

Wetlands

Description of Issue

Steep slopes within the canyon, bottomlands associated with the Gallatin River, creeks, small ponds and seeps present a patchwork of wetlands that could potentially be affected by the Proposed Project. Locating proposed structures and/or access roads in or next to wetlands may have a negative impact on wetland values which include riparian habitat for fish and wildlife, habitat connectivity, pollutant removal, sediment transport and storage, water temperature control, riverbank stability, flood water retention, groundwater recharge and energy and nutrient cycling. Locating proposed structures and/or access roads in or next to wetlands may result in discharge of dredged or fill material into Waters of the US. Engineering design, structure

spotting, BMPs, and compliance with regulatory policy would minimize or eliminate impacts to wetlands.

Indicators

In order to evaluate impacts to wetlands, the following indicators were established for analysis:

> Acreage of surface disturbance to federally jurisdictional Waters of the US, including wetlands.
>
> Compliance with applicable state and federal regulations for jurisdictional Waters of the US, including wetlands.

See the Indicators section at the beginning of the Water Resources section for a description of water resource impact levels. Table 3.4.4-1 describes the relative degree and temporal duration by which impacts to water resources were assessed.

Scale of Analysis

The spatial boundary of the wetlands direct and indirect effect analysis area includes the proposed 50 to 80-foot transmission line ROW for the 16 mile length of the Project Area on NFS lands including approximately five miles of private inholdings between the Forest Service boundary north of Spanish Creek to the Meadow Village Substation as well as existing access roads which may require improvement and other areas that could potentially be disturbed by construction, operation, and maintenance of the Proposed Project. Additional ROW width could be required if alternate transmission structure types are required due to terrain or other design criteria, however a 50-foot ROW was assumed for the length of the project because locations where alternative transmission structure types would be necessary have not been determined. The entire 37-mile route was considered for cumulative effects.

Affected Environment

In the analysis area, wetlands are primarily located adjacent to rivers, streams, and in depressions where water collects. Springs, seeps, and runoff from snowmelt and precipitation result in soil saturation or inundation during spring and early summer. Side hill and toe slope seeps are generally saturated late into the growing season.

No Montana DEQ high priority wetlands or riparian wetland research program sites were identified in the analysis area (MNRIS n.d.).

The Cowardin system described in the *Classification of Wetlands and Deepwater Habitats of the United States* was used to describe and classify wetlands (Cowardin et al. 1979). The analysis area is dominated by upper and lower riverine wetlands adjacent to the Gallatin River. There are also some palustrine wetlands located in depressions and adjacent to streams.

Forest-dominated wetland types are found in higher elevation areas in the south end of the analysis area. This wetland type is dominated by narrow leaf cottonwood (*Populus angustifolia*) and aspen (*Populus tremuloides*) with lodgepole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*), and Engleman spruce (*Picea engelmannii*) on the wetland fringes. Understory species include sandbar willow (*Salix exigua*), red-osier dogwood (*Cornus sericea*), woods rose (*Rosa woodsii*), and other willows (*Salix*, sp.).

Herbaceous-dominated wetlands are wet depression or slope areas with poorly drained soils. Dominant species include beaked sedge (*Carex rostrata*), mountain rush (*Juncus arcticus* ssp., *littoralis*), woollyfruit sedge (*Carex lasiocarpa*), Northwest Territory sedge (*Carex utriculata*),

and bluejoint reedgrass (*Calamagrostis canadensis*). On the driest surfaces is the western wheatgrass – green needlegrass community. Horsetails, rushes, and other grasses are typically co-dominant.

Wetland resources for the Proposed Project were field reviewed on August 23-26. Surveys were conducted within the proposed 50-foot ROW only for Waters of the US which could be filled with dredge or fill material. The wetland report identified 10 wetlands, one ephemeral drainage, and 14 streams (Wetland Inventory Report in the Project Record). Six of these wetlands were not identified by the Montana Natural Heritage Program (MTNHP), and numerous streams in the Cascade Creek area were not identified by USGS, so they were added to the GIS water resource database.

Since all wetlands are adjacent to the Gallatin River, a navigable river, they would be considered jurisdictional. The USACE would be consulted to confirm jurisdictional status and where wetland impacts must be avoided to the extent practicable. If wetland impacts cannot be avoided, the jurisdictional wetland delineations would be used to determine the need for a permit. If necessary, additional jurisdictional wetland delineations would be conducted for the affected wetland(s) to support permitting requirements.

Applicable Laws, Regulations, Forest Plan Direction

Clean Water Act Section 404

Waters of the US, including wetlands, are subject to USACE jurisdiction under Section 404 of the CWA. A Section 404 permit is required for the discharge of dredged or fill material into Waters of the US. The regulatory definition of Section 404 CWA jurisdictional wetlands according to the EPA and USACE are “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.” The Helena Office of the Omaha District of the USACE would provide regulatory review and permitting services for this project.

The USACE requires wetland mitigation if more than 0.1 acre of wetlands or other Waters of the US are permanently filled. However, where certain functions and values of wetlands are permanently or adversely affected, such as the conversion of a forested wetland to open water in the permanently maintained utility ROW, mitigation would be required to reduce the adverse effects of the project to the minimal level. Additionally, the USACE requires a nationwide permit if less than 0.5 acre of wetlands (Waters of the US) are permanently filled and an individual permit is required if more than 0.5 acre of wetlands (Waters of the US) are permanently filled.

See Water Quality for other regulations which may be applicable to wetlands.

NorthWestern would comply with requirements of the CWA and other regulations and obtain and/or complete applicable permits and plans.

Methodology

Digital wetland inventory maps were obtained from the MTNHP which are based on 2005 aerial photography and follow the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) protocol. NWI maps were not available for this area. The MTNHP’s wetland inventory maps provide approximate locations of wetlands one acre or larger that may or may not be jurisdictional based on the 1987 USACE Wetlands Delineation Manual. Wetlands can be vegetated or non-vegetated and are classified on the basis of their hydrology, vegetation, and

substrate. In this report, wetlands are classified according to the Cowardin system (Cowardin et al. 1979), which was used by the MTNHP to inventory and map the wetlands in the Project Area.

As part of the wetland inventory, POWER conducted a field inspection of wetlands and other Waters of the US within the proposed transmission line ROW for each alternative under consideration. Using methods outlined in the 1987 Corps of Engineers Wetlands Delineation Manual, wetlands were determined based on the presence of three wetland indicators: hydrophytic vegetation, hydric soils, and wetland hydrology. Forest Service soil surveys were reviewed prior to the field inspection and hydric soil information was synthesized with the wetland base maps. For wetlands that would be potentially impacted, wetland boundaries were delineated using a global positioning system (GPS) for accurate mapping.

See Indicators and Methods in this section.

Effects Analysis

This section describes the anticipated changes in wetlands for each alternative.

Alternative 1 - No Action

Direct and Indirect Effects of Alternative 1

Under the No Action Alternative, the project would not be constructed and no wetland impacts would occur. Wetlands would be unchanged from existing conditions.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2

The Proposed Action-Alternative 2 ROW would cross 2.7 acres of MTNHP and field identified wetlands for the entire length of the Project Area, including public and private lands. The majority of wetlands are located on NFS lands (2.1 acres) with the exception of four riverine wetlands located adjacent to Hell Roaring Creek, Dudley Creek, and West Fork Gallatin River (wetlands at two locations) and one field identified wetland (W9 – Wetland Inventory Report in the Project Record).

The majority of the wetlands for the Proposed Action-Alternative 2 are riverine, lower perennial (0.7 acre); riverine, upper perennial (0.7 acre); and palustrine emergent (0.8 acre). The riverine wetlands would be spanned in conjunction with spanning of the Gallatin River. All other wetlands would be spanned to the extent practicable. The line would cross no new areas of palustrine, forested wetlands, but some vegetation may need cutting or trimming for the larger 50-foot ROW to allow for required clearance for conductors. The minimum amount of vegetation would be cut to reduce disturbance to wetland functions and values. Table 3.4.4-5 shows the acres of MTNHP and field identified wetlands in the transmission line ROW for each alternative. Figure 3.4.4-2 shows the water and wetlands in the analysis area as well as MTNHP and field identified wetlands in the ROW.

TABLE 3.4.4-5 ACRES OF MTNHP AND FIELD IDENTIFIED WETLANDS IN THE ROW FOR EACH ALTERNATIVE

WETLAND TYPE	ALTERNATIVE 1 40-FOOT ROW	ALTERNATIVE 2 50-FOOT ROW	ALTERNATIVE 3 50-FOOT ROW	ALTERNATIVE 4 50-FOOT ROW
Palustrine				
Aquatic Bed	0.1	0.1	0.1	0.1
Emergent	0.5	0.8	0.6	1.1
Forested	0.2	0.3	0.3	0.3

WETLAND TYPE	ALTERNATIVE 1 40-FOOT ROW	ALTERNATIVE 2 50-FOOT ROW	ALTERNATIVE 3 50-FOOT ROW	ALTERNATIVE 4 50-FOOT ROW
Riverine				
Lower perennial	0.6	0.7	0.3	0.5
Upper perennial	0.5	0.7	0.7	0.7
Intermittent	0.04	0.1	0.1	0.1
Total	1.9	2.7	2.1	2.8

While the ROW of the Proposed Action-Alternative 2 crosses 2.7 acres of wetlands, the impacts would be minor due to the ability to span wetlands, direct embed (no additional excavation for foundation other than hole drilling) transmission structures in or near wetlands, and use of wetland matting as needed to access transmission structure locations. The impacts would be minor and readily mitigated per the actions described, as well as with PDFs specified in Chapter 2. It is anticipated that no specific wetland fill or dredge permits would be required.

There would be minimal impact to wetlands from access roads and overland travel to structures. A palustrine emergent identified wetland near Goose Creek; between Transmission Structures 30-08 and 30-09 would be crossed by overland travel. Overland travel to Structure 30-48 would require crossing of a palustrine emergent wetland as well. Use of wetland matting to cross palustrine emergent wetlands would reduce the impact to negligible levels. Additionally, overland travel would be required to access Structure 30-50 which crosses a palustrine forested identified wetland. The overland travel would stay outside the wetland to the degree possible and no trees would be cut in order to minimize impact.

The staging area east of Portal Creek would have no anticipated impact on wetlands. The following factors would result in negligible impacts: the staging area would be accessed via an existing assess road; the distance of the staging area from Portal Creek is approximately 190 feet at the closest point; and the staging area is located on a terrace east of Portal Creek.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

The Alternative 3 ROW would cross 2.1 acres of MTNHP and field identified wetlands for the entire length of the Proposed Project, including public and private lands. The majority of wetlands are located on NFS lands (1.6 acres) with the exception of four riverine wetlands located adjacent to Hell Roaring Creek, Dudley Creek, and West Fork Gallatin River (wetlands at two locations) and one field identified wetland (W9 – Wetland Inventory Report in the Project Record).

The majority of the wetlands in the Alternative 3 ROW are riverine, upper perennial (0.7 acre) and palustrine, emergent (0.6 acre). The riverine wetlands would be spanned in conjunction with spanning of the Gallatin River. The line would cross no new areas of palustrine forested wetlands, but some vegetation may need cutting or trimming for the larger 50-foot ROW to allow for required clearance for conductors. The minimum amount of vegetation would be cut to reduce disturbance to wetland functions and values. Table 3.4.4-5 shows the acres of MTNHP and field identified wetlands in the transmission line ROW for each alternative. Figure 3.4.4-2 shows the water and wetlands in the project area as well as MTNHP and field identified wetlands in the ROW.

While the ROW of Alternative 3 crosses 2.1 acres of wetlands, the impacts would be minor due to the ability to span wetlands, direct embed transmission structures in or near wetlands, and use of wetland matting as needed to access transmission structure locations. The impacts would be very small and readily mitigated per the actions described, as well as PDFs specified in Chapter 2. It is anticipated that no specific wetland fill or dredge permits would be required.

The impact to wetlands from access roads and overland travel would be the same as described under direct and indirect effects of Proposed Action-Alternative 2.

The staging area east of Portal Creek would have no anticipated impact on wetlands as described under direct and indirect effects of Proposed Action-Alternative 2.

Cave Creek LRO

There would be no difference in impact to wetlands between the Proposed Action – Alternative 2 and the Cave Creek LRO. Neither route crosses any wetlands.

Cascade East LRO

There is 0.1 acre of wetland located in the ROW for the Cascade East LRO and 0.7 acre of wetland located in the ROW for the Proposed Action-Alternative 2, so effects would be similar.

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

The Alternative 4 ROW would cross 2.8 acres of MTNHP and field identified wetlands for the entire length of the Proposed Project, including public and private lands. The majority of wetlands are located on NFS lands (2.2 acres) with the exception of four riverine wetlands located adjacent to Hell Roaring Creek, Dudley Creek, and West Fork Gallatin River (wetlands at two locations) and one field delineated wetland (W9 – Wetland Inventory Report in the Project Record).

The majority of the wetlands in the Alternative 4 ROW are riverine, upper perennial (0.7 acre) and palustrine, emergent (1.1 acres). The riverine wetlands would be spanned in conjunction with spanning of the Gallatin River. All other wetlands would be spanned to the extent practicable. The line would cross no new areas of palustrine forested wetlands, but some vegetation may need cutting or trimming for the larger 50-foot ROW to allow for required clearance for conductors. The minimum amount of vegetation would be cut to reduce disturbance to wetland functions and values. Table 3.4.4-5 shows the acres of MTNHP and field identified wetlands in the transmission line ROW for each alternative. Figure 3.4.4-2 shows the water and wetlands in the analysis area as well as MTNHP and field identified wetlands in the ROW.

While the ROW of Alternative 4 crosses 2.8 acres of wetlands the impacts would be minor due to the ability to span wetlands, direct embed transmission structures in or near wetlands, and the use of wetland matting as needed to access transmission structure locations. The impacts would be very small and readily mitigated per the actions described, as well as with PDFs specified in Chapter 2. It is anticipated that no specific wetland fill or dredge permits would be required.

The impact to wetlands from access roads and overland travel would be the same as described under direct and indirect effects of the Proposed Action – Alternative 2.

The staging area east of Portal Creek would have no anticipated impact on wetlands as described under direct and indirect effects of Proposed Action – Alternative 2.

Cave Creek LRO
There would be no difference in impact to wetlands between the Proposed Action – Alternative 2 and the Cave Creek LRO. Neither route crosses any wetlands.

Cascade West LRO
There is 0.8 acre of wetlands located in the ROW for the Cascade West LRO and 0.7 acre of wetlands located in the ROW for the Proposed Action – Alternative 2 , so effects would be similar.

Cumulative Effects
The cumulative effects for all action alternatives would be similar. The current condition described in the affected environment section above reflects cumulative effects of past projects in the analysis area. While the impact on wetlands from Alternatives 2, 3, and 4 would be minor due to the ability to span wetlands and direct embed transmission structures in or near wetlands, other proposed projects in the area may result in a loss of wetlands depending on the location of the project improvements in relation to existing wetlands. Other planned projects which may impact wetlands include US Hwy 191 projects, Montana Opticom proposal to bury fiber optic line (date unknown) from Four Corners to Big Sky, and the approximate 15 miles of transmission line route on private land from the Forest Service boundary north of Spanish Creek to Four Corners (Phase 1). Phase 1would cross approximately 2.5 miles of NWI riverine wetlands associated with the Gallatin River which would be spanned and avoided. NWI did not identify any other wetlands in the Phase 1 project corridor and ground truthing was not conducted for Phase 1. Therefore, project related activities are not anticipated to add measurable cumulative effects.

Comparison of Alternatives
Under the No Action Alternative, the project would not be constructed and no wetland impacts would occur. Wetlands would be unchanged from existing conditions. The Alternative 2 ROW would cross 2.7 acres of MTNHP and field identified wetlands compared to 1.9 acres for the No Action alternative. The Alternative 1 – No Action ROW is 40 feet in width versus 50 feet in width for Alternatives 2, 3, and 4, which is the primary reason Alternative 1 – No Action has fewer wetland acres than the Proposed Action-Alternative 2, despite identical routes. For comparison of alternatives, refer to Table 3.4.4-5.

The Alternative 3 ROW would cross 2.1 acres of MTNHP and field identified wetlands compared to 2.7 acres for the Proposed Action-Alternative 2, and 1.9 acres for Alternative 1.

The Alternative 4 ROW would cross 2.8 acres of MTNHP and field identified wetlands compared to 2.7 acres for the Proposed Action-Alternative 2, and 1.9 acres for Alternative 1.

The ROW for all alternatives, except Alternative 1 – No Action (0.2 acre), crosses the same amount of palustrine forested wetlands (0.3 acre).

The impact to wetlands from access roads and overland travel would be the same for all alternatives. There would be no impact to wetlands for any of the alternatives from staging areas, fly yards, or deck areas.

Summary Conclusion
Under the No Action Alternative, the project would not be constructed and no wetland impacts would occur. Wetlands would be unchanged from existing conditions. While the ROW of the Proposed Action-Alternative 2 crosses more acres of wetlands (2.7 acres) than Alternative 3 (2.1 acres) and less than Alternative 4 (2.8 acres), the impacts would be minor for all of the alternatives due to the ability to span wetlands, direct embed transmission structures in or near wetlands, and use of wetland matting as needed to access transmission structure locations. The

amount of palustrine, forested wetlands is the same for all alternatives (0.3 acre), except Alternative 1 – No Action (0.2 acre). None of the alternatives would cross new areas of palustrine forested wetlands, but some vegetation may need to be cut for the larger 50-foot ROW to allow for required clearance for conductors. The minimum amount of vegetation would be cut to reduce disturbance to wetland values. The impact to wetlands from access roads and overland travel would be the same for all alternatives, which would be minor to negligible. There would be no impact to wetlands from staging areas, fly yards, or deck areas.

If wetlands need to be crossed by equipment, temporary wetland matting would be used to reduce impacts to vegetation, hydrology, and soils. Wetland soils may be compacted but this would not trigger Section 404 permit requirements as long as permanent fill is not placed in the wetland. A potential indirect impact of soil compaction could include the establishment of less desirable plant species and increase the potential for noxious weeds.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

In addition to compliance with federal and state regulation and implementation BMPs described in Appendix D, impacts to wetlands would be reduced to minor levels.

There would be monitoring of BMPs during and after construction until permanent stabilization has been achieved. Guy wires may be required at some locations to hold the transmission structures in position. These guy wires may not fit into the proposed 50-foot ROW. Guy wire placement would avoid impacts to the greatest extent possible by not placing the guy wires in wetlands.

Consistency with Laws, Regulations, and Forest Plan

This water resource analysis was prepared in full compliance with the requirements of NEPA and is consistent with the applicable laws, regulations, and Forest Plan as described under Applicable Laws, Regulations, and Forest Plan in this section. The Proposed Project would also comply with all laws, regulations and the Forest Plan as described under Applicable Laws, Regulations, and Forest Plan.

3.4.5 Soils

Description of Issue

The Proposed Project could potentially cause excess soil disturbance that results in long term impairment of land productivity and reduced soil quality along portions of the transmission line corridor. Of specific concern is the extent and severity of soil disturbance and whether that disturbance has the potential to cause increased soil erosion and/or increased weed infestations. Upgrades to access roads, the installation of the upgraded power transmission lines and transmission structures, and the removal of trees along the transmission line right-of-way (ROW) are activities in this proposal that have the greatest potential to create soil disturbance.

Indicator

Measurement of detrimental soil disturbance (DSD), including detrimental effects of compaction, displacement, rutting, severe burning, surface erosion, loss of soil organic matter, and soil mass movement, has been used in Region 1 as a surrogate measure to ensure that land productivity and soil quality are not impaired. These standards "apply to lands where vegetation and water resource management are the principal objectives…" (USFS 1999). The NorthWestern Energy (NorthWestern) transmission line corridor has a singular management objective for the transmission of utility services. All other management objectives are secondary along this corridor. Transmission line corridors are included in the Gallatin National Forest Management Plan of 1987 (Forest Plan) as Management Area (MA) 25 along with pipelines, climatic and snow measuring sites, and electronic sites (USFS 1987).

MA 25 is, however, subject to all Forest-wide standards, including the maintenance of land productivity and protecting beneficial uses (USFS 1987). Although the DSD standards do not apply directly to this project, the underlying principle of protecting land productivity is still germane to the project.

Valid concerns exist about soil erosion and the potential proliferation of weed species along the transmission line corridor. Both soil erosion and weed infestations are associated with soil disturbance and have the potential to create cumulative impacts outside the utility corridor. As a result, these potential impacts will need to be monitored closely for a period of time after the transmission upgrade is completed, with immediate remediation actions taken if problems occur. Metrics used to compare alternatives in lieu of DSD standards are linear feet of road to be upgraded, linear feet of existing road to be used as-is, linear feet of overland vehicular access, square feet disturbance from new transmission structure installation, acres of pulling and tensioning sites, acres of conductor splicing sites, acres of staging areas and decking areas, and acres of tree removal.

Concern

Increases in soil erosion or weed infestations along the utility corridor have the potential to create DSD outside of the utility corridor. The potential degradation of the soil resources, both within the transmission line corridor and adjacent to the corridor, could disrupt the soil biological and hydrological functions over an extended area in a manner that reduces the ability of National Forest System (NFS) lands to supply goods and services to the American public. Severe or extensive soil disturbance resulting from failure to apply timely and appropriate remediation actions has the potential to cause significant, local land degradation.

Scale of Analysis

Spatial boundary

The spatial boundary for the majority of direct and indirect soil effects associated with the Proposed Project is the actual transmission line corridor, which is defined as approximately 50 feet either side of the centerline along the entire length of the corridor through NFS lands (approximately 16 miles). Additional areas of associated impacts outside this corridor, such as fly yards or access roads, have been added to the overall analysis area. Soil effects related to site productivity are spatially static, assuming no offsite erosion or deposition occurs as a result of the management activities. Detrimental soil disturbance within the intensively developed utility line is not a concern, so long as soil impacts do not extend outside the corridor and soil productivity is maintained (USFS 2009). The appropriate spatial limit for direct and indirect soil affects is the activity area.

Temporal boundary

The temporal boundary used in this analysis is from 60 years in the past to 20 years into the future. Remnant soil disturbance can still be found in some forest stands that were clear-cut up to 60 years ago. Twenty years into the future is beyond the current planning horizon for United States Forest Service (Forest Service or USFS) projects. It is impossible to predict future management actions that could affect the current project beyond 20 years out.

It is expected that the level of activity-related disturbance from upgrading transmission lines would be greatest immediately after the completion of the Proposed Project. That level of disturbance will gradually decrease for up to 20 years until any transitory detrimental effects on soil resources have been largely erased. This assumes, of course, that mitigation measures used to reduce soil impacts have been adequately implemented. Recovery of disturbed sites during this period would be the result of the combined influence of initial remediation efforts and natural recovery.

Equilibrium conditions where transitory impacts have been erased should be reached within 20 years from the time of implementation. After that point, only incremental improvements in the level of impact are likely to occur. Selected areas of tractor skidding, access roads and other areas of activity-related disturbance would be monitored at two years and five years after the project is complete. By year five, it should be obvious whether the site has been improving based on the mitigation measures implemented. Unsatisfactory results from sampling at either time would indicate that additional mitigation measures need to be implemented.

Affected Environment

The Proposed Project traverses approximately 16 miles of NFS lands in Gallatin Canyon and part way up the South Fork of the Gallatin River drainage. It passes through a number of different landforms and geologic parent materials along the way. Gradations in local climate conditions associated with changes in elevation, slope, and aspect are also prevalent along the route. Plant communities include conifer forests, open conifer/grassland areas, grasslands and riparian/wetland areas. All of the above factors influence soil resource properties at any given location.

Mean annual precipitation (MAP) in the analysis area ranges from approximately 15 to 24 inches. At the mouth of the canyon, MAP is likely in the 15 to 17 inch range. The amount of precipitation received increases with elevation further up the canyon up to 24 or 25 inches MAP just before the turn off to Big Sky where the transmission line corridor heads west. MAP likely remains at 24 to 25 inches along the final sections of the corridor on NFS land, north of the road to Big Sky, but

effective precipitation is reduced for much of the corridor in this section due to the south facing aspect.

Enhanced Soil Survey Information

Soils along the Proposed Project corridor are described in general by the Soil Survey of the Gallatin National Forest (GNF), Montana (Soil Survey) (USFS 1996). The Soil Survey identifies and maps a total of twenty-two soil map units as occurring within the area of the transmission line corridor. Ten of these map units (34-1C, 46-1B, 54-1A, 54-1B, 54-1C, 54-1G, 54-2D, 64-2A, 64-2C, 85-2A) cover the majority of the land within the transmission line ROW. Other soil map units are of limited (<1%) extent within the analysis area. The Soil Survey fits the definition of an Order 4, land type, soil survey. As such, it does not provide sufficient detail or accuracy for management decisions at a project scale. It does, however, provide a basis for understanding the general distribution of soils in the area. Information from other sources, including field analysis by the GNF Soil Scientist, Thomas Keck, are used in this section to interpret Soil Survey results presented here and fill in gaps where relevant information is missing in the Soil Survey document.

Selected soil and landscape data for the primary soil map units have been compiled into Tables 3.4.5-1 and 3.4.5-2. These data represent the information from the Soil Survey that are the most useful for making interpretations about the soils' susceptibility to disturbance and potential for land reclamation. For additional soils information available in the Soil Survey for this area, please see the Soils Technical Report (POWER 2011) in the Project Record.

Table 3.4.5-1 provides information on landforms, parent material (material from which soils in an area were formed), approximate range in slope (steepness), and percent rock outcrop by map unit. The majority of acreage within the transmission line corridor occurs on mountain slopes, according to the Soil Survey. This is a somewhat generic term to describe nearly all of the steeper landscapes in this area. The Soil Survey identifies the majority of mountain slopes as having "granitic rocks" as parent material. This is somewhat over-simplified, as the majority of bedrock parent materials in the Gallatin Canyon are metamorphic gneiss with inclusions of granite, granitic gneiss, and biotite schist. Soils formed from gneiss parent materials will tend more to having sandy loam textures in the non-rock fraction than coarse sandy or loamy coarse sand textures.

The "granitic" parent materials cover all bedrock landscapes identified in the Gallatin Canyon portion of the transmission line corridor. Once the corridor turns west near the Big Sky turnoff it begins paralleling the West Fork of the Gallatin River. Geologic materials along this stretch are mixed sedimentary beds, primarily shale, sandstone, and limestone as identified by soil map units 54-2D, and 85-2A in the Soil Survey. Soil textures, the amount and type of rock fragments, and soil chemistry change as a function of these different sedimentary parent materials. The common denominator for soils in this area on both footslope and mountain slope positions is the hotter and drier south facing aspect.

The transmission line corridor passes through a high proportion of very steep (45 to 60%) and extremely steep (60%+) mountain slopes or structurally controlled slopes in sedimentary bedrock areas. These are all considered to be mountain flank positions which generally have a high proportion of scree, rock outcrop, and/or shallow soils associated with them. There are also a high percentage of less steeply sloping, mountain base and footslope areas through which the corridor passes as well. These less steep mountain slopes often have a high percentage of deeper, colluvial (material deposited by gravity) soils. The less steep (<35%) slopes represent a nearly equal amount of the total area along the proposed transmission line corridor as the steeper, more

bedrock-controlled mountain slopes. This distinction in slopes and colluvial versus bedrock soils was not identified in the Soil Survey.

Slope estimates provided in the Soil Survey may be reasonable for mountain slope units overall, because they extend over large areas of very steep mountain slopes, but provide a poor characterization of slope ranges along the transmission line corridor. Rock outcrop percentages reported are crude estimates at best.

The remaining primary soil map units identified as occurring along the transmission line corridor relate to soil formed in alluvial (water deposited or glacier deposited materials). Soils in these areas are nearly always very deep (>80 inches) and have characteristics inherited from the type of deposition. The Soil Survey does a good job of identifying the area of glacial till deposition in the Cascade Creek area and in identifying the location of glacial/fluvial deposits overall within the analysis area.

Grassland meadows in the north end of Gallatin Canyon include a fair amount of mountain base or footslope areas along with the terrace and floodplain landscape components. Loess (or wind-deposited material) present in surface soil horizons may in part explain the expanded area of grassland vegetation relative to terraces further upstream (south) in the canyon. Deep deposits of wind-blown loess are present in portions of Gallatin Valley near Bozeman. In Gallatin Canyon, only isolated pockets of surface loess deposits are present. Where present, the loess has resulted in higher soil fertility levels that tend to support grassland vegetation.

Slope classes for the glaciofluvial (pertaining to meltwater streams from glacier ice [Bates and Jackson 1980]) map units are broad and general, due a poor job of characterizing slopes for specific landforms. In the southern half of Gallatin Canyon, the proposed transmission line corridor passes through small areas of wetlands associated with floodplain or low terrace landforms.

TABLE 3.4.5-1 SELECTED LANDSCAPE ATTRIBUTES COMPILED FROM THE SOIL SURVEY OF THE GNF FOR PRIMARY SOIL MAP UNITS IDENTIFIED ALONG THE PROPOSED PROJECT CORRIDOR

MAP UNIT	LANDFORM	PARENT MATERIAL	SLOPE RANGE	ROCK OUTCROP
	DATA COMPILED FROM TABLE 1 IN SOIL SURVEY OF GNF (USFS ET AL. 1996)			
34-1C	Moraines	Glacial drift	5-20%	na
46-1B	Terraces	Glacial outwash and alluvium	0-10%	0
54-1A	Mountain slopes	Granitic rocks	45-70%	20%
54-1B	Mountain slopes	Granitic rocks	45-70%	40%
54-1C	Mountain slopes	Granitic rocks	45-70%	15%
54-1G	Mountain slopes	Granitic rocks	45-70%	15%
54-2D	Mountain slopes	Interbedded sandstone and shale	45-70%	15%
64-2A	Terraces & Floodplains	Glacial outwash	0-10%	0
64-2C	Terraces & Floodplains	Glacial outwash and alluvium	0-10%	0
85-2A	Structurally controlled slopes	Limestone	45-70%	25%

Table 3.4.5-2 provides information about important soil properties, from a soil disturbance or remediation standpoint, that were compiled from the Soil Survey for the primary soil map units used in the area. Soil depths are based on the limits of soil depth classes reported in the Soil

Survey. Soil information from the Soil Survey that is questionable based on field observations is indicated in Table 3.4.5-2 in *italics*.

Surface soil textures can often be quite variable. For that reason, the family texture and mineralogy classification of soils are largely based on soil properties of subsoil layers, which are considered to be most important in determining the inherent productivity and response to management of soil resources. Most often, the portion of the soil used for these designations is 10 to 40 inches deep, although the actual depth used depends on specific attributes of the soil profile. The term "loamy-skeletal" in the particle-size class indicates more than 35 percent rock fragments (weighted average) are present in the particle-size control section (discussed above). The "loamy" portion indicates that soil texture in the fine-earth (<2.0 mm) fraction of the particle-size control section is some type of loam (sandy loam, loam, clay loam, or sandy clay loam) with up to 35 percent clay. "Texture Fine-earth Fraction" describes the texture of the fine-earth fraction after all rock fragments (>2.0 mm) have been removed by hand and/or sieving.

The adjective "gravelly" (gr), in front of the texture class indicates that 15 to 35 percent rock fragments are present in the soil that are primarily gravel size. Very gravelly indicates 35 to 60 percent rock fragments in the soil that are primarily gravel size. Very cobbly indicates 35 to 60 percent rock fragments in the soil that are primarily cobble size, while the adjective "extremely" indicates 60 to approximately 90 percent rock fragments by volume in the soil.

TABLE 3.4.5-2 SELECTED SOIL PROPERTIES COMPILED FROM THE SOIL SURVEY OF THE GNF FOR THE PRIMARY SOIL MAP UNITS IDENTIFIED ALONG THE PROPOSED PROJECT CORRIDOR

MAP UNIT	SURFACE TEXTURE(S)†	PARTICLE-SIZE CLASS	TEXTURE FINE-EARTH FRACTION††	SOIL DEPTH
	MAP UNIT DESCRIPTION*	TABLE 13*	TABLE 5*	INTERP. MUD*
34-1C	*gravelly loam*	Loamy-skeletal	sandy loam	>80 inches
46-1B	silt loam; loam	Loamy-skeletal	sandy loam	>80 inches
54-1A	very gravelly loam; gr-SL	Loamy-skeletal	sandy loam	*20-60 inches*
54-1B	gravelly loam; sandy loam	Loamy-skeletal	sandy loam	*60+ inches*
54-1C	gravelly loam	Loamy-skeletal	sandy loam	*60+ inches*
54-1G	gravelly loam	Loamy-skeletal	sandy loam	*60+ inches*
54-2D	silt loam; clay loam; gr-CL	Loamy-skeletal	silt loam; clay loam	*60+ inches*
64-2A	loam; sandy loam	Loamy-skeletal	loam; sandy loam	>80 inches
64-2C	gravelly loam; loam	Loamy-skeletal	Loam	>80 inches
85-2A	extremely cobbly sandy loam; very cobbly clay loam	Loamy-skeletal	sandy loam; clay loam	*60+ inches*

† Family level classification of the dominant particle-size class, includes rock fragments and fine-earth fraction (<2mm) of the soil.
†† Texture of the fine-earth fraction used in the family level soil classification.
Rock fragment size and amount abbreviations: gr = gravelly; vgr = very gravelly; vcb = very cobbly.
Texture abbreviations: SL = sandy loam; CL = clay loam; Soil depth: MD = moderately deep (20 to 40 inches) to bedrock.
* Identifies location of the data within the Soil Survey.

The main discrepancies between field observations and information from the Soil Survey is in the consistency of particle-size classes, lack of sandy subsoil classes or split texture classes, the limited size of surface horizon rock fragments, and the lack of shallow soils reported in the Soil Survey. Based on the range of parent materials, a wide range of particle size classes would be expected, although most would be skeletal. Sandy, sandy-skeletal, or loamy over sandy or sandy-skeletal classes should be common on terraces, floodplains, and associated with "granitic" (gneiss) parent materials in Gallatin Canyon. This was verified in the reference sample pits studied. Also, rock fragments found throughout many soils in canyon areas should be cobble or

stone size or boulders based on the extremely steep mountain slopes, hard bedrock material, glacial deposition, and high energy flows in the Gallatin River.

Finally, steep to extremely steep, bedrock-controlled mountain slopes and structurally-controlled landforms likely contain abundant shallow soils. Shallow soils can be readily seen on mountain slopes in Gallatin Canyon, especially on south aspects. For further details about site-specific soil conditions, see a summary of soil sampling results in Field Sampling and Soil Profile Data in this section, or the full soils report in the Project Record for the Proposed Project.

Summary of Affected Environment

Soil sampling conducted as part of this analysis along the transmission line corridor on NFS lands has been used to identify seven Soil Management Units based on soil and landscape factors (Table 3.4.5-3). These units can be readily identified in the field based on observable landscape differences. Figure 3.4.5-1 depicts the Soil Management Units for the Proposed Project Area within the GNF boundary.

Management Units range from highly productive, loess-capped, meadows in the north part of Gallatin Canyon to extremely steep, mountain flanks, to south facing, sedimentary mountain slopes north of the road to Big Sky. Unlike many projects on the Forest, the linear transmission line corridor stretches through a large swath of NFS lands, encountering a number of distinctly different landtype-soil associations along the way. Each Management Unit has its own unique management challenges, limitations, and opportunities.

TABLE 3.4.5-3 SOIL MANAGEMENT UNITS IDENTIFIED ALONG THE PROPOSED PROJECT CORRIDOR

SYMBOL	MANAGEMENT UNIT NAME	SLOPE RANGE	VEGETATION TYPE
1D	Loess-capped soils in upland meadows at the north end of Gallatin Canyon	2-15%	Grasslands
2E	Coarse textured forest and woodland soils in moderately steep mountain base areas	4-35%	Coniferous forests and open woodlands
3E	Heavier textured soils in mountain base areas along middle portions of the canyon	4-35%	Open conifer woodlands
4B	Grassland soils on terraces that are primarily well drained but may include areas of transitional wetlands	0-8%	Grasslands - some riparian
6E	Mixed sedimentary parent materials on south facing, mountain slopes - near Big Sky	4-45%	Open grown Douglas-fir
8E	Glacial till from metamorphic gneiss in the Cascade Creek area	8-30%	Coniferous forest
9G	Steep to extremely steep mountain flanks; scree slopes common	35-70%	Conifer forest, open woodland, scree

Management Units 1D, 4B, and 6E tend to have loam (or clay loam) surface soil textures which make them susceptible to soil compaction, while other units have predominantly coarse soil surface textures or abundant rock fragments on the surface limiting the potential for compaction. Soils on mountain slopes throughout Gallatin Canyon are primarily coarse textured throughout the soil profile due to the presence of metamorphic gneiss as the predominant parent material (Management Units 2E and 9G). Heavier textures are found, however, in the central portion of the canyon, which appears to correlate with the proximity of the Absaroka Volcanic Formation coming in from the east. Hot and dry, south facing slopes above the road to Big Sky (Unit 6E) have the greatest likelihood of expanding noxious weed infestations.

All of the above are examples of how different portions of the transmission line corridor may need to be treated differently within the context of an overall soil management/remediation plan. For further details on soil and reclamation implications associated with the above Management Units, see Effects Analysis in this section. A more complete discussion of the Management Units themselves will be available in the Project Record for this project.

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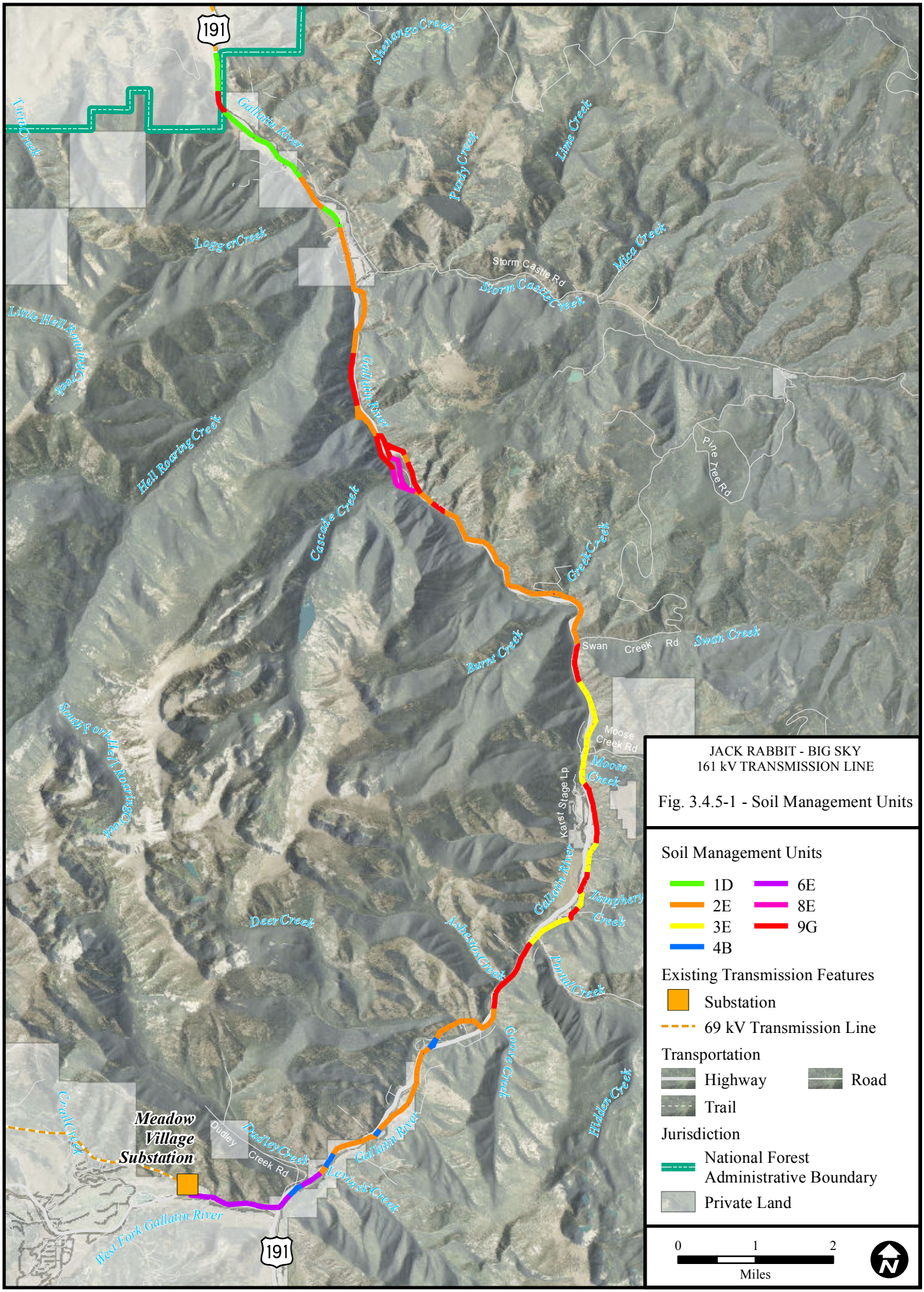

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Applicable Laws and Regulations

Legal directives to the Forest Service since 1960 have consistently stressed two themes: National Forests are intended to produce products and services, and NFS lands are to be managed in such a way as to maintain the productivity of the land. Sustained yield as a management objective is a core concept in several directives. National forests are clearly intended to be managed for the production of goods and services for the benefit of the American people.

Multiple-Use, Sustained-Yield Act of 1960 (P.L. 86-517, 74 Stat. 215: 16 U.S.C. 528-531)

National forests are required to be managed for a wide array of uses including outdoor recreation, range, timber, watershed, and fish and wildlife purposes according to the Multiple-Use, Sustained-Yield Act of 1960. Additionally, this Act requires a high-level of annual or regular periodic output of renewable resources production.

National Environmental Policy Act of 1969 (16 U.S.C. 43214)

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321-4346) establishes national policy for the protection and enhancement of the environment. NEPA refers to man and nature existing in "*productive harmony.*" Although the definition of "*productive harmony*" can be seen as being somewhat subjective, it can be inferred that maintaining land productivity is a major component of the concept.

Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1600-1614)

The Forest and Rangeland Renewable Resources Planning Act (RPA) set the framework for development of a renewable resource program based on comprehensive assessment of current and anticipated uses and demands for renewable resources from the Nation's private and public forests and rangelands. This effort is meant to be in coordination and consistent with efforts under the Multiple-Use, Sustained-Yield Act of 1960.

National Forest Management Act of 1976 (16 U.S.C. 472a)

The National Forest Management Act (NFMA) reorganized, expanded and amended the RPA of 1974, which called for the management of renewable resources on national forest lands. The NFMA requires the assessment of forest lands, development of a management program based on multiple-use, sustained-yield principles, and implementation of a resource management plan for each unit of the NFS. It is the primary statute governing the administration of national forests.

Forest Service Manual Chapter 2550 on Soil Management (WO Amendment 2500-2009-1)

Forest Service Manual (FSM) Chapter 2550 policy states:

> *"Responsible soil stewardship promotes and sustains biological and hydrologic function on National Forest System lands. Soils are essential for storing carbon and water. Soil inventories, soil quality assessments, monitoring and evaluation are required program elements for soil conservation and protection. This directive establishes the management framework for sustaining soil quality and hydrologic function while providing goods and services outlined in forest and grassland land management plans".*

Land Productivity

Sustained yield cannot exist without maintaining land productivity. The Sustained-Yield Act refers to "…coordinated management of resources without impairment of the productivity of the land." NEPA states that man and nature should exist in "productive harmony." The full definition

of "productive harmony" may be open to debate but it begins with maintaining land productivity. The RPA directly refers to the maintenance of productivity of the land and "specifies that substantial and permanent impairment of productivity must be avoided." Standards in the Forest Plan for the GNF indicate that "All management practices will be designed or modified as necessary to maintain land productivity and protect beneficial uses."

Soil Quality

The RPA refers to protecting the "quality of soil." Since then, references to "land productivity" in Forest Service directives have largely been replaced by references to "soil quality." It should be noted that these two terms are not necessarily synonymous. Many references to "soil quality" are made in the current Washington Office Amendment 2500-2009-1 to the FSM 2500 – Watershed and Air Management Chapter 2500 – Soil Management. Under Objectives (2550.2): "Maintain or improve soil quality on National Forest System lands…"

Soil quality has been largely used as a surrogate measure for predicting potential reductions in land productivity on NFS lands. While it is easy to tell when land productivity has been reduced due to degradation of the soil resource, it is extremely difficult to say, that for every instance and every land use, productivity has been significantly reduced or improved when specific soil quality thresholds have been passed. This is especially true when surrogate measures are used as indicators of soil quality.

The relationship between soil quality and productivity appears to be a general one at best. For example, soil compaction is one measure used to indicate reduced soil quality. If compaction is severe enough, detrimental soil disturbance is believed to occur indicating a reduction in land productivity. However, long-term effects on tree growth from "detrimental" compaction are not always consistent (Han et al. 2006). While Wert and Thomas (1981) found that detrimental compaction may impact tree growth for decades, papers by Fleming et.al. 2006, Greacen and Sands 1980, and Miller et al. 1996 indicate that soil compaction can at times have little or no effect.

Chapter 2550 – Soil Management: R-1 Supplement

The R-1 Supplement 2500-99-1 to FSM 2500 – Watershed and Air Management *(Effective 11/12/1999)* provides guidance for Region One on how NFS lands should be managed "without permanent impairment of land productivity and to maintain or improve soil quality." Soil quality is defined in the R-1 Supplement, as well as the Region-wide standard for not creating "detrimental soil conditions" on more than 15 percent of an activity area. General guidelines for determining detrimental soil disturbance were also provided in the R-1 Supplement. These guidelines have been defined more precisely for the GNF so they can be applied consistently in the field and so the identification of detrimental soil disturbance on the GNF is more closely aligned to observable reductions in soil productivity (Keck 2011).

Methodology for Analysis

Soil Survey

Standards provided in the Forest Plan require that the Soil Survey be incorporated into resource area analysis. In accordance with this requirement, the first step for this soils analysis was to assess soil information available in the Soil Survey as an initial assessment of soils along the Proposed Project corridor.

Data compiled in Tables 3.4.5-1 and 3.4.5-2 focus on the landscape and soil properties of greatest interest for partitioning the analysis area into management subunits and making interpretations about expected soil disturbance and appropriate mitigation measures. Information was extracted

from specific map unit descriptions in the main text of the Soil Survey along with data from tables at the back of the Soil Survey. Interpretation data in any soil survey are based on basic soil or landscape properties that are reported in the soil survey.

As noted previously, the Soil Survey fits the definition of an Order 4, land type, soil survey. It provides a basis for understanding the general distribution of soils in the area but does not provide the level of detail or accuracy needed to make management decisions at a project scale. Information from the Soil Survey was supplemented by soil sampling of the major soil-landscape associations along the proposed transmission line.

Field Sampling and Soil Profile Data

Site-specific, soil profile data collected along the existing transmission line corridor provide the basis for nearly all soil-related assessments made in this analysis. Field sampling for the Proposed Project consisted of sampling one backhoe or hand-dug soil pit for each half mile that the transmission line corridor crossed over NFS lands, to the extent allowed by access to the transmission line corridor. A total of 30 soil pits were sampled, most of which were dug with a backhoe.

Sample locations were based on the occurrence of specific soil-landscape associations along the corridor route. At least one representative soil sample was taken from each major soil-landscape association along the corridor that was accessible. Sample site locations were not evenly spaced, as landforms and corridor access often dictated site selection. In addition to access, the decisions to sample each site with a backhoe or by hand took into consideration the presence of any noxious weed infestations or cultural resource concerns in the area.

Data collected at each soil sample site included global positioning system (GPS) coordinates, a complete soil profile description, information about the plant community (including any weed species present), and information on selected landscape/landform attributes. Photographs were taken at each sample site. In addition, soil samples for subsequent laboratory analysis were collected for two soil horizons at each site.

Soil profile descriptions include horizon designations, upper and lower horizon depths, moist soil color, soil texture class including any adjectives needed to describe the size and amount of rock fragments present, estimated clay percentage, soil structure (grade, size, type), soil consistency (dry, moist, and wet), description of any clay films present, effervescent class, redox features (if present), roots, macropores, field pH and horizon boundary descriptions. All soil field analyses were conducted using technical guides and technical specifications in the 2002 Field Book for Describing and Sampling Soils (USFS-NRCS 2002).

Site descriptions include data on surface stoniness, drainage class, depth to groundwater (if present), elevation, slope steepness, aspect, landform, slope shape, parent material, estimated mean average annual precipitation and estimated flooding frequency (if applicable). Vegetation data collected include overstory information by tree species and the relative abundance of understory species, including any weed species.

Two soil samples for laboratory analysis were sent to Agvise Laboratories in Northwood, North Dakota for soil pH, texture and organic matter analysis. Much of the focus on the laboratory data was to determine the accuracy of field sampling results for soil texture and soil pH and verify that the field data provided a good representation of these critical soil properties.

For both the soil pH and texture data, adjustments can be made to the field data if the lab analysis indicates systematic differences between field and lab results. No large scale adjustments were

made to the field data, although final particle size classifications at the family level of soil classification relied heavily on laboratory results wherever available. Field and laboratory data can be found in the Soil and Site Assessment and Sampling report (Terra 2011).

Soil Management Units

The development of Soil Management Units from the point sample data was based on readily observable differences in landforms, geologic parent materials, and broadly defined differences in soil properties rather than soil classifications. The sample points were first divided into groups based on landform differences, resulting in three major classes: mountain slopes (including both mountain base and lower mountain flank positions); terraces; and loess-capped grassland areas along the north end of Gallatin Canyon.

From there, sample points taken in the metamorphic gneiss-dominated mountain slopes throughout Gallatin Canyon were separated from sample points taken in mountain slopes along the short stretch along the existing transmission line corridor heading west towards Big Sky, which have mixed sedimentary parent materials. These in turn were divided into sample points taken in shale-dominated areas and sample points taken in sandstone areas. Sample points taken in terrace areas, including river terraces, stream terraces, and a limited area of glacial outwash bench, were further split into two groups: riparian transition zone sites that have persistent groundwater within 60 inches of the soil surface, and better drained terraces. These two classes can be readily distinguished by differences in the corresponding plant communities.

Sources of Soil Disturbance

Overland Access

Overland access would consist of “drive and crush” travel with tracked or rubber tired equipment. “Drive and crush” refers to vehicular travel to access a site without substantially modifying the landscape. Vegetation is crushed, but not cropped. Soil will be compacted, but no surface soil will be removed. The extent of soil compaction depends on the type and amount of overland travel, inherent soil properties such as soil texture and rock fragment content, and soil moisture levels at the time of use. Even though vegetation may be damaged or even destroyed, this material provides some mulch to protect the surface soil, and leaves the seed and root cuttings in place. Crushed vegetation would potentially re-sprout after temporary use is stopped. To minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape, the alignment of any overland routes would follow the landform contours in designated areas where practicable, provided that such alignment does not impact other resource values. On soils that are highly susceptible to compaction, the timing can be adjusted where practical to avoid trafficking an area during wet periods. Soil compaction and rutting could be a problem in sensitive soils if an area is used when wet.

Staging Areas

Several temporary staging areas would be required for materials and equipment storage and staging for construction activities. Currently there are two areas proposed on NFS land, a mid-canyon location near Portal Creek, which would occupy approximately 1.2 acres, and a north-canyon location near Indian Ridge trailhead, which would occupy approximately 14 acres. Vegetation crushing from overland travel and placement of materials on the ground would likely occur. It is assumed that both areas under consideration currently have grassland vegetation. The staging areas would serve as field offices, reporting locations for workers, parking space for vehicles and equipment, and sites for temporary marshalling of construction materials.

Soil compaction would likely occur in these storage areas. Vegetation may be completely removed from the most heavily-trafficked areas, although viable seed and root cuttings will likely

remain in the soil and the soil resource itself would likely remain intact. Surrounding the highest impact area would be a wider area where vegetation has been broken and/or crushed but still remains covering most of the surface. Soils in this area would be compacted but not as severely as the most heavily-trafficked areas. Rutting may be a problem in sensitive soils if an area is used when wet.

Decking Areas

Five log decking areas, approximately one tenth to one and a half acres each, would be required for the temporary storage, collection, handling, sorting and/or loading of trees or logs. All five decking areas would be located on NFS lands on previously disturbed areas. Logs and/or trees removed from the ROW would be transported to the decking areas by mechanical skidders or helicopter. Impacts in decking areas would be quite similar to those of staging areas. The basic soil resource will remain intact.

Vegetation Removal

Woody vegetation 14 feet or higher, or vegetation that could grow to 14 feet or higher, within the ROW would be cleared. In addition, trees that are outside of the ROW boundary but have potential to fall into lines or affect lines during wind-induced line swing would be cut down. Dead, dying, or otherwise dangerous trees or tree limbs located near the ROW that could pose a hazard to the transmission line facilities would be identified and removed as part of NorthWestern's routine vegetation management program.

The primary method of ROW clearing includes manually felling trees with chainsaws and other non-powered handheld tools and removing that vegetation with ground based equipment or helicopters where safely feasible. The primary benefit of manual methods is selectivity; only unwanted or target vegetation is removed, while non-target vegetation is not disturbed. The manual vegetation removal techniques employed by NorthWestern are described in detail in the ROW Clearing Plan (see Appendix B). While selectively clearing vegetation will likely have limited impact on soil resources, skidding of trees to decking areas does have the potential to create detrimental soil disturbance.

Access Roads

There are many existing trails and roads in the vicinity of the Proposed Project. The existing road network may require some upgrade in a few locations to allow access of construction equipment into the 161 kilovolt (kV) transmission line corridor. This may involve clearing vegetation, blading and redistributing the bladed material to fill in ruts or potholes. Blading of existing roads has the potential to cause a portion of the topsoil resource to be lost. Equipment to improve access roads would include tracked bladed equipment, backhoes, dump trucks and crew-haul vehicles. Standard design techniques such as installing water bars and dips to control erosion would be included. In addition, travel on sensitive soils would be restricted during wet periods, where practical, to minimize impacts such as rutting and soil compaction in specific locations. Such conditions could arise during heavy rains or during snow melt.

Approximately 600 feet of new temporary construction road may be constructed to access the proposed Indian Ridge construction yard.

Transmission Structure Installation

Excavation for transmission structure holes would be made generally with power auger or backhoe equipment. If rocky areas are encountered, transmission structure holes may require drilling and blasting. Where vehicle access is not permitted or possible, holes would be excavated by drilling and blasting, or loosening and excavation of the soil to the required depth using hand tools. Cast-in-place concrete footings would be installed at heavy angles and dead-end structures

where guying is not permitted or feasible. Cast-in-place footings would be installed by placing reinforced steel in excavated foundation holes and encasing it in concrete.

Excavations associated with the installation of power poles and other infrastructure could result in lost or degraded topsoil. Excavations, where practical, will be completed in a manner that preserves most of the topsoil and, if appropriate, suitable subsoil, by selectively removing soil in two or three lifts. The most common method would be to remove a one-foot topsoil lift, which would be placed separately from the remainder of subsoil and substrate material alongside the hole. Top soil would then be replaced at the top of fill when finished. In some limited situations where suitable subsoil materials cover sand and gravel substrates, two lifts of suitable soil material may be segregated for the coarser substrates during excavation. In this case a zero- to one-foot topsoil and a one-foot to a maximum of three-foot total subsoil lift could be used.

Conductor Splicing and Pulling and Tensioning Sites

Conductor splicing would be required at the end of a conductor spool during stringing. Mid-span conductor splicing sites would be established along the Proposed Project corridor at an approximate rate of one site every three miles.

Once transmission structures are in place, a “sock-line” would be pulled (strung) from transmission structure to transmission structure and threaded through the stringing sheaves on each transmission structure. A helicopter would be used along more rugged sections of the transmission line to position the sock-line in the stringing sheaves. This process would be repeated until the ground wire and conductor is pulled through all sheaves. Conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end. Work areas for the pulling and tensioning would be established along the Proposed Project corridor at an approximate rate of one site every three miles. No blading or excavation would be required for these work areas.

Preliminary Assessment of Initial Detrimental Soil Disturbance Levels

As noted previously, the Region 1 DSD standard does not apply to intensively developed sites such as utility corridors. Preliminary DSD data were collected, however, to get at least an initial assessment of the current level of soil disturbance along the transmission line corridor. The Region 1 approach to soils NEPA analysis regarding DSD (USFS 2009) was adapted, as needed, for application to the Proposed Project. Soil monitoring transects, consisting of ten sample points each, were run across the transmission line corridor at points 300 feet either side of the backhoe pit locations. Points along these transects were assessed for the presence of DSD according to GNF standards.

DSD was assessed at 166 locations along 23 transect segments associated with 14 sample site locations. Not every transect had ten sample points. Often, proximity to the US Hwy 191 ROW or the Gallatin River eliminated potential soil monitoring locations from consideration. Portions of some transects were eliminated for these reasons. Since backhoe sites required some type of access off of the highway, these are also the sites prone to having the greatest level of DSD because of that accessibility.

The total calculated DSD from soil monitoring transects conducted near 14 of the 30 soil sample sites equals 7.8 percent, which is well below the Region standard of a maximum 15 percent activity related detrimental soil disturbance. Limited reconnaissance was conducted along less accessible portions of the transmission line corridor. Results of the reconnaissance verified that much less soil disturbance was present in more remote sections. Factoring in the fact that more than 50 percent of the corridor is largely inaccessible gives an overall estimate of approximately

3.9 percent prior DSD along the 100-foot-wide swath centered on the existing transmission line, which is well below the Region 1 maximum standard.

Assessment of Mitigation Effectiveness

In order for the mitigation of soil disturbance to be successful, appropriate and effective mitigation measures need to be selected. The design and implementation of mitigation measures should take into account the type of soil disturbance expected to occur, the soil's inherent susceptibility to the type of disturbance expected, and the soil's resilience to that disturbance.

The mitigation effectiveness tables below (Tables 3.4.5-4 and 3.4.5-5) can be used as tools to help in the selection of effective mitigation measures. They list the possible mitigation measures that could be applied to Proposed Project-related soil disturbance. Next to each mitigation measure, a predicted rate of effectiveness is listed – for two years and five years after the mitigation measure is applied. The mitigation measures in the tables can then be selected based on the extent of the mitigation required for a particular type of disturbance. The tables also illustrate that mitigation measures are more effective when combined and that mitigation success increases over time.

TABLE 3.4.5-4 MITIGATION EFFECTIVENESS FOR ROADS IMPROVED BY BLADING (BY TREATMENT METHOD)

Mitigation Measure	Mitigation Effectiveness Year 2	Mitigation Effectiveness Year 5
Rip to 6 inches; recontour where appropriate	60%	70%
Rip to 6 inches; recontour where appropriate; and add appropriate vegetation management	70%	85%
Rip to 6 inches; recontour where appropriate; add appropriate vegetation management ; and add slashing in forest areas	75%	90%
Slashing only in forest areas	15%	25%

Notes: 1. A reasonable level of implementation effectiveness (at a minimum) is assumed.
2. Percentages are based on the assumption that standard GNF erosion control measures would be applied to all roads and would effectively control soil erosion on those roads

TABLE 3.4.5-5 MITIGATION EFFECTIVENESS FOR EXCAVATED TRANSMISSION STRUCTURE INSTALLATION AREAS (BY TREATMENT METHOD)

Treatment Method	Mitigation Effectiveness Year 2	Mitigation Effectiveness Year 5
Salvage topsoil (0-1 foot) and subsoil (1-2 feet) separately and replace in sequence	65%	80%
Add appropriate vegetation management	75%	90%
Add slashing in forest areas	80%	95%
Salvage topsoil only (0-1 foot lift) and replace at surface	60%	75%
Slashing only	15%	20%

Note: A reasonable level of implementation effectiveness (at a minimum) is assumed.

Effects Analysis

Soil Resources and Susceptibility to Degradation

Table 3.4.5-6 lists the potential impact that each of the primary types of soil disturbance related to the Proposed Project could have on each Soil Management Unit. Soil Management Unit 6E on the north side of the road into Big Sky is by far the most susceptible Unit to soil degradation. High

potential exists for soil erosion, soil compaction, and weed infestation impacts from disturbances along the corridor in this area.
Except for Management Unit 6E, high potential exists for detrimental compaction due to loam and silt loam surface textures prevalent in this area. A high potential for rutting exists in Management Unit 2B due loam surface textures and wetness associated with landscape position along the Gallatin River and the likelihood of some wet areas associated with shallow. Existing ruts and field observations at several locations along the corridor verify the high potential for rutting in these areas.

TABLE 3.4.5-6 SOIL MANAGEMENT UNIT POTENTIAL FOR IMPACTS

MANAGEMENT UNIT SYMBOL	SLOPE RANGE (%)	SOIL EROSION	COMPACTION	RUTTING	WEED INFESTATION
1D	2-8	low	high	moderate	moderate
	8-15	moderate	high	moderate	moderate
2E	4-15	low	low	low	moderate
	15-35	moderate	low	low	moderate
3E	4-15	low	moderate	low	moderate
	15-35	moderate	moderate	moderate	moderate
4B	0-8	low	moderate	high	moderate
6E	4-15	moderate	high	moderate	high
	15-45	high	moderate	moderate	high
8E	8-15	low	low	low	moderate
	15-30	moderate	low	low	moderate
9G	35-75	moderate	low	low	low

Potential for landslides or mass wasting is an important interpretation that was not included in the above table. Most areas in Management Units 1D, 2E, 3E, 4B, and 8E have little or no likelihood of mass wasting. The two Units with the greatest potential for mass wasting are Unit 6E where underlying shale bedrock can cause landslide activity on steep slopes, and unit 9G where steep to extremely steep slopes are also prone to rockslides as evidenced by large scree slopes present in the area. The Montana Department of Transportation (MDT) has been trying to control a relatively small slide along the north side of United States Highway 191 (US Hwy 191) for decades in this area. That slide has essentially the same type of geologic strata as is found in Unit 6E.

Alternative 1 – No Action

Direct and Indirect Effects for Alternative 1

If no action was taken (Alternative 1), the existing transmission line would be left in place and would continue to operate as it has in the past. Because Alternative 1 would cause no change in current, existing conditions, there would be no increase or decrease in impacts to soil resources. The periodic maintenance of the vegetation in the ROW associated with the existing transmission line would have the same impact to soil resources that it has previously had. The level of soil disturbance would not change.

Cumulative Effects – Alternative 1

Alternative 1 would not add to the existing level of soil disturbance. Therefore, it would not contribute to any cumulative impacts to soil quality caused by other projects.

Direct and Indirect Effects for All Action Alternatives (2, 3, and 4)

The three action alternatives (Alternatives 2, 3, and 4) are approximately the same length and occur relatively close together within the limited space of the Gallatin Canyon. The soil disturbing activities, as described in the Sources of Soil Disturbance section, are the same for each action alternative, and there is very little difference in the amounts of disturbance associated with those activities for each action alternative. The amounts of each type of disturbance for each action alternative are summarized in Table 3.4.5-7. Because of their close proximity to each other, the action alternatives occur within the same landforms and Soil Management Units. Therefore, there is little variation between alternatives with respect to overall soil impact. Because of this, effects for all action alternatives are analyzed together.

TABLE 3.4.5-7 PROPOSED PROJECT ACTIVITY AND AREA OF SOIL DISTURBANCE BY ALTERNATIVE

ACTIVITY	ALT. 2	ALT. 3	ALT. 4
Existing road to be improved (linear feet)	4,697	4,697	4,697
Total existing road to be used as-is (linear feet)*	114,108	114,108	114,108
Total vehicular overland use (linear feet / acres)*	11,920 / 5.4	11,920 / 5.4	11,920 / 5.4
Temporary disturbance from installation of transmission structures, pulling and tensioning, temporary access road, overland travel, fly yards, decking areas and splicing (acres)**	53.6	52.1	52.7
Permanent disturbance from transmission structures (acres)	0.34	0.34	0.34
Total Temporary Disturbance	76.7	75.2	75.8
Fly Yards and Decking areas (acres)***	17.7	17.7	17.7
Timber clearing (acres)	14.8	22.4	22.5

*These numbers represent linear footage of existing road to be used as-is and vehicular overland use both inside and outside the 100-foot Proposed Project corridor.
**This is the acreage of the area to be used. No blading or excavation would be required for structure work areas, pulling and tensioning areas, splicing areas, or fly yards.
***This is the total acreage of the area to be used. Only 0.05 acre would be excavated, for each Alternative, at decking areas.
Notes: For the purposes of impact assessment for soils, areas that would be re-claimed after construction including ROW to be cleared, work areas, overland travel, fly yards and decking areas, etc., were considered temporary soil disturbance. Permanent soil disturbance was considered in areas where soil would actually be displaced including the soil displaced at each transmission structure. These assumptions may differ for other resources.

Cumulative Effects - Action Alternatives 2, 3, and 4

Current and future projects occurring in the Proposed Project Area which may have a cumulative effect on soil resources when combined with soil impacts associated with the Proposed Project Alternatives 2, 3, and 4 include the following:

US Hwy 191 Gallatin Canyon Safety Improvements (tentative construction 2013):

MDT is making improvements to US Hwy 191 through Gallatin Canyon in order to enhance public safety. The projects include adding turn lanes for Montana State Highway 64 (MT Hwy 64) going to Big Sky, slope flattening, widening of shoulders, improving clear zones, improving site distance, installing new and upgraded guardrails, and replacing two bridges.

No cumulative effect – Improvements to US Hwy 191 would be within the highway ROW, which is outside the spatial boundary for this project.

Montana Opticom – Proposal to bury fiber optic line from Four Corners to Big Sky:

It is unknown at this time whether the proposed fiber optic line would be buried within the highway ROW or within the transmission line Proposed Project Area.

Exact cumulative effect, if any, is unknown at this time; it would be minimal at most.

GNF – Fuel reductions projects between the Gallatin River and the Lee Metcalf Wilderness Area (schedule based on opportunity for appropriate conditions):

The project boundaries for proposed fuel reductions projects are unknown at this time. Exact cumulative effect, if any, is unknown at this time.

GNF – Recreation home project requests (i.e., septic system upgrades) (yearly):

Minimal cumulative impact possible due to disturbance associated with excavating existing septic systems and replacing them. It is unknown if any septic systems are currently located within the 100-foot transmission line corridor used as the project boundary for the NorthWestern transmission line upgrade.

GNF – Timber sale in the Jack Creek area (current project):

No cumulative effect – The Jack Creek Drainage is far enough away from the transmission line corridor that there would likely be no spatial overlap between the two projects.

GNF – Noxious weed spraying along highway corridor, trailheads, and some trails (yearly):

No cumulative effect – Weed spraying does not create soil disturbances, although weeds may create soil disturbance resulting in soil erosion due to poor ground cover if they are not properly controlled.

GNF – Rebuild fishing platform at Moose Creek Flat Campground (future project – not yet scheduled):

Minimal cumulative effect possible – Soil disturbance associated with installing a new fishing platform footing could be viewed as a possible cumulative soil disturbance when combined with the Proposed Project where ground is disturbed outside the river channel. Disturbance would be very minor relative to the overall project size.

Comparison of Alternatives

Under Alternative 1, the upgraded transmission line would not be built and there would be no increase in impacts to soil resources but impacts associated with operation and maintenance of the 16 mile existing line would continue. As discussed above, the three action alternatives (2, 3, and 4) are approximately the same length and occur relatively close together for the majority of the upgraded line. There is very little difference in the amounts of disturbance associated with the soil-disturbing activities for each action alternative. The amounts of each type of disturbance for each action alternative are summarized in Table 3.4.5-7. The action alternatives occur within the same landforms and Soil Management Units. Therefore, there is little variation between alternatives with respect to overall soil impact.

Summary Conclusion

Based on the effects analysis presented above, there would be minimal differences in soil disturbance caused by Alternatives 2, 3 and 4. Each of these Action Alternatives would cause the same level of permanent soil disturbance (0.34 acre), with only slight variations in the amount of temporary disturbance caused. The Proposed Action-Alternative 2 would have the fewest acres of trees cleared (14.8 acres), while Alternative 4 would have the most acres of trees cleared (22.5 acres), closely followed by Alternative 3 (22.4 acres). If no action were taken (Alternative 1), there would be no increase in impacts to soil resources. Alternative 1 would have the lowest impact to soil quality.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Adherence to best management practices (BMPs) listed in Appendix D, and other environmental protection measures listed in the Construction and Operation Plan (COP), would ensure that the full intent of laws and directives for the Forest Service and GNF to protect soil and land productivity and soil quality is met.

Project Design Features (PDFs) 8.2 through 8.6, as described in Chapter 2 and measures in the Weed Management, Reclamation and Revegetation Plan (Appendix C) would also be applied to avoid or reduce the impacts of the Proposed Project. Measures identified in Appendix C include reestablishing suitable, native-based vegetation at soil backhoe pits along the transmission line corridor (Table 3.4.5-8) in accordance to guidelines provided by soil management unit.

TABLE 3.4.5-8 VEGETATION ESTABLISHMENT STRATEGIES BY SOIL MANAGEMENT UNIT

Management Unit Symbol	Vegetation Type	Management Unit Name	Vegetation Strategy[1]
1D	Grasslands	Loess capped soils in upland meadows, 2 to 15% slopes	Seed aggressive native seed mix or barley mix with smooth brome re-colonization
2E	Open conifer woodlands	Coarse textured forest and woodland soils on mountain slopes, 4 to 45% slopes	Natural recovery provided adequate weed control; with or w/o wood chips
3E	Open conifer woodlands	Heavier textured soils in mountain base areas with open grown conifers, 4 to 35% slopes	Seed standard native grass seed mix
4B	Grasslands	Grassland soils on terraces that are primarily well-drained but may include areas of transitional wetlands, 0 to 8% slopes	Seed standard native grass seed mix; possible later introduction big sage (GNF)
	Minor amount of transitional wetlands	Grassland soils on terraces that are primarily well-drained but may include areas of transitional wetlands, 0 to 8% slopes	Limited area; plant wetland species using locally available plugs or cuttings
6E	Open grown Douglas fir	Mixed sedimentary parent materials on south facing, mountain slopes – near Big Sky, 4 to 45% slopes	Seed low elevation/south aspect, native grass seed mix
8E	Coniferous forest	Glacial till from metamorphic gneiss in the Cascade Creek area, 8 to 30% slopes	Natural recovery provided adequate weed control; with or w/o wood chips

MANAGEMENT UNIT SYMBOL	VEGETATION TYPE	MANAGEMENT UNIT NAME	VEGETATION STRATEGY[1]
9G	Open conifer woodlands	Steep to extremely steep mountain flanks; scree slopes common, 35 to 70% slopes	Natural recovery provided adequate weed control
	Scree	Steep to extremely steep mountain flanks; scree slopes common, 35 to 70% slopes	None

[1]*Use of natural recovery to re-vegetate excavated sites requires that adequate topsoil salvaging has occurred in addition to adequate weed control. Otherwise these sites will need to be seeded with the appropriate seed mix.*

Consistency with Laws, Regulations, and Forest Plan

The Proposed Project meets the overriding management objectives for National Forests of maintaining soil and land productivity (Sustained Yield Act 1960; NEPA 1969; RPA 1974; National Forest Management Act 1976; and the Forest Plan) and protecting soil quality (RPA 1974; R1 Supplement 2500-99-1 to the Forest Service Manual 1999; and Washington Office Amendment 2009-1 to the FSM 2009). Existing detrimental soil disturbance levels along the existing transmission line corridor are low, estimated at approximately 3.9 percent for the corridor overall. Limiting detrimental soil disturbance, as noted previously, is used in Region 1 as a surrogate measure for ensuring that both soil productivity and soil quality are preserved.

The Proposed Project will have limited impact on soil resources overall. Most impacts will involve potential soil compaction due to trafficking and storage of materials onsite. These impacts can be readily mitigated by shallow ripping of the compacted area and reseeding where necessary. Many of these impacts will occur along the same two-track roads and trails currently in use. Only excavations made to install new transmission structures and associated infrastructure and the possible blading of existing roads will potentially remove a portion of the existing topsoil resource.

Areas used for electrical transmission lines, pipelines, climatic and snow measuring sites are covered in MA 25 in the Forest Plan. The Forest standards for soils, as defined in the Forest Plan, are to incorporate the Soil Survey into resource area analysis and to use Forest BMPs in planning and implementation of project activities. Forest-wide standards will clearly be met by the Proposed Project.

Region 1 soil quality standards apply to lands where vegetation and water resource management are the principle objectives, such as timber sales, grazing pastures or allotments, wildlife habitat, and riparian areas. The standards do not apply to intensively developed sites, such as “mines, developed recreation sites, administrative sites, or rock quarries (USFS 1999).” All of the examples cited for “intensively developed sites” relate to activities where the desired activity itself precludes limiting disturbance to less than 15 percent of the area. The only decision in those cases is whether or not to allow the activity. Once it has been decided that a project will go forward, the level of disturbance in the immediate project area becomes somewhat irrelevant.

An electrical transmission line corridor fits somewhere in between an intensively developed site and lands where vegetation management is the principal objective. The project does have a single focus to provide electricity to the Big Sky area, but vegetation along the corridor is still being managed. Vegetation management along the corridor remains a major objective if not the principal objective for the Forest Service on this land. Unlike the examples of intensively developed sites, the Proposed Project can be managed to meet the detrimental soil disturbance standard without an undue burden.

Regardless of the above, the potential level of DSD caused by the Proposed Project will be well within the Region 1 (R1) standard. In addition, the amount of preliminary soil monitoring completed in 2011 using low intensity transects is sufficient, based on the R1 protocol (USFS 2009), to meet soil quality documentation requirements for the project. Whether or not the transmission line corridor is excluded from the R1 soil quality standards becomes a moot point as a result.

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3.4.6 Noxious Weeds

Description of Issue

Noxious and invasive weeds (weeds) were identified during interdisciplinary team scoping discussions, initial public scoping, and the Notice of Intent (NOI) comment period. Weeds were included as an issue because ground disturbance, access road widening, and increased vehicle activity may cause new weed populations to become established and existing populations to expand. In addition, the right-of-way (ROW) corridor and access road widening would create more open, unforested habitat that is suitable for weeds, especially with its proximity to United States Highway 191 (US Hwy 191), which is known to be a major transport vector for weeds.

Indicators

Indicators specific to weeds are:

Number of acres made suitable for weed establishment and spread based on all disturbances resulting from the Proposed Project; and

Effectiveness of weed related Project Design Features (PDFs).

Scale of Analysis

Spatial Boundary

The spatial boundary of the weeds analysis includes all areas that would be potentially disturbed or serve as a vector as a result of the Proposed Project, as described in Chapter 2.

Temporal Boundary

The temporal boundary of weeds is the current condition of weed infestations in the analysis area based on existing data and surveys that were conducted in 2010, through the life of the Special Use Permit (SUP).

Affected Environment

There are many terms that are used to describe a weed species, including invasive, exotic, non-native, introduced, and noxious. Invasive weeds are those species, usually non-native, able to establish colonies and potentially exclude or replace more desirable species. Exotic, introduced, and non-native weeds are those species that have been intentionally or accidentally transported from another country or region. These species often have a competitive advantage over native species because pest species that have co-evolved over time in the country of origin are not present. Noxious weeds are species that are legally defined for a given country, state, county, or other jurisdictional entity. This legal status provides guidance for prioritizing weed prevention and treatment efforts to those species that are considered have the greatest negative economic and/or ecological impacts (MNWSAC 2008).

Noxious and invasive weeds can produce negative environmental and economical consequences, including hydrological changes (i.e., decreased water quality, sediment deposition, and erosion), impaired biological diversity, habitat degradation and loss, displacement of wildlife and plant species, reduced forage and production for domestic and wild grazing ungulates, increased fuel loading and associated fire risk, and reduced recreation quality (MNWSAC 2008).

Table 3.4.6-1 lists the weed species relevant to the analysis area and whether they have been documented within 400 feet of the proposed alternatives. The distance of 400 feet was selected so that weed populations adjacent to the ROW would be included in the analysis, because these populations have the greatest potential for being spread.

The existing transmission line was first built in the early 1950s and then rebuilt in the early 1970s. During construction, it is unlikely that there were as many weed species and infestations as there are currently. In addition, recreational use of the Gallatin River and traffic along the highway was lower than the present day and has also likely contributed to weed invasion and spread. New construction activities associated with the proposed rebuilding of the transmission line have the potential to establish and spread weeds to a much greater extent than previously.

Many of the weed populations in the existing ROW are located near other disturbances that create conditions for weed establishment and spread. Most of the larger weed infestations are associated with the highway and pullouts; access roads; campsites and recreation residences; and fishermen trails along the Gallatin River (see Figure 3.4.6-1). The areas that appeared to have weed infestations directly associated with the existing transmission line are where there are roads that were built for the transmission line.

The most effective way to manage weeds is through integrated weed management, which includes:

Minimizing the ability of vectors to transport weed seeds, roots, and other reproductive plant materials. This is accomplished by pre-treating existing weed patches to reduce current seed source and roots prior to the disturbance, and using weed-free materials (e.g., seeds, gravel, fill, and mulch).

Avoiding disturbance where weeds are present. Disturbance includes anything that would involve the movement or churning of soil and/or plant materials. Disturbance examples include logging, timber clearing and thinning, domestic livestock, digging, and road construction.

Re-vegetate disturbed soil with desirable vegetation as soon as possible.

Specific prevention, inventory and monitoring, and treatment measures required on the Gallatin National Forest (GNF) are described fully in the Gallatin National Forest Noxious and Invasive Weed Treatment Project Final Environmental Impact Statement (FEIS) EIS/Record of Decision (ROD) (USFS 2005). Health and safety effects of herbicide use also tiers to the Gallatin National Forest Noxious and Invasive Weed Treatment Project Final EIS/ROD (Forest Service 2005).

TABLE 3.4.6-1 2011 WEED SPECIES AND THEIR STATUS AND PRESENCE IN THE PROPOSED PROJECT AREA (THE SPECIES LIST WILL BE REVISED OVER TIME AS NEW SPECIES ARE IDENTIFIED)

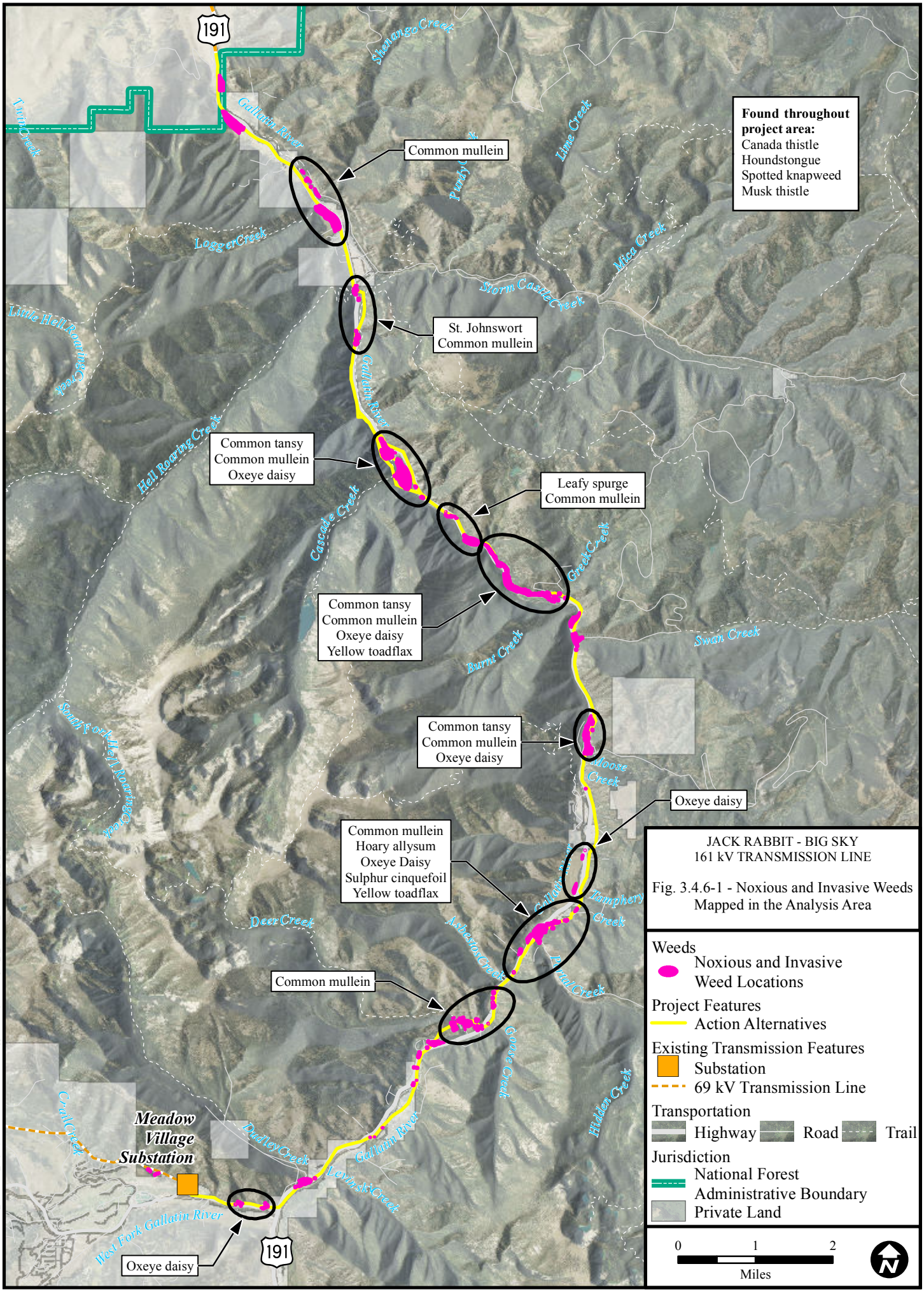
Species Name[1,2]	Species Background[1]			Legal Status		Present in County[4]	Mapped in Proposed Action Area[6]
	Life Span	Growth Habit	Reproductive mechanisms	State/ County[2, 5]	On GNF Invasive Plants List[3]		
Russian knapweed *Acroptilon repens*	perennial	forb	rhizomes, seeds	2B	X	X	
scentless chamomile *Anthemis arvensis*	annual	forb	seeds	4	X		
golden chamomile *Anthemis tinctoria*	perennial	forb	seeds		X	X	
burdock *Arctium spp.*	biennial	forb	seeds		X	X	
hoary alyssum *Berteroa incana*	annual, biennial	forb	seeds	2A	X	X	X
cheatgrass *Bromus tectorum*	annual	grass	seeds	3	X	X	X
flowering rush *Butomus umbellatus*	perennial	forb	rhizomes, seeds	1B	X		
whitetop *Cardaria draba*	perennial	forb	rhizomes, seeds	2B	X	X	
musk thistle *Carduus nutans*	biennial, perennial	forb	seeds	4	X	X	X
diffuse knapweed *Centaurea diffusa*	annual, perennial	forb	seeds	2B	X	X	
meadow knapweed *Centaurea nigrescens*	perennial	forb	seeds	4	X	X	
yellow starthistle *Centaurea solstitialis*	annual	forb	seeds	1A	X	X	
spotted knapweed *Centaurea stoebe* ssp. *micranthos*	biennial, perennial	forb	seeds	2B	X	X	X
rush skeletonweed *Chondrilla juncea*	perennial	forb	rhizomes, seeds	1B	X		

Species Name[1,2]	Species Background[1]			Legal Status		Present in County[4]	Mapped in Proposed Action Area[6]
	Life Span	Growth Habit	Reproductive mechanisms	State/ County[2, 5]	On GNF Invasive Plants List[3]		
Canada thistle *Cirsium arvense*	perennial	forb	rhizomes, seeds	2B	X	X	X
bull thistle *Cirsium vulgare*	biennial	forb	seeds		X		
poison hemlock *Conium maculatum*	biennial	forb	seeds	4	X	X	
field bindweed *Convolvulus arvensis*	perennial	forb, vine	rhizomes, seeds	2B	X	X	
houndstongue *Cynoglossum officinale*	biennial	forb	seeds	2B	X	X	X
Scotch broom *Cytisus scoparius*	perennial	shrub	seeds	1B	X		
blueweed *Echium vulgare*	annual, biennial	forb	seeds	2A	X		
Russian olive *Elaeagnus angustifolia*	perennial	tree	rhizomes, seeds	3	X	X	
leafy spurge *Euphorbia esula*	perennial	forb	rhizomes, seeds	2B	X	X	X
orange hawkweed *Hieracium aurantiacum*	perennial	forb	rhizomes, seeds, stolons	2A	X	X	
meadow hawkweed *Hieracium caespitosum*	perennial	forb	rhizomes, seeds, stolons	2A	X		
meadow hawkweed *Hieracium floribundum*	perennial	forb	rhizomes, seeds, stolons	2A	X		
meadow hawkweed *Hieracium piloselloides*	perennial	forb	seeds	2A	X		
Hydrilla *Hydrilla verticillata*	perennial	forb	rhizomes, seeds	3	X		
black henbane *Hyoscyamus niger*	annual, biennial	forb	seeds		X	X	

Species Name[1,2]	Species Background[1]			Legal Status		Present in County[4]	Mapped in Proposed Action Area[6]
	Life Span	Growth Habit	Reproductive mechanisms	State/ County[2, 5]	On GNF Invasive Plants List[3]		
St. Johnswort *Hypericum perforatum*	biennial, perennial	forb	rhizomes, seeds	2B	X	X	X
yellowflag iris *Iris pseudacorus*	perennial	forb	rhizomes, seeds, stolons	2A	X		
Dyer's woad *Isatis tinctoria*	biennial, perennial	forb	seeds	1B	X	X	
field scabiosa *Knautia arvensis*	annual, perennial	forb	seeds	4	X	X	
perennial pepperweed *Lepidium latifolium*	perennial	forb	rhizomes, seeds	2A	X	X	
oxeye daisy *Leucanthemum vulgare*	perennial	forb	rhizomes, seeds	2B	X	X	X
Dalmatian toadflax *Linaria dalmatica*	perennial	forb	rhizomes, seeds	2B	X	X	
yellow toadflax *Linaria vulgaris*	perennial	forb	rhizomes, seeds	2B	X	X	X
purple loosestrife *Lythrum salicaria*	perennial	forb, subshrub	rhizomes, seeds	1B	X		
purple loosestrife *Lythrum virgatum*	perennial	forb, subshrub	rhizomes, seeds	1B	X		
Eurasian watermilfoil *Myriophyllum spicatum*	perennial	forb	stem fragments	1B	X		
Scotch thistle *Onopordum acanthium*	perennial	forb	rhizomes, seeds	4	X		
Japanese knotweed *Polygonum cuspidatum*	perennial	forb, subshrub	rhizomes, seeds	1B	X		
Himalayan knotweed *Polygonum polystachyum*	perennial	forb	rhizomes, seeds	1B	X		
giant knotweed *Polygonum sachalinense*	perennial	forb	rhizomes, seeds	1B	X	X	

Species Name[1,2]	Species Background[1]			Legal Status		Present in County[4]	Mapped in Proposed Action Area[6]
	Life Span	Growth Habit	Reproductive mechanisms	State/ County[2, 5]	On GNF Invasive Plants List[3]		
sulfur cinquefoil *Potentilla recta*	perennial	forb	seeds	2B	X	X	X
curlyleaf pondweed *Potamogeton crispus*	perennial	forb	rhizomes, seeds	3	X	X	
tall buttercup *Ranunculus acris*	perennial	forb	seeds	2A	X	X	
tansy ragwort *Senecio jacobaea*	perennial	forb	seeds	2A	X		
saltcedar *Tamarix* ssp.	perennial	shrub, tree	rhizomes, seeds	2B	X		
common tansy *Tanacetum vulgare*	perennial	forb	rhizomes, seeds	2B	X	X	X
common mullein *Verbascum thapsus*	biennial	forb	seeds		X	X	X

Sources: Whitson 2000 and USFS 2010[1]; MDA 2010 and Gallatin County 2011[2]; S. Lamont (pers. comm. 2011)[3]; and Rice 2011[4]. [5]Montana and Gallatin County legal noxious status is classified based on the prioritization required for each weed species. These include Priority 1A (not present in Montana, requires eradication if detected); Priority 1B (limited presence in Montana, requires eradication or containment); Priority 2A (common in isolated areas of Montana, requires eradication or containment where less abundant); Priority 2B (abundant in Montana and widespread in many counties, requires eradication or containment where less abundant); Priority 3 (not Montana listed noxious weed but have potential to have significant negative impacts, plants prohibited from being intentionally spread or sold other than as a contaminant in agricultural products); and Priority 4 (Gallatin County listed noxious weeds). Priorities 2A, 2B, 3, and 4 are prioritized by local weed districts. [6]Mapped in Proposed Project Area includes all weed species that are documented within 400 feet of proposed and existing ROW, so that weeds adjacent to these areas are included in the analysis.


Found throughout project area:
Canada thistle
Houndstongue
Spotted knapweed
Musk thistle
Common mullein
St. Johnswort
Common mullein
Common tansy
Common mullein
Oxeye daisy
Leafy spurge
Common mullein
Common tansy
Common mullein
Oxeye daisy
Yellow toadflax
Common tansy
Common mullein
Oxeye daisy
Oxeye daisy
Common mullein
Hoary allysum
Oxeye Daisy
Sulphur cinquefoil
Yellow toadflax
Common mullein
Oxeye daisy
Meadow Village Substation
191
191
Gallatin River
West Fork Gallatin River
Twin Creek
Logger Creek
Little Hell Roaring Creek
Hell Roaring Creek
South Fork Hell Roaring Creek
Cascade Creek
Burns Creek
Deer Creek
Asbestos Creek
Trail Creek
Dudley Creek
Levinsky Creek
Goose Creek
Hidden Creek
Humphery Creek
Moose Creek
Swan Creek
Mica Creek
Storm Castle Creek
Lime Creek
Purdy Creek
Shelango Creek
Crail Creek
JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE
Fig. 3.4.6-1 - Noxious and Invasive Weeds Mapped in the Analysis Area
Weeds
Noxious and Invasive Weed Locations
Project Features
Action Alternatives
Existing Transmission Features
Substation
69 kV Transmission Line
Transportation
Highway
Road
Trail
Jurisdiction
National Forest
Administrative Boundary
Private Land
0
1
2
Miles
6/26/2012 W:\113792_Jackrabbit_BigSky\PER\Environmental\GIS\Apps\EIS\Figures\Chapter_3_Summer_2012\Fig_3_4_6_1_Weed.mxd

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Applicable Laws, Regulations, Forest Plan Direction

Forest Service Manual 2080

Lists required and recommended Best Management Practices (BMPs) for all United States Forest Service (Forest Service or USFS) resource areas (USFS 2001).

Forest Service Manual 2259.03

"Forest office shall cooperate fully with State, County and Federal officials in implementing 36 CFR 222.8 and sections 1 and 2 of PL 90-583. Within budgetary constraints, the Forest Service shall control to the extent practical, noxious farm weeds on all National Forest System lands."

Executive Order 13112

Invasive Species, February 3, 1999. This order directs federal agencies whose actions may affect the status of invasive species to (l) prevent the introduction of invasive species, and (2) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner, as appropriations allow. As stated in 36 Code of Federal Regulation (CFR) Sub A, Sec 222.8 "… The chief, of the Forest Service, will cooperate with County or other local weed control Districts in analyzing noxious farm weed problems and developing control programs in areas which the National Forest and National Grasslands are a part."

Federal Noxious Weed Act of 1974 (sec 9)

The Federal Noxious Weed Act of 1974 (sec 9) authorizes the Secretary to cooperate with other Federal and State agencies or political subdivisions thereof, and individuals in carrying out measures to eradicate, suppress, control or prevent the spread of noxious weeds. The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.

Gallatin National Forest Management Plan (1987)

Management direction for the GNF is found in the Gallatin National Forest Management Plan of 1987 (Forest Plan). The following summary highlights the management direction relevant to this proposal.

Integrated pest management, which uses chemical, biological, and mechanical methods, will be the principal control method. Spot herbicide treatment of identified weeds will be emphasized. Funding for weed control on disturbed sites will be provided by the resource that causes the disturbance (II-28).

Gallatin National Forest Noxious and Invasive Weed Treatment Project Final EIS and ROD

This 2005 Plan expands the current weed program to treat 13,260 acres of weeds with herbicides (both aerial spray and ground treatments), mechanical, cultural and biological control methods (USFS 2005).

The State of Montana County Noxious Weed Management Act (MSC 7-22, 80-5, and 80-7; annotated 2009)

This act provides for designation of noxious weeds within the State and directs control efforts. Provisions are made for registration of pesticides, licensing of distributors and applicators, and enforcement of State statutes. An enforcement responsibility for the control of noxious weeds within Montana is delegated to County Commissioners through Weed Management District Boards. In Montana, the Montana County Noxious Weed Management Act (MCNWA) states that it is unlawful for any person to allow noxious weeds to propagate or go to seed on their land

unless they have an approved weed management plan. This act directs counties to develop weed control plans and implement weed control efforts.

Montana Weed Management Plan (2005)

Strengthen, support, and coordinate private, county, state, and federal weed management efforts in the state, and promote implementation of ecologically-based integrated weed management programs.

Gallatin County Weed District Noxious Weed Management Plan

Establishes noxious weed management criteria, implements and enforces the MCNWA, conducts weed education programs, develops cooperative agreements, manages noxious weeds on county-owned land and ROWs, and coordinates and monitors noxious weed management activities (Gallatin County 2008).

Methodology for Analysis

1. Inventory weed species

Weeds were surveyed on all accessible NFS lands within the proposed ROW corridor, including a 400-foot buffer from the ROW (June 21-25, 2010). Some weeds were still in the vegetative to pre-bud stage, and were difficult to accurately identify and map. To address this, potential weed locations that were identified during the initial survey were re-visited and confirmed in forested habitats August 9-12, 2010, and in wetland and riparian habitats August 23-25, 2010. Surveys were conducted on foot, except where access was restricted (i.e., private entry, steep terrain, etc.), in which case binoculars were utilized to the extent feasible. Areas along the centerline were surveyed more intensively to focus survey efforts. A survey-grade global positioning system (GPS) was used to document the survey route and the location of weeds that were observed. GPS data collected included species, date, surveyor, and patch width and length. This data is consistent with the data requirements listed on the Weed Inventory Form – Gallatin National Forest 2010 Backcountry, which was provided by the Forest Service. In addition, previously existing weed data for the GNF was evaluated and combined with the 2010 weeds data. Weed species documented within 400 feet of the ROW corridor are indicated in Table 3.4.6-1.

2. Identify amount of disturbance (both permanent and temporary) for each alternative

Project-related activities and usage areas that would result in disturbance (permanent or temporary) are designated whether or not the disturbance would be maintained for the life of the SUP. Permanent disturbances specific to weeds include upgrading and widening of existing roads, structure ground pads, the existing ROW, and ROW widening. The existing and widened ROW is included because the ROW would be maintained for the life of the SUP, which would create a long-term increase in solar exposure, thus creating improved conditions for weed infestations. Temporary disturbances would only occur during construction of the transmission line and include pulling and tensioning sites, conductor splicing sites, fly yards, decking areas, overland travel, and temporary construction roads (see Table 3.4.5-7 in the Soils section). Weeds present where project-related disturbances would occur are at high risk for expanding in land area and/or spreading to other disturbed sites that have a high potential for weed establishment.

3. Identify the environmental conditions most conducive to weed establishment

Project-related disturbances that result in less forest cover (i.e., tree clearing) would create conditions more favorable for weed establishment and spread. Most weed species thrive in these openings where there is increased solar radiation and usually drier soil condition, along with improved conditions for weed growth from the disturbance that created the opening. All project-related disturbances would be at high risk for the establishment and spread of weeds, especially where there are multiple transport vectors and weeds are already present. Widening of the ROW corridor has the highest potential for weed establishment and spread because they would be maintained as non-forested lands during the active life of the SUP for the transmission line.

4. Develop PDFs and evaluate effectiveness of techniques based on literature review, monitoring results, and/or previous experience.

PDFs were developed for addressing weeds, reclamation, and revegetation. These PDFs are compliant with Forest Service regulations and federal and local laws and are referenced below, described in Chapter 2, and in the Weed Management, Reclamation, and Revegetation Plan (Appendix C).

Effects Analysis

Alternative 1 – No Action

Direct and Indirect Effects of Alternative 1

Under Alternative 1, the existing 69 kV transmission line would continue to function in its current state. During approximately 35 years of operation, the current 40-foot wide ROW supporting the 69 kV line has been maintained for safety and system reliability, so these activities would continue. ROW vegetation maintenance and operations and maintenance would continue under their current regime. This includes maintaining the existing 40-foot ROW width, hazard tree removal, and transmission structure replacement, as required, to minimize failure. Line inspection patrols and other periodic maintenance activities would continue.

Including the ROW, highway, and access roads used for operation and maintenance, there are approximately 30 of 72 acres (41.4%) in the existing ROW that are currently infested by eight weed species (Table 3.4.6-2). The existing route roughly parallels US Hwy 191 and the Gallatin River, crossing the highway eleven times and the river eight times. Weeds are most easily transported and spread at these intersections of the ROW, Gallatin River, US Hwy 191, and adjacent National Forest System (NFS) land.

Vegetation maintenance, and operations and maintenance activities would continue to be potential vectors for weed spread. Under the current SUP, NorthWestern Energy (NorthWestern) does not actively prevent or control weeds in the existing ROW. This is not consistent with the Forest Plan, which requires the resource that causes the disturbance to treat the weeds (page II-28, in Forest Service 1987) and Forest Service Manual 2080 (9.c), which requires all re-issued permits to include provisions that require weed treatments by the permit holder. Thus, Alternative 1 would require NorthWestern to treat weeds within the ROW and access roads in the future.

Cumulative Effects of Alternative 1 (No Action)

Projects analyzed for cumulative effects to weeds included recreational activities, weed spraying (by the Forest Service, Montana Department of Transportation [MDT], and Gallatin County), US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF

recreation home project requests, Jack Creek timber sale, and a fishing platform at the Moose Creek Flat Campground.

Under Alternative 1, recreational activities would continue to have a substantial, adverse cumulative effect to weeds because recreational users serve as weed vectors when using the Gallatin Canyon in and around the existing ROW. The Gallatin Canyon is used by many people for river rafting, hiking, camping, sightseeing, as well as increasing the traffic along US Hwy 191 and side roads for accessing recreational opportunities. Weed seeds and roots are transported by vehicles, humans, livestock, pets, and boats from other places that have been visited (both within and outside of Gallatin Canyon) and heavy recreational use that causes soil disturbance also creates sites where weeds are more likely to proliferate. Weeds infestations are common along US Hwy 191 and side roads within the Gallatin Canyon, particularly where there are high use recreational sites such as trailheads, fisherman trails, campsites, and recreation residence areas.

TABLE 3.4.6-2 LAND AREA OF WEEDS ON NFS LANDS IN THE PROPOSED PROJECT AREA, BASED ON GROUND-TRUTHED DATA COLLECTED IN 2010 AND FOREST SERVICE RECORDS (IN ACRES)[1]

Weed Species	Total Existing and New Permanent Disturbance[2]				New Permanent Disturbance[3]			Temporary Disturbance[4]	Total Disturbance for Proposed Action[5]	
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 2	Alt. 3	Alt. 4	Common to Alts. 2, 3, and 4	Acres	Percent (%)
Musk thistle *Carduus nutans*	1.0	1.4	1.4	1.4	0.3	0.3	0.4	0.2	1.6	1.3%
Spotted knapweed *Centaurea stoebe* ssp. *micranthos*	9.9	12.4	12.6	12.4	2.6	2.7	2.6	4.8	17.3	15.0%
Canada thistle *Cirsium arvense*	5.2	6.6	6.6	6.6	1.4	1.4	1.4	4.4	11.0	9.5%
Houndstongue *Cynoglossum officinale*	5.1	6.3	6.3	6.3	1.3	1.3	1.3	4.2	10.5	9.1%
Oxeye daisy *Leucanthemum vulgare*	6.3	7.8	7.8	7.9	1.4	1.4	1.6	0.9	8.6	7.5%
Yellow toadflax *Linaria vulgaris*	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1%
Common tansy *Tanacetum vulgare*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2%
Common mullein *Verbascum thapsus*	2.9	3.8	3.8	3.8	0.9	0.9	0.9	0.3	4.1	3.6%
Total Weeds	17.8	22.4	22.5	22.6	4.6	4.7	4.8	13.0	35.4	30.6%
Total Forest Service Land Area	72.9	91.9	100.1	100.0	19.0	27.1	27.1	23.5	115.4	100.0%

[1]Weed infestations were mapped using a buffer, so that the land area of weeds is a greater estimate than what actually occurs on the ground. [2]Total existing disturbance for Alternative 1 includes the existing ROW and access roads to be widened. Total existing and new permanent disturbance for Alternatives 2, 3, and 4 includes existing disturbance for Alternative 1 plus new permanent disturbance. ROW is included as permanent disturbance for this section because of how it would affect weeds. [3]New permanent disturbance includes land that would be used for widening the ROW and access roads, ROW that would be added for Alternative 3 and 4 LROs, and existing ROW that would be retained for distribution to residences. [4]Temporary disturbance includes land that would be used during construction for overland access, fly yards, and decking areas, and then rehabilitated after construction is completed. Site-specific data on pulling and tensioning sites are not available and not included in these calculations. Pulling and tensioning sites would be 52.1 to 53.6 acres depending on alternative, but a large proportion of this land area would overlap with the ROW. [5]Total disturbance for proposed action is the total permanent and temporary disturbance for the Proposed Action (Alternative 2).

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Under Alternative 1, weed spraying (by the Forest Service, MDT, and Gallatin County) would continue to have a substantial, beneficial cumulative effect on managing weeds in the Gallatin Canyon. Most of the weed infestations in the existing ROW are adjacent to US Hwy 191, side roads and high use recreational sites. Weed spraying controls and/or eradicates weeds at locations that are targeted by Forest Service, MDT, and Gallatin County, and thus reduces weed seed and roots that could be spread to the ROW. In addition, where jurisdictional and priority overlaps for these agencies and NorthWestern, weed infestations are more likely to be detected and effectively treated.

Under Alternative 1, the US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable would have a substantial, adverse cumulative impact on the potential spread and establishment of weeds in the existing ROW because of the associated soil disturbance and larger and/or linear scale of the projects. The GNF recreation home project requests and a fishing platform at the Moose Creek Flat Campground would have a negligible to small, adverse cumulative impact on the potential spread and establishment of weeds in the existing ROW. There would still be associated soil disturbance in areas that already have weed infestations, which would increase the probability of weed spread, but these projects are of a much reduced scale.

Alternative 2 – Proposed Action

Direct and Indirect Effects of Alternative 2

Alternative 2 (Proposed Action) would include upgrading the existing 69 kilovolt (kV) Jack Rabbit to Meadow Village transmission line (originally constructed in the early 1970s) using portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to soils and vegetation would be associated with ROW clearing and would occur within or directly adjacent to the existing ROW.

New permanent disturbance for the Proposed Action would include additional land that would be used for widening the ROW by approximately 10 feet maintenance of existing access roads, and structure locations. Much of the land that would be used for new permanent disturbance for the Proposed Action is already infested with weeds to a similar degree as the existing ROW (Table 3.4.6-2). New permanent disturbance for the Proposed Action would consist of approximately 19.0 acres, of which 4.6 acres are currently infested with weeds. Habitat that is not directly adjacent to the existing ROW would not be disturbed for the ROW associated with the Proposed Action.

Temporary disturbance including pulling and tensioning sites, conductor splicing sites, fly yards, decking areas, and overland travel would consist of approximately 76.7 acres. All temporary disturbances, except pulling and tensioning sites would occur on lands that are already infested with weeds. Approximately 13 acres of lands that would be used for temporary disturbance are currently infested with eight weed species (Table 3.4.6-2). Soil disturbance and construction equipment usage at these locations would create conditions for prolific weed spread, and potentially make the weed infestations worse. Overland travel presents a great risk for spreading weed seeds and other reproductive plant materials into natural areas. PDFs would be required to prevent weed infestations from spreading to other locations or expanding in abundance.

Weed infestations are prevalent in and adjacent to the existing transmission line, particularly where US Hwy 191, the Gallatin River, and recreational sites intersect the ROW (Figure 3.4.6-1). Weed infestations are susceptible to expanding and providing a seed source in areas with ground disturbance. Existing access road and ROW corridor widening have the greatest risk for establishing new weed populations and having them spread along these open, linear corridors.

Under the Proposed Action, ROW operations and maintenance efforts also have the potential to spread weeds during vegetation management, hazard tree removal, transmission structure replacement, and whatever else is needed for maintain safety and reliability of the transmission line.

The existing transmission line was first built in the early 1950s and then rebuilt in the early 1970s, and it is unlikely that there were as many weed infestations during construction as there is currently. New construction activities associated with the proposed upgrading of the transmission line have the potential to establish and spread weeds to a much greater extent than previously. As with the existing SUP, NorthWestern would be responsible for the prevention and control of noxious weeds in the existing ROW and access routes, which includes preventative measures and annual weed control as required by the Forest Service.

Weed management that would be required under the Proposed Action is referenced below (see PDFs, BMPs, Mitigation, and Monitoring), and is described in the Weed Management, Reclamation, and Revegetation Plan (Appendix C). PDFs common to several issues and specific to weeds are described in Chapter 2. PDFs would be implemented by NorthWestern and result in equal or reduced weed infestations within the Proposed Action area.

Weed management that would be required is further described in Chapter 2 and in the Weed Management, Reclamation, and Revegetation Plan (Appendix C). PDFs common to several issues and specific to weeds are proposed to reduce or avoid effects from weeds. BMPs and PDFs applicable to weeds (1.1, 1.2, 1.3, 1.5, 1.7, 1.9, 5.1, and 7.4) are described in Chapter 2. The Weed Management, Reclamation, and Revegetation Plan (Appendix C) describes weed management, reclamation, revegetation, and monitoring and reporting methods that would be under the action alternatives. PDFs would be implemented by NorthWestern and result in equal or reduced weed infestations within the Proposed Action area.

Alternative 3 – Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Alternative 3 would utilize much of the same alignment as Alternative 2 with the exception of the two Local Routing Options (LROs) described below:

Cave Creek LRO

This LRO would require additional tree clearing due to the alignment moving upslope, approximately 200 feet in places, from the existing 69 kV transmission line. Portions of this LRO would occupy the original 1950s 50 kV transmission line corridor that was abandoned in the early 1970s when the current 69 kV transmission line was upgraded. The existing distribution line to the local residences in the Cave Creek recreation residence tract would remain in place. The existing 69 kV transmission line structures outside of those required for distribution within the recreation residence tract would be removed. This LRO would require 1.9 acres of tree clearing in an area where weeds have not been documented and are not known to occur.

Cascade East LRO

The Cascade East LRO would eliminate two highway and two river crossings. This LRO would require marginal tree clearing due to the alignment moving to the east of US Hwy 191 along less forested slopes. The existing distribution line to the residences in the Cascade recreation residence tract would remain in place to service the local area. The existing 69 kV transmission line structures outside of those required for local distribution service to the recreation residence tracts would be removed. This LRO would require the 6.2 acres of tree clearing on mostly open, forested talus that is currently infested by spotted knapweed.

Alternative 3 would require new permanent disturbance of 27.1 acres. This is 8.1 acres more than Alternative 2. Temporary disturbance would be approximately 75.2 acres similar to Alternative 2. Weed management that would be required under Alternative 3 is the same as Alternative 2.

Alternative 4 – Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

Alternative 4 would utilize the same alignment as Alternative 3 with the exception of using the Cascade West LRO instead of the Cascade East LRO, as described below. It generally moves this section of the transmission line further to the west of recreational residences.

Cascade West LRO

This LRO would eliminate two highway and two river crossings. This LRO would require tree clearing due to the alignment moving upslope, approximately 500 feet in places, in heavier forested lands. The existing distribution line to the residences in the Cascade recreation residence tract would remain in place to service the local area. The existing 69 kV transmission line structures outside of those required for distribution service to the recreation residence tract would be removed. This LRO would require 6.1 acres of tree clearing in an areas that already support small infestations of five weed species, including musk thistle, Canada thistle, hounds tongue, oxeye daisy, and common tansy. These forested habitats are moist relative to the general area, and are bisected many interspersing unnamed creeks which eventually flow into Cascade Creek.

Alternative 4 would require 27.1 acres of new permanent disturbance, which is 8.1 acres more than Alternative 2 and the same as Alternative 3. There would be tree clearing in densely forested habitats more susceptible to weed invasion from canopy opening compared to the relatively open Douglas-fir removed for Alternative 3. The numerous, small, existing weed infestations combined with soil disturbance, seed transport pathways, and opening of the forest canopy would make this LRO highly susceptible to weed spread. Temporary disturbance would be approximately 75.8 acres, similar to Alternatives 2 and 3. Weed management that would be required under Alternative 4 is the same as Alternatives 2 and 3.

Cumulative Effects of Alternatives 2, 3, and 4

Alternatives 2, 3, and 4 would result in greater cumulative effects than Alternative 1. The action alternatives would create new permanent and temporary disturbance, resulting in the disturbance of soils, habitat, and existing weed infestations. Under Alternatives 2, 3, and 4, weeds would be more likely to become established in new locations and spread from existing infestations. Weeds would be more likely to be spread where the action alternatives and other soil disturbing activities and projects, including recreational activities, US Hwy 191 Gallatin Canyon Safety Improvements, and Montana Opticom fiber optic cable would be in close proximity or overlap. The GNF recreation home project requests and a fishing platform at the Moose Creek Flat Campground would still have a negligible to small, adverse cumulative impact on the potential spread and establishment of weeds in the existing ROW. There would be associated soil disturbance in areas that already have weed infestations, which would increase the probability of weed spread. The Jack Creek timber sale is not in close proximity to the action alternatives and would not contribute to the cumulative effects of the action alternatives.

Under Alternatives 2, 3, and 4, weed spraying (by the Forest Service, MDT, and Gallatin County) would continue to have a substantial, beneficial cumulative effect on managing weeds in the Gallatin Canyon, but the greater disturbance and higher likelihood of weed establishment and spread would require substantially increased implementation of NorthWestern's weed management program.

Comparison of Alternatives

Alternatives 2 (Proposed Action), 3, and 4 would require new permanent disturbance, while Alternative 1 (No Action) would not require any additional new disturbance. Alternatives 3 and 4 would require new permanent disturbances of approximately 27.1 acres, 8.1 acres more than Alternative 2 (19.0 acres). Temporary disturbance would be approximately 76.7 acres for Alternatives 2, 75.2 for Alternative 3, and 75.8 acres for Alternative 4.

Approximately 30.6 percent of the current ROW is infested by noxious weed species. Currently, noxious weeds are periodically prevented or controlled by NorthWestern; however, a re-issued permit would include provisions that require weed treatments. Therefore, weed treatments within the ROW and access roads would occur for Alternative 1 in the future. Alternatives 2, 3, and 4 have similar acreages currently infested by noxious: 35.4 acres, 35.5 acres and 35.6 acres respectively. Additional tree clearing would occur with Alternatives 3 (7.6 acres more than Alternative 2) and 4 (7.7 acres more than Alternative 2) which would increase susceptibility to weed invasion. Noxious weed management would be required for all alternatives.

Summary Conclusions

The No Action alternative (Alternative 1) would negligibly affect weeds in the Proposed Project Area, and these effects would be from ROW operations and maintenance activities except that NorthWestern would now be required to treat weeds along the corridor. The Proposed Action (Alternative 2) would require 19.0 acres of new permanent disturbance, while Alternatives 3 and 4 would each require 27.1 acres of new permanent disturbance. These 8.1 additional acres required for Alternatives 3 and 4 would be in areas that are not already directly adjacent to the ROW, so would be more susceptible to weed establishment and spread from project-related soil disturbance, vegetation removal, and increase in vectors. Alternatives 3 and 4 would require a similar amount of tree clearing, although it would be in open Douglas-fir habitats for Alternative 3 and in moist, dense lodgepole pine forest for Alternative 4. The new permanent disturbance for the three action alternatives would increase the susceptibility of the Proposed Project Area to weed invasion and spread by opening up the canopy, increasing soil disturbance, and creating weed seed transport vectors. All three action alternatives would have 75.2 to 76.7 acres of temporary disturbance. Of the three action alternatives, Alternative 2 (Proposed Action) would disturb the least amount of habitat and require the least amount of tree clearing, thus presenting the lowest overall risk to weed establishment and spread. For the three action alternatives, PDFs would effectively manage the increased risk of weed establishment and spread through the implementation of a Weed Management, Reclamation, and Revegetation Plan (Appendix C).

Project Design Features, Best Management Practices, Mitigation, and Monitoring

NorthWestern would treat all existing weeds impacted by the Proposed Project at the appropriate time to maximize effectiveness of treatment, prior to any ground disturbance. The expectation is that the treatments would be highly effective at killing the existing weeds so that the weeds are dead and not spread along the transmission line corridor. Achieving an effective application requires two treatments within one year; including re-treating the missed plants about three weeks after the first application. Monitoring would be conducted by NorthWestern (with personnel qualified in plant identification and weed management) prior to any ground disturbance, to document that effective weed mortality has been achieved. The documentation (for both herbicide treatment records and effectiveness monitoring) would be provided to the Forest Service prior to ground disturbance.

After construction, NorthWestern would continue to treat weeds annually for the life of the SUP in the ROW and access routes. For areas with temporary disturbance caused by the installation of the rebuilt transmission line, NorthWestern would treat weeds annually until the areas are weed-free for five consecutive years and the area has been successfully revegetated. Revegetation thresholds are listed in the Weed Management, Reclamation, and Revegetation Plan in Appendix C.

Weed management that would be required is further described in Chapter 2 and in the Weed Management, Reclamation, and Revegetation Plan (Appendix C). PDFs common to several issues and specific to weeds are proposed to reduce or avoid effects from weeds. Best management practices and project design features applicable to weeds (0.6, 1.1, 1.2, 1.3, 1.9, 4.6, 5.1, and 7.4) are described in Chapter 2. The Weed Management, Reclamation, and Revegetation Plan (Appendix C) describes weed management, reclamation, revegetation, and monitoring and reporting methods that would be under the action alternatives. PDFs would be implemented by NorthWestern and result in equal or reduced weed infestations within the Proposed Action area.

Specific prevention, inventory and monitoring, and treatment measures required on the GNF are described fully in the Gallatin National Forest Noxious and Invasive Weed Treatment Project Final EIS/ROD (USFS 2005). Health and safety effects of herbicide use tiers to the Gallatin National Forest Noxious and Invasive Weed Treatment Project Final EIS/ROD (USFS 2005).

Consistency with Laws, Regulations, and Forest Plan

All alternatives would be consistent with federal, state, and county noxious weed laws and direction because NorthWestern would be required to fund and implement a Weed Management, Reclamation, and Revegetation Plan. This would also be consistent with the Forest Plan direction that “funding for weed control on disturbed sites will be provided by the resource that causes the disturbance” (II-28). The Weed Management, Reclamation, and Revegetation Plan would address implementation of BMPs and other weed management standards, as stipulated in Forest Service Manual 2080, Gallatin National Forest Noxious Weed Treatment Final EIS and ROD (USFS (2005), USFS Manual 2259.03, and State of Montana County Noxious Weed Management Act (MSC 7-22, 80-5; annotated 2009).

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3.4.7 Forested Vegetation and Fire/Fuels

Description of Issue

Effects of the Proposed Project on forested vegetation and fire/fuels were identified as an analysis issue during interdisciplinary team scoping discussions, initial public scoping, and the Notice of Intent (NOI) comment period. Tree removal associated with right-of-way (ROW) clearing for the Proposed Project has the potential to: reduce the amount of forested old growth , increase the amount of insect activity to unacceptable levels, increase tree injury, increase down woody debris, and increase fire risk fuel loading.

Indicators

The potential effects to forested vegetation and fire/fuels for each alternative were derived by comparing the land area (acres) of each vegetation type with the estimated land area of disturbance for each alternative. Table 3.4.7-1 defines the terms used to describe magnitude and duration of effects on forested vegetation and fire/fuels.

TABLE 3.4.7-1 DESCRIPTION OF IMPACT LEVELS

THRESHOLDS	DESCRIPTION RELATIVE TO FORESTED VEGETATION AND FIRE/FUELS
Negligible	No forested vegetation would be affected and there would be no change in the potential for increased fire/fuels. If changes were detectable, the effects would be very slight, local, short-term (<20 years). No Project Design Features (PDFs) would be necessary.
Minor	Changes to forested vegetation and fire/fuels potential would be measurable, although the changes would be small, likely short-term (<20 years), and the impacts would be localized within the Proposed Project. No PDFs would be necessary.
Moderate	Changes to forested vegetation and fire/fuels potential would be measurable and long-term (>20 years), but would be localized within the Proposed Project. PDFs would be necessary, but the measures would likely be successful.
Major	Changes to forested vegetation and fire/fuels potential would be readily measurable, long-term (>20 years), would have substantial consequences, and would be noticed throughout the Proposed Project. PDFs would be necessary and their success would not be guaranteed.

Scale of Analysis

The spatial boundary of forested vegetation and fire/fuels includes all forested stands that would be disturbed as a result of the Proposed Project, plus adjacent lands within the Gallatin and Madison Mountain Ranges, Gallatin County, and Gallatin National Forest (GNF) timber compartments from which data were extrapolated for analysis. The temporal boundary for evaluating effects covers the period of construction and the life of the Special Use Permit (SUP). Following construction, hazard trees and excessive vegetation would continue to be removed when it poses a hazard to the operation and maintenance of the transmission line.

Affected Environment

Habitat

The Forest Service manages vegetation data (or “strata”) for timber compartments using the Timber Stand Management Recording System (TSMRS) (USFS n.d.). The lands in the nine timber compartments surrounding the analysis area are 82 percent forested, 16 percent unforested, and two percent unknown (Figure 3.4.7-1; Table 3.4.7-2). The forested lands within these nine

timber compartments are dominated by lodgepole pine (*Pinus contorta*), Douglas-fir (*Pseudotsuga menziesii*), Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and whitebark pine (*Pinus albicaulis*). The unforested lands are comprised of grasslands, meadows, sagebrush shrublands, willows (*Salix* spp.), marshes and fens, talus, tundra, streams, rivers, bedrock, cliffs, avalanche chutes, and civilized areas.

Habitat in the analysis area is 56.6 percent forested and 43.4 percent unforested, based on ground-truthed data collected for the *Forest Health Technical Report*. The forested lands in the analysis area are dominated by Douglas-fir, lodgepole pine, and Engelmann spruce, with smaller amounts of Rocky Mountain juniper (*Juniperus scopulorum)*, limber pine (*Pinus flexilis*), and quaking aspen (aspen; *Populus tremuloides*). The elevation ranges between 5,234 to 6,162 feet and the aspect is predominantly southwest to northwest-facing slopes. Slope varies from flat (3˚) to very steep talus slopes (60˚); and soils are typically rocky and shallow. Much of the forested habitat tends to be drier and of lower to more moderate elevations than the surrounding area. No subalpine fir or whitebark pine is documented in the analysis area.

Descriptions of dominant vegetation types in the analysis area are provided below, and are based on ground-truthed data collected for the *Forest Health Technical Report* (Figure 3.4.7-2).

Douglas-fir: Douglas-fir is the dominant tree species, comprising up to 28.3 percent of the Proposed Project Area. Douglas-fir stands grow as a monoculture or mixed with other tree species, including Engelmann spruce, lodgepole pine, and Rocky Mountain juniper. Douglas-fir dominated stands generally occur on gentle (10˚) slopes with soil development, to steep talus slopes (60˚). Douglas-fir occurs on all but north- to northwest-facing aspects, on drier, rocky soils than other tree species. Shrub associates in the understory include mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), common snowberry (*Symphoricarpos albus*), common juniper (*Juniperus communis*), mallow ninebark (*Physocarpus malvaceus*), Woods' rose (*Rosa woodsii*), russet buffaloberry (*Shepherdia canadensis*), white spiraea (*Spiraea betulifolia*), huckleberry (*Vaccinium* spp.), grouse whortleberry (*Vaccinium scoparium*), Saskatoon serviceberry (*Amelanchier alnifolia*), and twinberry honeysuckle (*Lonicera involucrata*).

Lodgepole Pine: Lodgepole pine is the second most dominant tree, comprising 9.4 percent of the analysis area. Lodgepole pine stands grow as a monoculture, or mixed with Douglas-fir and Engelmann spruce. Lodgepole pine-dominated stands occur on flats (5˚) with soil development to steep slopes (60˚), on west-, north-, and east-facing aspects. Shrub associates in the understory include mountain big sagebrush, white spiraea, russet buffaloberry, Saskatoon serviceberry, mallow ninebark, common snowberry, common juniper, Woods' rose, grouse whortleberry, thin leaf huckleberry (*Vaccinium membranaceum*), globe huckleberry (*Vaccinium globulare*), twinberry honeysuckle, currant (*Ribes* spp.), Rocky Mountain maple (*Acer glabrum*), thimbleberry (*Rubrus parviflorus*), and creeping barberry (*Mahonia repens*).

TABLE 3.4.7-2 FORESTED HABITATS IN THE NINE TIMBER COMPARTMENTS SURROUNDING THE ANALYSIS AREA IN THE GNF

STRATUM (FORESTED)	TIMBER COMPARTMENTS (ACRES)									TOTAL (ACRES)	TOTAL (%)
	602	603	604	605	606	616	617	619	622		
Aspen	0	0	0	0	23	18	0	67	44	151	0.1
Douglas-fir	11,262	3,337	2,749	783	2,372	2,869	6,087	4,708	1,969	36,137	17.7
Douglas-fir/ Lodgepole pine	17	0	0	0	0	0	0	0	0	17	0.0
Engelmann spruce	0	19	0	0	0	0	0	0	0	19	0.0
Engelmann spruce/ Subalpine Fir	5,716	4,834	1,218	3,182	246	8,968	3,354	221	5,583	33,321	16.3
Juniper	463	0	0	13	0	0	0	0	0	476	0.2
Krumholtz morphology	58	110	0	56	0	349	211	0	840	1,624	0.8
Limber Pine	0	10	0	0	53	0	0	7	0	69	0.0
Lodgepole pine	11,140	5,125	3,590	3,854	2,385	9,221	3,990	6,133	18,311	63,749	31.1
Lodgepole pine/ Douglas-fir	1,394	831	307	525	1,128	121	127	843	1,924	7,201	3.5
Ponderosa pine	7	0	0	0	0	0	0	0	0	7	0.0
Subalpine fir	0	66	0	0	0	0	0	0	0	66	0.0
Unknown	245	116	888	2	1,206	8	0	10	345	2,820	1.4
Whitebark pine	2,060	2,644	1,619	2,048	712	2,266	2,615	506	10,841	25,312	12.4
Total Unforested	2,229	1,807	1,058	2,287	731	7,009	6,150	1,034	11,401	33,707	16.5
Total Forested	32,119	16,976	9,483	10,462	6,919	23,810	16,384	12,485	39,512	16,8150	82.2
Total	34,593	18,899	11,429	12,751	8,856	30,828	22,534	13,528	51,259	20,4677	100.0

Source: Forest Service (n.d.)

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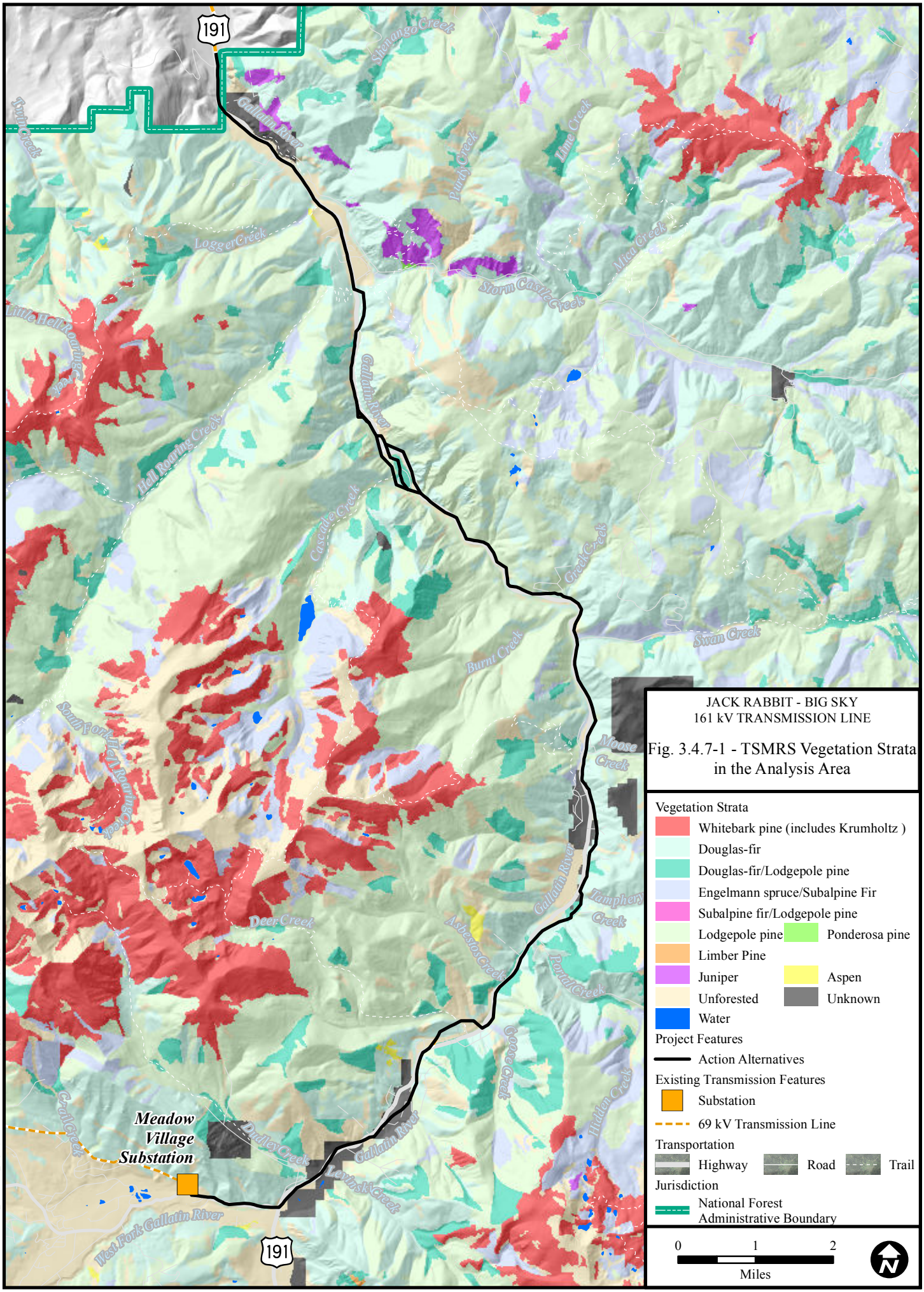

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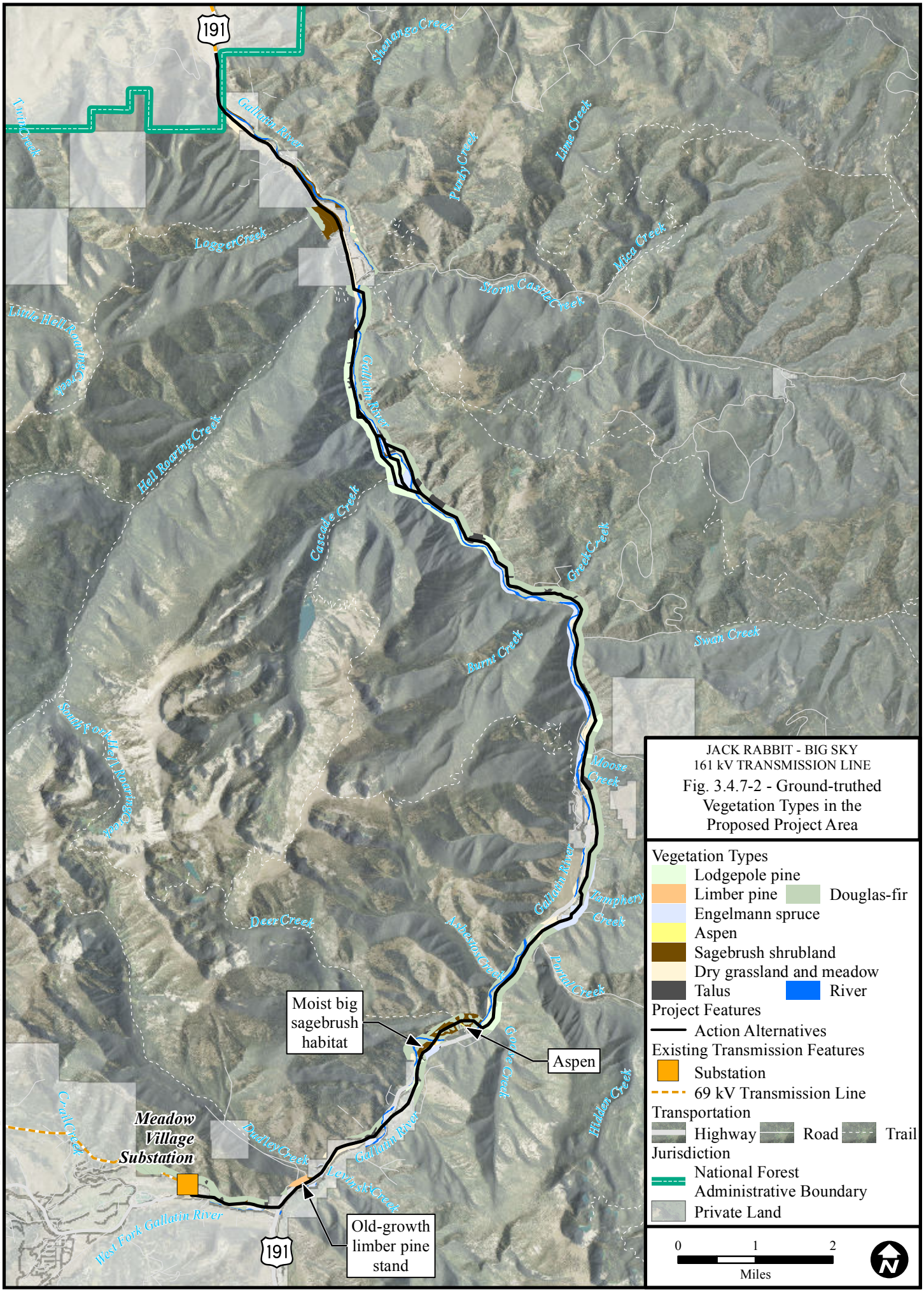
JACK RABBIT - BIG SKY
161 kV TRANSMISSION LINE
Fig. 3.4.7-2 - Ground-truthed Vegetation Types in the Proposed Project Area
Vegetation Types
Lodgepole pine
Limber pine
Douglas-fir
Engelmann spruce
Aspen
Sagebrush shrubland
Dry grassland and meadow
Talus
River
Project Features
Action Alternatives
Existing Transmission Features
Substation
69 kV Transmission Line
Transportation
Highway
Road
Trail
Jurisdiction
National Forest Administrative Boundary
Private Land
0
1
2
Miles
Moist big sagebrush habitat
Aspen
Old-growth limber pine stand
Meadow Village Substation
191
Gallatin River
West Fork Gallatin River
Shelango Creek
Purdy Creek
Lime Creek
Mica Creek
Storm Castle Creek
Logger Creek
Twin Creek
Little Hell Roaring Creek
Hell Roaring Creek
Cascade Creek
Greek Creek
Swan Creek
Burns Creek
South Fork Hell Roaring Creek
Moose Creek
Humphery Creek
Deer Creek
Asbestos Creek
Portal Creek
Goose Creek
Hidden Creek
Dudley Creek
Levinsky Creek
Crail Creek
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Engelmann Spruce:
Engelmann spruce is the third most prevalent tree, comprising 5.3 percent of the analysis area. Engelmann spruce stands grow as a monoculture or mixed with lodgepole pine and Douglas-fir. Engelmann spruce-dominated stands occur on flats (3˚) with soil development to steep slopes (50˚), predominantly on north-facing aspects, but also occurring on southwest- to northeast-facing aspects. Shrub associates in the understory include white spiraea, russet buffaloberry, mallow ninebark, common snowberry, common juniper, Woods' rose, huckleberry, twinberry honeysuckle, currant, Rocky Mountain maple, redosier dogwood (*Cornus sericea*), red elderberry (*Sambucus racemosa*), chokecherry (*Prunus virginiana*), and gray alder (*Alnus incana*).

Limber Pine:
Limber pine is also uncommon, comprising just 0.4 percent of the analysis area. The only limber pine stand grows with Rocky Mountain juniper, and with currant in the sparse shrub understory. The slope is moderately steep (35˚), and the stand occurs on a south-facing slope.

Quaking Aspen:
Quaking aspen is uncommon, comprising 0.01 percent of the analysis area. The only quaking aspen stand grows with Douglas-fir and lodgepole pine, and shrub associates are common snowberry and Woods' rose. The stand occurs near a creek on a gentle slope (20˚) and southwestern aspect.

Other Habitats:
Other habitats present are sagebrush shrubland (37.8%), dry grassland and meadow (12.3%), talus (4.7%), civilized areas (i.e., highway) (1.2%), and open water (0.6%). Wetland habitat including the river edge, seeps, bogs, mesic meadows, and stream banks also occurs infrequently.

Old Growth
Specific criteria for old growth stands in the GNF are based on *Old-Growth Forest Types of the Northern Region* (Green et al. 1992, errata corrected 2008) for the East-Side Montana Zone (M. Novak, personal communication, 2010). Using the criteria documented in Table 3.4.7-3, forested stands in the analysis area were evaluated to determine whether they met the definition for old growth (Forest Health Technical Report in the Project Record). There was only one forest stand that met all criteria required to be classified as old growth. This was an old growth limber pine stand which comprised approximately 0.2 acre (0.4%).

TABLE 3.4.7-3 OLD GROWTH FOREST TYPES FOR THE GNF

Tree	Moisture Conditions	Age	DBH	Stand Density
Douglas-fir	Warm to cool and dry to wet environments	>200 years	>19 inches	>5 trees/acre and basal area >60 feet²/acre
Engelmann spruce	Cold, dry to moist environments	>135 years	>13 inches	>8 trees/acre and basal area >40 feet²/acre
Lodgepole pine	Warm to cool, dry to wet environments	>150 years	>10 inches	>12 trees/acre and basal area >50 feet²/acre
Limber pine	Warm, dry to very dry environments	>120 years	>9 inches	>6 trees/acre and basal area >50 feet²/acre

Source: Green et al. 1992, errata corrected 2008. DBH=diameter at breast height.

The Gallatin National Forest Management Plan of 1987 (Forest Plan) states that the United States Forest Service (Forest Service or USFS) would strive to develop the following successional stages *in timber compartments containing suitable timber*: 10 percent grass-forb, 10 percent seedlings, 10 percent saplings, 10 percent pole, 10 percent mature and 10 percent old growth. The amount of old growth in the Gallatin Mountain Range, occurring on the east side of the Gallatin River, is 26.7 percent with a confidence interval of 17.9 to 36.1 percent (90 percent confidence

interval). The amount of old growth in the Madison Mountain Range, on the west side of the Gallatin River, is 30.0 percent with a confidence interval of 22.9 to 37.4 percent (90 percent confidence interval) (M. Novak, personal communication, 2011a).

The amount of old growth in the Gallatin and Madison mountain ranges far exceeds the minimum of 10 percent required for timber compartments containing suitable timber. Management Area (MA) 25 (where the analysis area occurs) does not contain suitable timber, but the 10 percent old growth minimum would still be complied with, even though it is not a requirement. The old growth limber pine stand would be the only old growth affected in forest stands disturbed as a result of the Proposed Project. This is a small amount of old growth, particularly compared to the proportion of old growth that occurs in the Gallatin and Madison mountain ranges.

Insects and Diseases

Tree insects and diseases are important because infestations and outbreaks can result in large-scale forest die-off, increasing the fuel load and associated fire risk. Most insects and diseases of the GNF are native species that create outbreaks as stands become older. Increased stand density (basal area/acre) and tree diameter are associated with infestations of insects and diseases. Mountain pine beetle (*Dendroctonus ponderosae*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), western spruce budworm (*Choristoneura occidentalis*), dwarf mistletoe (*Arceuthobium americanum*), engraver beetle (*Ips* spp.), and schweinitzii root and butt-rot (*Phaeolus schweinitzii)* are the main insects and diseases known to the GNF (M. Novak, personal communication, 2010). Symptoms of these insects and diseases include tree galls, pitch tubes, cracks, holes, running sap, and dead trees.

The following is a description of the most common insects and disease on the GNF and how they relate to the analysis area. Mountain pine beetle is the most prevalent insect or disease on Forest Service lands in Gallatin County (Table 3.4.7-4). Lodgepole pine stands become susceptible to mountain pine beetle infestations when they achieve a diameter at breast height (DBH) greater than eight inches, mean stand age of greater than 80 years, and/or stand density greater than 80 basal area/acres (Amman 1978; Safranyik and Carroll 2006; Fettig et al. 2007). All of the lodgepole pine stands evaluated surpassed these criteria, which indicates that all lodgepole pine stands in the Proposed Project Area are susceptible to mountain pine beetle infestations. In addition, pitch tubes on lodgepole pine trees, diagnostic of an existing mountain pine beetle infestation, were frequently documented in the Proposed Project Area (see Forest Health Technical Report in the Project Record).

TABLE 3.4.7-4 LAND AREA (IN ACRES) INSECT AND DISEASE MORTALITY AND DEFOLIATION IN GALLATIN COUNTY, BY LAND OWNERSHIP

NATIONAL	GNF	OTHER FEDERAL	PRIVATE	STATE	TOTAL
Forestland	585,048	77,463	199,570	6,281	868,362
Dieback	34	0	216	50	300
Douglas-fir Beetle	1,678	255	174	0	2,107
Mountain Pine Beetle-Lodgepole Pine	51,872	2,497	19,599	4,868	78,836
Mountain Pine Beetle-Ponderosa Pine	0	0	2	0	2
Mountain Pine Beetle-High Elevation	16,684	2557	1,904	11	21,156
Subalpine Fir Mortality	534	0	568	0	1,102
Western Spruce Budworm	11,286	76	8,381	140	19,883

Source: USFS 2010.

Western spruce budworm is the second most prevalent insect or disease on Forest Service lands in Gallatin County (Table 3.4.7-4). This species has co-evolved with Douglas-fir, Engelmann spruce, and other tree species on Forest Service lands of Region 1. Western spruce budworm can

become infested where there is crowded stand density and multiple layers of climax host species (USFS 1987). The Engelmann spruce and Douglas-fir trees at stands in the analysis area had a DBH of 9 to 36 inches, age of 78 to 200 years, and stand density of 60 to 380 basal area/acre (typically >80). Western spruce budworm was detected at three stands in the analysis area.

The Douglas-fir beetle is less prevalent than the mountain pine beetle or western spruce budworm on Forest Service lands in Gallatin County (Table 3.4.7-4). Douglas-fir stands become more susceptible to the Douglas-fir beetle when mean stand age is greater than 120 years, stands become dense, and when there are trees with root disease or injury. Other factors that can increase infestations are the presence of recently downed or damaged Douglas fir trees (from drought, fire, severe logging damage or severe defoliation) and having a DBH >8 inches (Fettig et al. 2007; Hood and Bentz 2007; Forest Service 2010). Only three Douglas-fir stands in the analysis area had trees >120 years, out of the thirteen Douglas-fir stands visited. The stands typically had a stand density of 60 to 380 basal area/acre and a DBH of 11 to 36 inches. No Douglas-fir beetle damage to trees was documented in the analysis area, although they may have been undetected. Reducing tree competition for moisture and exposing woody materials to sunlight through stand density reduction can reduce susceptibility to the Douglas-fir beetle (Fettig et al. 2007; Forest Service 2010).

Stand density (basal area/acre) of forested stands at plots in the analysis area varied from 60 to 380 feet²/acre, and all but one were ≥ 80 feet²/acre, which is the threshold for increased potential for insect and disease infestations (see Forest Health Technical Report in the Project Record). Based on current infestations, stand density, age, and DBH, there is a high potential for insects and disease to occur in the analysis area.

Snags/Down Woody Debris

Snags and down woody debris are important for wildlife habitat in forested environments. The GNF defines ‘snags’ as standing dead trees greater than 18 feet in height and greater than 10 inches DBH (USFS 1993). Dead and down woody debris (down woody debris) is defined as down woody debris having equal or greater than three inches DBH (USFS 1993).

After a live tree (stage 1) becomes injured by fire, lightening, insects, or other disturbances, it goes into a declining stage (stage 2). Once the tree dies, and if it remains standing, this snag generally has intact bark and branches (stage 3). As time, insects, excavating wildlife, and other decay processes proceed, the bark loosens and sloughs off, braches detach from the trunk, and the trunk breaks down until only the stump remains of the snag (stage 4 to stage 9). Down woody debris (or coarse woody debris) includes all woody materials on the ground >3 inches DBH, and represents woody materials that detach from live trees and snags. Fine woody debris includes all woody materials on the ground <3 inches DBH.

Snags are an important habitat component for primary excavating wildlife, such as woodpeckers, and for secondary cavity nesters including chickadees, bluebirds, squirrels, bats, and black bears. Once snags become down woody debris, amphibians, reptiles, birds, and mammals use them for foraging sites, hiding and thermal cover, denning, nesting, and travel corridors. Down woody debris is also important for erosion control, and also for its subsequent decomposition into soil and nutrients (Maser et al. 1979). Retention of snags, live, and declining trees which become snags, and down woody debris of varying DBH and stages are vital for providing habitat for many wildlife species.

Snag and down woody debris characteristics vary depending on tree species (USFS 1993). Douglas-fir and lodgepole pine are considered the most valuable snags trees for cavity-dependent species. It is typically a large-crowned tree with roots that vary in depth relative to soil depth, but

is susceptible to windthrow after canopy protection is reduced. Lodgepole pine generally has a narrow crown and deep root system, which make it resistant to windthrow. Engelmann spruce provides low to moderate value for cavity-dependent species, because of its shallow root system and susceptibility to windthrow. Limber pine is typically such a small component in the species mix occurring on dry, rocky sites to provide widespread value. Subalpine fir has moderate value for cavity-dependent species, because of the narrow crown, which make them resistant to windthrow despite their shallow root systems.

The Forest Service is required to maintain sufficient snag habitat and down woody debris components to accommodate the needs of cavity nesting birds and other wildlife species dependent on these components *in conjunction with the timber clearing program* (USFS 1993). Measures in the Forest Plan and Amendment No. 15: Snag Management Direction (USFS 1993) do not apply to snag and down woody debris management for the Proposed Action. This is because the Proposed Project is in MA 25, which does not contain suitable timber, and the Proposed Project is not part of the timber clearing program.

The current number of snags per acre for the Gallatin and Madison mountain ranges is provided in Table 3.4.7-5. The Forest Health Technical Report (found in the Project Record) includes more detail on down woody debris in tons/acre for the analysis area, which ranges between 1 to 15 tons/acre, with a mean of 5.8 tons/acre.

TABLE 3.4.7-5 SNAGS PER ACRE FOR THE GALLATIN AND MADISON MOUNTAIN RANGES

MOUNTAIN RANGE	SNAG DBH (INCHES)	MEAN NUMBER OF SNAGS PER ACRE	90% CONFIDENCE INTERVAL
Gallatin	10-15	12.6	7.9-17.3
	15-19.9	4.6	2.3-6.9
	20-25	0.8	0.2-1.6
Madison	10-15	9.8	6.1-13.8
	15-19.9	2.1	1.2-3.2
	20-25	0.5	0.2-0.9

Source: M. Novak, personal communication, 2011a.

Fire/Fuels

Fire/fuels are heavily influenced by vegetation and down woody debris, which are described previously in this section. Douglas-fir is the most prevalent forested habitat type in the Proposed Project Area, and lodgepole pine, Engelmann spruce, limber pine, and quaking aspen are also present (in that order). Fire regimes in Douglas-fir habitat types are varied, ranging from low to moderate severity surface fires at relatively frequent intervals (7 to 20 years) to severe crown fires at long intervals (50 to 400 years) (Kilgore 1981; Steinberg 2002).

Most of the Proposed Project Area is in Fuel Model 8, but some portions are in Fuel Models 2 and 10 (Anderson 1982; Gallatin County 2006). The open water of the Gallatin River and the unvegetated talus slopes in the Proposed Project have insufficient fuels to carry fire (Scott and Burgan 2005). Fuel Model 8 is characterized by closed canopy stands of short-needle conifers and having a compact litter layer of needles, leaves, and twigs. Fuel Model 8 is associated with slow-burning ground fires with low flame lengths and total fuel load for fine woody debris (<3 inches) of 5.0 tons/acre (T/ac) (Anderson 1982; Scott and Burgan 2005).

Fuel Model 2 is characterized by open shrub lands and pine stands that cover one-third to two-thirds of the area; and total fuel load for fine woody debris (<3 inches) of 4.0 T/ac. Fires are spread through fine herbaceous fuels, are fast-burning, and have a moderate to high flame length (depending on proportion of shrubs and grasses, and whether litter from forest canopy is present)

(Anderson 1982; Scott and Burgan 2005). Fuel Model 10 is similar to Fuel Model 8, except there are greater quantities of down woody debris (>3 inches) because of a large load of dead material on the forest floor; and higher fine woody debris (12.0 T/ac). The large load of dead material is usually related to insect- and disease-infected stands, windthrow, and light thinning or partial-cut slash. Fuel Model 10 has the greatest fire intensity of all the timber fuel models, and has higher rates of spread and flame length than Fuel Model 8 (Anderson 1982; Scott and Burgan 2005).

Fuel loads can be decreased by fuel treatments such as removing down woody debris, thinning to reduce canopy density, and removing ladder fuels. Down woody debris (or coarse woody debris) contributes to large and severe fires because it can hold smoldering fire on a site for extended periods of time, which can develop into a fast moving dangerous fire by high winds (Brown et al. 2003). Down woody debris can also create soil heating conditions where organic matter is removed or destroyed, nutrients volatilized, the water absorbing capacity of the soil decreased, and living plant parts and microorganisms killed (Brown et al. 2003). Fine woody debris greatly influences the rate of spread and intensity of surface fires and exacerbates the potential for crown fires (Brown et al. 2003).

Fuel load and depth are important properties for predicting whether a fire would be ignited, its rate of spread, and its intensity (Anderson 1982). Fuel loading is measured in T/ac and represents the amount of dead and down fuel on or near the grounds surface. For the Proposed Project Area, the fuel loading system is within the following categories:

Low fuel load – 1-10 T/ac
Moderate fuel load – 10-20 T/ac
High fuel load – 20 T/ac

Current fuel loads within the Proposed Project Area range between 1 and 15 T/ac, with a mean of 5.8 T/ac. Based on the above fuel loading categories, current fuel loads in the Proposed Project Area are low to moderate.

Fire history data provided by the GNF show that three large fires (greater than 50 acres in size) occurred within one mile of the analysis area during 1940-2007; however, the Greek Creek Fire of 1982 is the only fire that burned within a portion of the analysis area. The source of ignition for these fires was documented as lightning and debris burning. Numerous minor fires have occurred within one mile of the analysis area. The source of ignition for these smaller fires include lightning, equipment, smoking, campfire, debris burning, arson, and miscellaneous.

Fires have the potential to affect the operation of the Proposed Project and, consequently the reliability of the transmission system in the region. Smoke and hot gases from a large fire under or near a power line can create a conducting path between conductors and the ground, initiating flashovers. Fires can also damage steel support structures and overhead conductors, and can destroy wood transmission structure support structures. No loss of service has occurred with the existing 69 kV transmission line due to fires under or near the power line (P. Asay, personal communication, 2011).

Applicable Laws, Regulations, Forest Plan Direction

Gallatin National Forest Management Plan (1987)

Management direction for forested vegetation and fire/fuels in the GNF is found in the Forest Plan and associated amendments. The GNF is divided into 26 management areas, each with different management goals, resource potentials, and limitations, as described in Chapter III of

the Forest Plan. Most relevant standards in the Forest Plan and associated amendments are geared towards addressing timber clearing treatments, and tied to a specific management area.

Applicable forest-wide standards are 9 and 14.1-14.6, as follows:

> Forest-Wide Standard 9 – Air Quality: The forest will cooperate with the requirements of the Montana Air Quality Bureau in the State Implementation Plan. The requirements of the State Implementation Plan and the Montana Smoke Management Plan will be met.
>
> Forest-wide Standard 14.1 - Fire: Fire management will be provided at a level commensurate with the Level II Analysis. Refer to Appendix E of Forest Plan for a summary of the Level II Fire Analysis.
>
> Forest-wide Standard 14.2 - Fire: The wildfire suppression response identified in the management area standards (i.e., control, contain or confine) will be employed.
>
> Forest-Wide Standard 14.3 - Fire: Activity-created dead and down woody debris would be reduced to a level commensurate with risk analysis.
>
> Forest-Wide Standard 14.4 - Fire: Treatment of natural fuel accumulations to support hazard reduction and management area goals would be continued.
>
> Forest-Wide Standard 14.5 - Fire: Prescribed fire (planned or unplanned ignitions) may be utilized to support management area goals.
>
> Forest-Wide Standard 14.6 - Fire: Prescribed fire objectives for smoke management will be met within the constraints established by the Montana State Airshed Group's MOU.

The Forest Plan states that MA 25 *"consists of electrical transmission lines and pipelines, climatic and snow measuring sites, and electronic sites. The Management Goal for Management Area 25 is: Establish and manage facilities consistent with adjacent management area goals."* Applicable standards specific to MA 25, where the Proposed Project would occur, are for timber and fire, as follows:

> Timber: Classified as unsuitable for timber production. Timber may be removed for construction and maintenance of the areas.
>
> Fire: The wildfire suppression response will be control. Prescribed fire may be used to meet the management area goal.

Most of the standards specific to forested vegetation, such as old growth forest, snags, and down woody debris, are only applicable "*in timber compartments containing suitable timber,"* and not required for MA 25. This is discussed here to clarify that there is no specific regulatory direction on old growth forest, snags, and down woody debris in the Forest Plan.

Montana Forest Fire Rules and Regulations 77-5-103(3), 76-11-101, 76-13-102(7), and 76-13-109 MCA; ARM 36.10.119-132

Addresses rules and regulations pertaining: to debris burning; railroads and powerlines; equipment; flaming and glowing substances; fire extinguishers and firefighting tools; forest activity restrictions; and forest closures.

Managing the Impact of Wildfires on Communities and the Environment – A Report to the President in Response to the Wildfires of 2000 (aka The National Fire Plan)

Operating Principle #4: Hazardous Fuel Reduction - Assign highest priority for hazardous fuel reduction to communities at risk and municipal watersheds where conditions favor uncharacteristically intense fires.

Protecting People and Sustaining Resources in Fire-adapted Ecosystems: a Cohesive Strategy to Reduce Over-accumulated Vegetation (aka The Cohesive Strategy)

Focuses on priorities of the National Fire Plan: wildland-urban interface, municipal watersheds, threatened and endangered species habitat, and maintenance of Condition Class I areas.

Methodology for Analysis

1. Conduct habitat assessment and assess forested vegetation, old growth stands, insects and disease, and snags/down woody debris.

The habitat assessment was conducted August 9-12, 2010 on forested habitats on accessible Forest Service lands on the analysis area and within a 400 feet buffer of the analysis area. Field accessibility was based on proximity to the existing transmission line, public entry and access, traversable terrain or lacking talus, etc. Plot data collected included habitat type/climax series; dominant tree, sapling, shrub, and herbaceous species; down woody debris; tree age, DBH, height, and signs of insects and disease; and stand density (basal area). Inaccessible forest stands were assessed visually using binoculars. Light Detection and Ranging (LiDAR) aerial imagery (1/3-foot resolution; collected June 4-5, 2009) was used to extrapolate the field data and differentiate between forest stands that were visually distinctive.

Standardized methods were used to collect field data (M. Novak, personal communication, 2010). A 20-inch long increment borer was used to extract cores from a minimum of at least one tree in each stand that appeared to be the oldest tree present (based on DBH and height). At each plot, the other trees in the stand were visually assessed as to whether their measurements were consistent with the cored tree(s). Annual growth rings were counted using a Leica S6E Stereozoom microscope (after fieldwork was completed), and samples were evaluated whether any met the criteria for an old growth stand, as described in Table 3.4.7-2 (Green et al. 1992). A prism having a basal area factor of 20 was used to measure stand density. Down woody debris and tree insects and diseases were measured using standard Forest Service guides (Fischer 1981; Hagle et al. 2003). Habitat types/climax series were based on Habitat Types of the Gallatin and Custer National Forests (USFS 1979). Sources of information for identifying plant species included standard floras appropriate to the GNF (Hitchcock et al. 1969; Hitchcock and Cronquist 1973; and Dorn 1984) and botanists' personal knowledge of the species.

Results of the habitat assessment are incorporated into the Affected Environment portion of this section, and are provided in more detail in the Forest Health Technical Report, found in the Project Record.

2. Assess Fire/Fuels for the Proposed Project.

Stand density at the 23 plots in the analysis area ranged from 60 and 380 basal area per acre (BA/ac), with a mean of 172 BA/ac (POWER 2011). These measurements are relevant to estimating disease potential, since mountain pine beetle prefer stands having >80 BA/ac (M. Novak, personal communication, 2010). Nearly all the plots had >80 BA/ac (21 of 23 plots), indicating a high potential for mountain pine beetle infestations throughout forested areas of the analysis area.

Western spruce budworm, mountain pine beetle, and mistletoe were the primary tree diseases observed at plots in the analysis area (POWER 2011). Symptoms documented at plots across the analysis area included tree galls, pitch tubes, cracks, holes, running sap, and dead trees. Pitch tubes on lodgepole pine are diagnostic of mountain pine beetle infestations. More than half of the plots sampled (12 of 23 plots) had evidence of mountain pine beetle infestations.

Fuel loading within the analysis area was categorized as low to moderate, ranging from 1 and 15 T/ac, with a mean of 5.8 T/ac (POWER 2011).

3. Identify potential effects regarding tree clearing.

Potential effects regarding tree clearing include old growth, insects and disease, and snags/down woody debris. Table 3.4.7-6 compares the land area of habitat types that would be affected by the Proposed Project and associated alternatives. Project-related activities and usage areas that would result in tree clearing are designated whether or not the disturbance would be maintained for the life of the SUP. Permanent disturbances specific to forested vegetation include upgrading and widening of existing roads, structure ground pads, the existing ROW, and ROW widening. The existing and widened ROW is included because the ROW would be maintained for the life of the SUP, which would allow lopping of ROW vegetation to within 18 inches of the ground. Temporary effects would only occur during construction of the transmission line and include pulling and tensioning sites, conductor splicing sites, fly yards, decking areas, and overland travel (see Table 3.4.7-6). Details on potential effects are discussed further in the Effects Analysis below.

TABLE 3.4.7-6 HABITAT ON NFS LANDS IN THE ANALYSIS AREA, BASED ON GROUND-TRUTHED DATA COLLECTED IN 2010

Vegetation Type	New Permanent Disturbance (acres)[1]			Temporary Disturbance (acres)[2]	Total New Disturbance for Proposed Action[3]	
	Alt. 2	Alt. 3	Alt. 4	Common to Alts. 2, 3, & 4	Acres	Percent (%)
Aspen	0.0	0.0	0.0	0.0	0.0	0.1%
Civilized Areas (highway)	0.3	0.4	0.4	0.2	0.5	1.2%
Douglas-fir	9.8	14.3	10.1	2.2	12.0	28.3%
Dry grassland and meadow	0.8	0.8	0.8	4.4	5.2	12.3%
Engelmann spruce	1.3	2.4	2.2	0.9	2.3	5.3%
Limber pine	0.2	0.2	0.2	0.0	0.2	0.4%
Lodgepole pine	3.5	5.6	9.9	0.5	4.0	9.4%
Sagebrush shrubland (moist and dry portions)	1.0	1.0	1.0	15.1	16.1	37.8%
Open Water (river)	0.3	0.4	0.6	0.0	0.3	0.6%
Talus	1.8	2.1	1.8	0.2	2.0	4.7%

Vegetation Type	New Permanent Disturbance (acres)[1]			Temporary Disturbance (acres)[2]	Total New Disturbance for Proposed Action[3]	
	Alt. 2	Alt. 3	Alt. 4	Common to Alts. 2, 3, & 4	Acres	Percent (%)
Total Forested	14.8	22.4	22.5	3.7	18.5	43.4%
Total Unforested	4.2	4.7	4.6	19.8	24.1	56.6%
Total	19.0	27.1	27.1	23.5	42.5	100.0%

Source: Forest Health Technical Report (in the Project Record)

Notes: [1]New permanent disturbance includes land that would be used for widening the ROW and access roads and ROW that would be added for the Alternative 3 and 4 LROs. Existing ROW that would not be used for Alternative 3 and 4 LROs was not subtracted because these portions of ROW would be retained for distribution to residences. ROW is included as permanent disturbance for this section because of how it would affect forested vegetation. [2]Temporary disturbance includes land that would be used during construction for overland access, fly yards, and decking areas, and then rehabilitated after construction is completed. Site-specific data on pulling and tensioning sites are not available and not included in these calculations. Pulling and tensioning sites would be 52 .1to 53.6 acres depending on alternative, but a large proportion of this land area would overlap with the ROW. [3]Total disturbance calculated for the Proposed Action is the total new permanent and temporary disturbance for the Proposed Action (Alternative 2).

Effects Analysis

Alternative 1 - No Action

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1, the existing 69 kilovolt (kV) transmission line would continue to function in its current state. The existing route roughly parallels Montana State Highway 62 (MT Hwy 62) and United States Highway 191 (US Hwy 191) and the Gallatin River, crossing the highway eleven times and the river eight times. During approximately 35 years of operation, the current 40-foot wide ROW supporting the 69 kV line has been maintained for safety and system reliability but has been allowed to re-vegetate with natural vegetation communities. Although the current SUP allows for the lopping of vegetation to within 18 inches of the ground, vegetation has been generally left in its natural state unless it inhibits normal maintenance activities or presents a safety or operational risk. As warranted, hazard trees that are an immediate threat to the transmission line and present a risk of fire, equipment damage or power outage are removed from the ROW as allowed by the current SUP. Line-related human disturbance in the form of patrols and routine maintenance occurs annually or more often, if needed.

The potential for the existing 69 kV transmission line to ignite a fire would remain the same and there would be negligible effects to the existing fuel models present in the Proposed Project. Transmission lines have an inherent potential to ignite or exacerbate fires from arcing, flashovers, lightning, and maintenance activities; however, design features implemented as standard practice minimize this potential. The primary source of ignition associated with the operation of a transmission line occurs through electrical arcing, which occurs when an energized conductor makes contact with another conductor or grounded object (e.g., vegetation debris, conductor-to-conductor, helicopters, and lightning contact). Transmission line protection and control systems are designed to detect faults (such as arcing from debris contact with the line) and rapidly shut off power flow. Smoke and hot gases from a large fire under or near a transmission line can create a conducting path between conductors and the ground, initiating flashovers. The potential for ignition may also occur during maintenance activities. Lightning protection is provided by overhead ground wires along the line. Fires occurring near the existing transmission line can affect the operation and reliability of the transmission system in the region from flashovers and damage to transmission line structures.

ROW vegetation maintenance and operations and maintenance would continue under their current regime. This includes maintaining the existing 40-foot ROW width, removal of excessive

undergrowth and hazard trees, and transmission structure replacement, as required, to minimize failure. Line inspection patrols and other periodic maintenance activities would continue. Effects to forested vegetation and fire/fuels under the No Action Alternative would be limited to ROW management, operations, and maintenance efforts. This could include the removal of mature trees in the old growth stand and the removal of snags and declining trees (representing future snags). Hazard tree removal would also reduce the potential of insects and disease, as long as mitigation measures regarding tree clearing and removal were appropriately followed. Most of the analysis area already has high potential for insect and disease infestations, so tree removal and increasing solar radiation to remaining trees would locally decrease the potential of insects and disease.

Summary

Under Alternative 1, the Project would not be constructed and the only effects to forested vegetation and fire/fuels would be from operation and maintenance activities, which would have negligible to minor effects.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Alternative 2 (Proposed Action) would include rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line (originally constructed in the early 1970s) using portions of a 1950s-era 50 kV transmission line corridor within GNF. The only adjustment to the existing ROW would be the Deer Creek engineering refinement, which would require slightly less tree clearing than following the existing ROW. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW.

New permanent disturbance for Alternative 2 would include additional land that would be used for widening the ROW and access roads, and structure locations. Forested land that would be cleared for new permanent disturbance is comprised mainly of Douglas-fir and lodgepole pine, but also includes Engelmann spruce, limber pine, and quaking aspen, and totals 14.8 acres (Table 3.4.7-6). Unforested lands are comprised of talus, sagebrush shrubland, dry grassland and meadow, highway, and open water, totaling 4.2 acres.

Temporary disturbance would include land that would be used during construction for overland access, fly yards, and decking areas, and pulling and tensioning sites, and then rehabilitated after construction is completed. All temporary disturbances except pulling and tensioning sites (to be determined depending on engineering design) would occur on lands dominated by sagebrush shrubland (moist and dry portions) and dry grassland and meadow, and smaller amounts of forested habitats, totaling 23.5 acres (Table 3.4.7-6). Pulling and tensioning and sites would be 53.6 acres for Alternative 2 and would likely disturb vegetation types similar to that of new permanent disturbance, so mostly Douglas-fir and lodgepole pine.

Manual vegetation removal and tree removal techniques are described in the ROW Clearing Plan (see Appendix B). To reduce the potential of tree insects and disease, felled trees would be transported to a decking area for processing. After completion of the project, temporarily disturbed lands would be revegetated in accordance with the Weed Management, Reclamation, and Revegetation Plan. Since all wetland and riparian habitat would be spanned for protecting wetland resources, they would be protected, resulting in minimal effects to these sensitive habitat features.

Down woody debris has an important ecological function, but increases the risk of wildfire through fuel loading. To balance these, down woody debris would be piled and burned, chipped, or removed from the ROW corridor using ground based equipment or helicopter where safely feasible, as described in the ROW Clearing Plan. The size and placement of piles would be planned to ensure live vegetation and infrastructure would not be damaged and there is no threat of arcing. Reducing excessive undergrowth and down woody debris would reduce the risk of fires smoldering on a site for extended periods of time and developing into larger, harder to manage fires. Due to safety considerations, helicopter removal of timber may not be feasible in some locations. In these site specific areas, slash and down woody debris would remain on-site. As a result, there may be some site specific locations that exceed forest-wide standards; however, as a whole, these forest-wide standards would be met for the Proposed Project Area.

Old growth would be minimally affected because there is only a small amount of old growth in the analysis area, and this would be addressed in the ROW Clearing Plan (Appendix B). The 0.2 acre of old growth limber pine occurs where ROW widening is proposed, but this stand would be protected by a PDF, as described in the ROW Clearing Plan (Appendix B) to avoid clearing of limber pine >9 inches DBF (Table 3.4.7-6). Tree clearing may also include the removal of snags and declining trees (representing future snags), but would be done to the minimum required for operation and maintenance of the transmission line. Sensitive habitat features in Alternative 2 include the old growth limber pine stand, quaking aspen grove, and moist sagebrush shrubland, as shown in Figure 3.4.7-2.

Portions of the existing ROW adjacent to nonforested lands (e.g., shrublands, grasslands) that would be widened would remain in Fuel Model 2. The existing ROW adjacent to forested lands is also currently in Fuel Model 2 because the ROW is maintained by removing excessive vegetation and hazard trees. Forested lands directly adjacent to the existing ROW are predominantly in Fuel Model 8 with a smaller amount of Fuel Model 10. Portions of the existing ROW adjacent to forested lands that would be widened would be expected to remain in Fire Model 8 or 10, or change to Fuel Model 11, depending on the amount of slash and down woody debris removed (Anderson 1982). Fuel Model 11 is in the logging slash group, characterized by light partial cuts in mixed conifer stands and total fuel load of <3 inch materials of 11.5 T/ac. Fuel Model 11 can produce fairly active fires from the intermixed slash and herbaceous material, but the spacing of the light fuel load and shading from overstory limit the fire potential (Anderson 1982).

Transmission lines have the potential to ignite fires, but this is not correlated with higher line voltages such as upgrading from a 69 kV to 161 kV transmission line. There may be the potential for increased fire ignition risk on a short-term basis during construction (e.g., welding, vehicle ignition). To minimize the potential of fires, all applicable fire laws and regulations would be observed during the construction period and construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires. A Fire Prevention Plan would be developed and incorporated into the COP. The COP would include practices such as operating all internal and external combustion engines (including off-highway vehicles (OHV), chainsaws, generators, heavy equipment, etc.) with qualified spark arresters, fueling all highway-authorized vehicles off-site to minimize the risk of fire, and carrying fire suppression equipment on all vehicles and equipment.

The Proposed Action also has the potential to affect forested vegetation and fire/fuels as a result of ROW operations and maintenance management. This includes maintaining the ROW, removal of excessive undergrowth and hazard trees, and transmission structure replacement, as required, to minimize failure. Line inspection patrols and other periodic maintenance activities would continue. ROW management and operations and maintenance could include the hazard tree removal, including snags and declining trees (representing future snags). Removal of hazard trees

would decrease fire risk by preventing tree contact with the line and subsequent line arcing. Hazard tree removal would also reduce the potential of insects and disease, as long as measures regarding tree clearing and removal were appropriately followed. Most of the Alternative 2 already has high potential for insect and disease infestations, so tree removal and increasing solar radiation to remaining trees would locally decrease the potential of insects and disease.

Summary

Under Alternative 2, the Proposed Project would be constructed and there would be removal of excessive undergrowth and tree clearing in 14.8 forested acres and temporary disturbance in 3.7 forested acres. There would be removal of excessive undergrowth in 4.2 acres unforested acres and temporary disturbance in 19.8 unforested acres. Tree clearing of 0.2 acre of old growth limber pine would be prevented through avoidance by spanning or micrositing, following specific PDFs as described in the ROW Clearing Plan (Appendix B). Effects to forested vegetation would be negligible to moderate, and the moderate effects (to old growth) would be reduced to minor impacts through implementation of the ROW Clearing Plan (Appendix B).

Portions of the Proposed ROW in and adjacent to unforested lands (e.g., grasslands, shrublands) would have negligible to minor changes in fire/fuels potential, and remain classified as Fuel Model 2. Portions of the Proposed ROW in and adjacent to forested lands would have minor to moderate changes in fire/fuels potential, and remain as Fuel Model 8 or 10, or change to Fuel Model 11. Effects to fire/fuels would be negligible to moderate, and the moderate effects would be reduced through PDFs on down woody debris and slash, as described in the ROW Clearing Plan.

Once the Proposed Project would be constructed, there would be operation and maintenance activities that continue for the life of the SUP that have negligible to minor effects.

Alternative 3 - Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Alternative 3 would require total new permanent disturbance of 22.4 acres forested lands and 4.7 acres unforested lands. This is 7.6 acres of additional forested lands that would require tree clearing compared to Alternative 2. Temporary disturbance would be the same as Alternative 2. Existing ROW that would be abandoned for the Alternative 3 local routing options (LROs) would remain permanently disturbed because these portions of ROW would be still used and maintained for local distribution to residences.

Alternative 3 would utilize the same alignment as Alternative 2 with the exception of the LROs described below. It generally moves the transmission line further to the east of recreation residences. Alternative 3 would be the same as Alternative 2, with the following exceptions:

Cave Creek LRO

This LRO would require additional tree clearing due to the alignment moving upslope, approximately 200 feet in places, from the existing 69 kV transmission line. Portions of this LRO would occupy the original 1950s 50 kV transmission line corridor that was abandoned in the early 1970s when the current 69 kV transmission line was upgraded. The existing distribution to the residences in the Cave Creek recreation residence tract would remain in place. The existing 69 kV transmission line structures outside of those required for distribution within the recreation residence tract would be removed. This LRO would require the removal of 1.9 acres of lodgepole pine forest, which is in Fuel Model 8.

Cascade East LRO

This LRO would eliminate two highway and two river crossings. This LRO would require marginal tree clearing due to the alignment moving east of US Hwy 191 along less forested slopes. The existing distribution to the residences in the Cascade recreation residence tract would remain in place. The existing 69 kV transmission line structures outside of those required for distribution service to the recreation residence tract would be removed. This LRO would require the removal of 6.2 acres of predominantly Douglas-fir (mostly on open forested talus slopes), with lesser amounts of Engelmann spruce and lodgepole pine forests; all of these would be in Fuel Model 8. In addition, 0.3 acre of talus slopes and 0.1 acre of river would be crossed.

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

Alternative 4 would require total new permanent disturbance of 22.5 acres forested lands and 4.6 acres unforested lands. This is 7.7 acres of additional forested lands that would require tree clearing compared to Alternative 2 and 0.1 acres more than Alternative 3. However, the forested habitat that would require tree clearing for this LRO is moister, denser, on more developed soils, and comprised of predominantly moist lodgepole pine instead of dry, open Douglas-fir. Temporary disturbance and old growth tree clearing would be the same as Alternatives 2 and 3. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would be still used and maintained for local distribution to residences.

Alternative 4 would utilize the same alignment as Alternative 3, with the exception of the LRO described below. It generally moves the transmission line further to the west of recreational residences. Alternative 4 would be the same as Alternative 3, with the exception of using the Cascade West LRO instead of the Cascade East LRO.

Cascade West LRO

This LRO would eliminate two highway and two river crossings. This LRO would require tree clearing due to the alignment moving upslope, approximately 500 feet in places, in heavier forested lands. The existing distribution to the residences in the Cascade recreation residence tract would remain in place. The existing 69 kV transmission line structures outside of those required for distribution service to the recreation residence tract would be removed. This LRO would require the removal of 6.1 acres of predominantly lodgepole pine forests, with lesser amounts of Engelmann spruce and Douglas fir forests. The forested vegetation in the LRO corresponds to Fuel Models 8 and 10, as down woody debris is up to 15 T/ac in places. These forested habitats are moist relative to the general area, and there are many interspersing unnamed creeks with downed logs that flow into Cascade Creek. In addition, 0.3 acre of river would be crossed.

Summary

Under Alternative 4, the Proposed Project would be constructed and there would be removal of excessive undergrowth and tree clearing in 22.5 forested acres and temporary disturbance in 3.7 forested acres. There would be removal of excessive undergrowth in 4.6 acres unforested acres and temporary disturbance in 19.8 unforested acres. Tree clearing of 0.2 acre of old growth limber pine would be prevented through avoidance by spanning or micrositing, following specific PDFs described in the ROW Clearing Plan (Appendix B). Effects to forested vegetation would be negligible to moderate, and the moderate effects (to old growth) would be reduced to minor impacts through PDFs.

Portions of the Proposed ROW in and adjacent to unforested lands (e.g., grasslands, shrublands) would have negligible to minor changes in fire/fuels potential, and remain classified as Fuel Model 2. Portions of the proposed ROW in and adjacent to forested lands would have minor to

moderate changes in fire/fuels potential, and remain as Fuel Model 8 or 10, or change to Fuel Model 11. Effects to fire/fuels would be negligible to moderate, and the moderate effects would be reduced through PDFs on down woody debris and slash, as described in the ROW Clearing Plan (Appendix B).

Once the Proposed Project would be constructed, there would be operation and maintenance activities that continue for the life of the SUP that have negligible to minor effects.

Cumulative Effects of Alternatives 2, 3, and 4

Other current and future projects in the analysis area would have negligible to moderate, direct to indirect, and short-term to long-term cumulative effects to forested vegetation and fire/fuels. The proposed US Hwy 191 Gallatin Canyon Safety Improvements would involve widening and improving US Hwy 191, which could remove potential habitat for sensitive species by removing riparian trees. The GNF timber sale in the Jack Creek area, the Montana Opticom project, and GNF fuel reductions projects between the river and wilderness area would result in the removal of trees. GNF annual noxious weed spraying, recreation home project requests, recreational activities, and Moose Creek Flat Campground fishing platform rebuild would have negligible cumulative effects. Habitat fragmentation from other projects would not be substantially increased, given that most cumulative projects would occur within the currently fragmented Gallatin River Canyon. Cumulatively, these projects, when combined with Alternatives 2, 3 or 4, would have a negligible impact on forested vegetation and fire/fuels.

Summary Conclusions

The No Action Alternative (Alternative 1) would have negligible to minor effects to forested vegetation and fire/fuels, and these effects would be from ROW maintenance activities (Table 3.4.7-7). The Action Alternatives are similar to each other and would have negligible to minor effects to forested vegetation and fire/fuels, and vary by the number of acres required for tree clearing. Of the Action Alternatives, the Proposed Action (Alternative 2) would require the least tree clearing and Alternative 4 (LRO West) would require the most tree clearing. The moist lodgepole pine stand that would be cleared under Alternative 4 has higher ecological value compared to the open Douglas-fir associated with Alternative 3 (LRO East). The minimal acreage (0.2 acre) of affected old growth limber pine would be the same for all three Action Alternatives, and be addressed through PDFs described in the ROW Clearing Plan (Appendix B). Tree clearing would generally increase fire risk associated with construction, operation, and maintenance activities for the Action Alternatives, but this risk would be reduced by removal of down woody debris and slash, as described in the ROW Clearing Plan (Appendix B).

TABLE 3.4.7-7 COMPARISON OF TREE CLEARING AND OLD GROWTH ACRES BETWEEN ALTERNATIVES

ALTERNATIVE	TREE CLEARING ACRES	OLD GROWTH AFFECTED ACRES
Alt. 1: No Action	No New Row Clearing; Maintenance Of Existing Row	0.0 acre
Alt. 2: Proposed Action	14.8 Acres, Primarily Douglas-fir and Lodgepole Pine	0.2 acre Limber Pine
Alt. 3: LRO East	22.4 Acres, Primarily Open Douglas-fir	0.2 acre Limber Pine
Alt. 4: LRO West	22.5 Primarily Moist Lodgepole Pine	0.2 acre Limber Pine

Source: Table 3.4.7-6

Comparison of Alternatives

Alternatives 2 (Proposed Action), 3, and 4 would require new permanent disturbance, while Alternative 1 (No Action) would not require any additional new disturbance. Alternatives 3 and 4

would require new permanent disturbances of 27.1 acres, 8.1 acres more than Alternative 2 (19.0 acres). Temporary disturbance would be approximately 23.5 acres for Alternatives 2, 3, and 4. Alternative 2 would permanently disturb 14.8 acres of forested and 4.2 acres of unforested land. Compared with Alternative 2, Alternative 3 would disturb an additional 7.6 acres of forest land and Alternative 4 would disturb an additional 7.7 acres. The area of land with old growth limber pine that could be disturbed is the same for Alternatives 2, 3 and 4 (0.2 acre) and, for all action alternatives, impacts to old growth would be reduced through PDFs.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Various PDFs are proposed to reduce or avoid effects to biological resources, including forested vegetation and fire/fuels. Best management practices (BMPs) and PDFs applicable to forested vegetation and fire/fuels (1.1, 1.2, 1.5, 1.7, 1.9, 5.4, and 6.1) are listed in Chapter 2. Additional measures are also described in the ROW Clearing Plan (Appendix B). These PDFs would minimize impacts to forested vegetation and fire/fuels from the Proposed Project.

Consistency with Laws, Regulations, and Forest Plan

Overall, the three Action Alternatives would comply with forest-wide standards 9 and 14.1-14.6 (USFS 1987) because PDFs would effectively manage slash and down woody debris in preventing fire risk. Due to safety considerations, helicopter removal of timber may not be feasible in some locations. In these site specific areas, slash and down woody debris would remain on-site. As a result, there may be some site specific locations that exceed forest-wide standards; however, as a whole, these forest-wide standards would be met for the Proposed Project area.

All other standards specific to forested vegetation (e.g., old growth forest, snags, and down woody debris) are not required for Management Areas 2, 3, 4, and 25, where the majority of the Proposed Project would be located because these are classified as unsuitable for timber. However, the average amount of old growth in the Gallatin and Madison mountain ranges is 21 percent, which means the 10 percent old growth minimum would still be complied with. The old growth limber pine stand occurs on 0.2 acre of the Proposed Project, and would be protected by PDF 4.13 to avoid clearing of limber pine >9 inches DBF to the greatest extent possible.

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3.4.8 Sensitive Plants

Description of Issue

Sensitive plants were identified as an analysis issue during interdisciplinary team scoping discussions, initial public scoping, and the Notice of Intent (NOI) comment period.

Indicators

Potential effects to sensitive plants for each alternative are the number of acres of occupied habitat and suitable unoccupied habitat that would have ground disturbance as a result of the Proposed Project. Table 3.4.8-1 defines the terms used to describe magnitude and duration of effects to sensitive plants.

TABLE 3.4.8-1 DESCRIPTION OF IMPACT LEVELS

THRESHOLDS	DESCRIPTION RELATIVE TO SENSITIVE PLANTS
Negligible	No sensitive plants or suitable habitat would be affected. If changes were detectable, the effects would be very slight, local, short-term (<20 years). No Project Design Features (PDFs) would be necessary.
Minor	Effects to sensitive plants or suitable habitat would be measurable, although would be small, likely short-term (<20 years), and localized within the Proposed Project. No PDFs would be necessary.
Moderate	Effects to sensitive plants or suitable habitat would be measurable and long-term (>20 years), but would be localized within the Proposed Project. PDFs would be necessary, but the measures would likely be successful.
Major	Effects to sensitive plants or suitable habitat would be readily measurable, long-term (>20 years), would have substantial consequences, and would be noticed throughout the Proposed Project. PDFs would be necessary and their success would not be guaranteed.

Scale of Analysis

The spatial boundary of sensitive plants includes all federal lands that would be disturbed as a result of the Proposed Project. The temporal boundary for direct and indirect effects cover the period of active construction, and general line operations and maintenance for the life of the Special Use Permit (SUP), as impacts associated with the periodic maintenance and line patrols of the transmission line. Following construction, hazard trees and excessive vegetation would continue to be removed when it poses a hazard to the operation and maintenance of the transmission line.

Affected Environment

All United States Forest Service (Forest Service or USFS) planned, funded, executed, or permitted programs and activities require review for possible effects on sensitive species (FSM 2672.4). Sensitive plants that were reviewed in the analysis area include:

Species on the Region 1 Sensitive Plant Species list (USFS 2004b); and

Updates to the Region 1 lists in May 2011 (USFS, pers. comm., 2011).

Table 3.4.8-2 provides a list and brief habitat and phenology summary of all sensitive plant species. The potential of sensitive plants to occur were assessed by comparing the habitat requirements of sensitive plants with the vegetation types that occur in the analysis area. All

habitats were surveyed within the Proposed right-of-way (ROW) during the appropriate time of year by qualified botanists. No sensitive plants were detected on Forest Service lands.

Within the Gallatin National Forest (GNF), the existing ROW traverses both forested and non-forested habitats. In forested areas, the maintained ROW is predominantly vegetated by sapling tree, shrub, grass and forb species adjacent to stands of Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), and/or Engelmann spruce (*Picea engelmannii*). Shrub communities within the forested sections of the ROW are dominated by huckleberry (*Vaccinium spp*.), common snowberry (*Symphoricarpos albus*), mallow ninebark (*Physocarpus malvaceus*), Woods' rose (*Rosa woodsii*), and other species that benefit from sunlight penetration created by openings in the forest canopy. Non-forested portions of the existing ROW extend through shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), grasslands, and open water of the Gallatin River. Habitat for the Proposed Project Area is described further in Section 3.4.4 – Water Resources; Wetlands and Section 3.4.7 – Forested Vegetation and Fire/Fuels.

Suitable habitat documented for sensitive plants in the ROW includes riparian and wetland areas (seeps, bogs, hummocks, mesic meadows, and stream banks); open woodland, dry meadow, and bunchgrass plant communities that are predominantly native; and big sagebrush associated with Douglas-fir forests. Most suitable habitat for sensitive plants in the ROW is associated with riparian and wetland areas. Information on the presence or absence of suitable habitat for sensitive plant species in the ROW is provided in Table 3.4.8-2. Based on the survey results, there is a low probability that sensitive plant species occur within the ROW. Undetected individuals or populations of sensitive plants could occur where there is suitable habitat, although this is unlikely based on survey results.

Applicable Laws, Regulations, Forest Plan Direction

Forest Sensitive Species

Section 2670 of the Forest Service Manual delegates designation of sensitive species to each Regional Forester. Forest Sensitive Species are defined as, "Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution."

Gallatin National Forest Management Plan (1987)

Management direction for the GNF is found in the Gallatin National Forest Management Plan of 1987 (Forest Plan). The following summary highlights the management direction relevant to this proposal. Standards found in the Forest Plan relevant to the issue include:

Habitat that is essential for species identified in the Sensitive Species list developed for the Northern Region will be managed to maintain those species (Forest Plan, Forest-wide Standard – Wildlife and Fish, 6.a.12, page II-18).

TABLE 3.4.8-2 SENSITIVE PLANT SPECIES FOR THE GALLATIN NF (2011) THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR

Species Name[1]	Phenology[2]	Habitat[2]	Elevation (feet)	Legal Status[3]	Species Occurrence		Habitat Present/ Absent
					GNF[4]	County[5]	
Musk-root Adoxa moschatellina	Flowers June to early July.	Forest, moist mossy slopes, rock crevices.	4,400 to 5,400 ft.	USFS Sensitive 3	S		Present
Short styled columbine Aquilegia brevistyla	Flowers June to mid-July.	Open woods and streambanks, limestone sites, northern aspects.	5,000 to 6,000 ft.	USFS Sensitive 3	K		Present
Large-leaved balsamroot Balsamorhiza macrophylla	Flowers June to July and seeds late June to early August.	Open hills, associated w/ bunchgrasses.	7,000 to 8,500 ft.	USFS Sensitive 2	K	K	Present
Small yellow lady's slipper Cypripedium parviflorum	Flowers late May to early July.	Bogs, damp mossy woods, seeps, moist forest meadow ecotones.	3,000 to 6,200 ft.	USFS Sensitive 3	K	K	Present
English sundew Drosera anglica	Fruits July to August.	Peat lands, on floating organic mats--undisturbed sphagnum bogs.	3,000 to 9,000 ft.	USFS Sensitive 3	K	K	Absent
Beaked spikerush Eleocharis rostellata	Mature fruits in July to August.	Bogs.	2,700 to 6,100 ft.	USFS Sensitive 3	K	K	Present
Giant helleborine Epipactis gigantea	Flowers late June to mid-July.	In Montana, occurs only around thermal springs with year-round water flow, bogs, fens, and seeps.	2,000 to 5,750 ft.	USFS Sensitive 2	S		Absent
Discoid goldenweed Haplopappus macronema var. macronema	Flowers late July to August.	Rocky, open or sparsely wooded slopes, talus, above timberline.	7,640 ft. +	USFS Sensitive 3	K		Absent
Slender cotton grass Eriophorum gracile	Flowers July to August.	Peat land, fens, and bogs.	3,000 to 7,600 ft.	USFS Sensitive 3	K		Present
Hiker's gentian Gentianopsis simplex	Flowers July to August.	Mountain bogs, meadows, seeps.	4,400 to 8,400 ft.	USFS Sensitive 3	K		Present
Northern rattlesnake plantain Goodyera repens	Flowers late July to August.	Open mossy forests, moist limestone, or shale slopes in old growth Douglas-fir, Engelmann spruce/twinflower, or subalpine fir /twinflower habitats.	5,700 to 6,800 ft.	USFS Sensitive 3	S		Absent
Hall's rush Juncus hallii	Fruits in August to September.	Moist to dry meadows and slopes, montane.	6,900 to 8,400 ft.	USFS Sensitive 3	K	K	Absent
Dwarf purplemonkey flower Mimulus nanus	Flowers June to July.	Dry gravelly or sandy slope; may prefer bare areas with minimal competition.	6,565 ft.	USFS Sensitive 3	K	K	Absent

Species Name[1]	Phenology[2]	Habitat[2]	Elevation (feet)	Legal Status[3]	Species Occurrence		Habitat Present/ Absent
					GNF[4]	County[5]	
Whitebark pine Pinus albicaulis	Identifiable year round.	Forested areas in high elevation, upper montane habitat near tree line.	2,950 to 12,000 ft. depending on latitude	USFS Sensitive 2	K	K	Absent
Austin's knotweed Polygonum douglasii ssp. austiniae	Flowers in July and fruits in August.	Open, gravelly, shale soils with eroding slopes and banks.	5,800 to 6,600 ft.	USFS Sensitive 3	S		Absent
Barratt's willow Salix barrattiana	Mature fruits in July to August.	Cold, moist soil near or above timberline.	6,800 to 10,500 ft.	USFS Sensitive 3	S		Absent
Shoshonea Shoshonea pulvinata	Flowers during June to July and fruits June to August.	Open, windswept limestone outcrops and ridgetops.	6,800 to 9,000 ft.	USFS Sensitive 3	S		Absent
Alpine meadowrue Thalictrum alpinum	Flowers in late June and fruits in July.	On hummocks with low shrubs in moist, alkaline meadows in montane and subalpine areas.	6,500 to 7,000 ft.	USFS Sensitive 3	S		Present
California false-hellebore Veratrum californicum	Flowers in July to August.	Wet meadows and streambanks in montane, subalpine, and alpine in Engelmann spruce and Douglas-fir habitats.	5,000 to 8,500 ft.	USFS Sensitive 3	S		Present

[1]Nomenclature is based on common names used by the GNF (USFS 2004b) and scientific names used by ITIS (2009). [2] *Source:* MTNHP 2010a. [3]Legal status: FWS LT= Listed Threatened. Forest Service Sensitive 2=rangewide imperilment and 3=regional/state imperilment. [4]Known (K) or suspected (S) occurrence, based on Forest Service 2004b). [5]Gallatin County; source: MTNHP 2009.

Methodology for Analysis

1. Survey for sensitive plant species during the appropriate time of year.

Two sensitive plant surveys were conducted within the Proposed Project Area on all accessible Forest Service lands and within 400 feet of the proposed ROW corridor to address the different phenology (timing of flowering and/or fruiting) of the target species. The first survey (June 21-25, 2010) took place in all habitats and the second survey (August 23-25, 2010) took place only at wetlands and riparian areas. During the first survey, most non-wetland species were blooming although some were at the bud stage as phenology was a few weeks behind during 2010. During the second survey, most wetland species were blooming or in fruit. Most of the sensitive plants were well within the appropriate phenology window during either the first or second survey. A habitat assessment, mentioned below, took place between the two floral surveys. Incidental floristic data from the habitat assessment were collected and incorporated into the survey outcome. Surveys were conducted by foot except where access prevented this (i.e., private entry, steep terrain), in which case habitat was assessed for potential suitability using binoculars. Areas along the centerline of the analysis area or with potential suitable habitat for target species were surveyed more intensively to focus survey efforts. Surveys were floristic, meaning that all taxa were identified to the level necessary to determine if they were sensitive plant species. No species listed in Table 3.4.8-2 were detected on Forest Service lands during the 2010 surveys, and there are no prior records of sensitive plants documented on these lands (MTNHP 2009).

2. Conduct habitat assessment and assess presence/absence of suitable habitat for sensitive plant species.

The habitat assessment was conducted during August 9-12, 2010 on all accessible Forest Service lands within 400 feet of the analysis area. Visually distinctive stands that were inaccessible were scoped using binoculars. Field accessibility was based on proximity to the existing transmission line, public entry and access, traversable terrain or lacking talus, etc. Light Detection and Ranging (LiDAR) aerial imagery (1/3-foot resolution; collected June 4-5, 2009) was used to extrapolate the field data and differentiate between forest stands that were visually distinctive. Habitats surveyed in the Proposed Project Area were mostly forested lands that were dominated by Douglas-fir, lodgepole pine, Engelmann spruce, Rocky Mountain juniper, and limber pine. Other habitats surveyed included shrublands dominated by mountain big sagebrush, dry meadows, and riparian and wetlands areas that included seeps, bogs, hummocks, mesic meadows, and stream and river banks. The elevation ranged between 5,234 to 6,162 feet. Suitable habitat documented for sensitive plants included riparian and wetland areas (seeps, bogs, hummocks, mesic meadows, and stream banks); open woodland, dry meadow, and bunchgrass plant communities that are predominantly native; and big sagebrush associated with Douglas-fir forests. Table 3.4.8-2 provides details about habitat requirements and presence of suitable habitat within the ROW.

Effects Analysis

Alternative 1 - No Action

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1, the existing 69 kilovolt (kV) transmission line would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. During approximately 35 years of operation, the current 40-foot wide ROW supporting the 69 kV line has been maintained for safety and system reliability but has been allowed to re-vegetate with natural vegetation communities. Although the current Special Use Permit (SUP) allows for the lopping of vegetation to within 18 inches of the ground, vegetation has been generally left in its natural state unless it inhibits normal maintenance activities or presents a safety or operational risk. ROW vegetation maintenance and operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, removal of excessive vegetation and hazard trees removal, and transmission structure replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue.

Weed management and removal of excessive vegetation and hazard trees would have a negligible effect to sensitive plants, because sensitive plants are not known to occur within the existing ROW but there suitable habitat. Some reduction in shrub and forb cover within the ROW may occur depending upon maintenance requirements. No effects to habitat or stream quality would occur under Alternative 1 when compared to current conditions.

Summary

Under Alternative 1, there would be negligible effects to suitable habitat for sensitive plants from operation and maintenance activities.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts.

Alternative 2 - Proposed Action

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under Alternative 2, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Under the Action Alternatives, an existing angle would be removed (i.e., ROW straightened) in a meadow area on the floor of the canyon south of Deer Creek. The entire area is within 0.2 mile of the Unites States Highway 191 (US Hwy 191) travel corridor and traverses an adjacent network of roads trails, recreation areas and recreation residences. Line-related human disturbance in the form of patrols and routine maintenance would still occur annually or more often, if needed. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW.

New permanent disturbance for Alternative 2 would include additional land that would be used for widening the ROW and access roads, and structure locations. Forested land that would be cleared for new permanent disturbance is comprised mainly of Douglas-fir and lodgepole pine, but also includes Engelmann spruce, limber pine, and quaking aspen, and totals 14.8 acres (see Table 3.4.7-6 in Forested Vegetation and Fire/Fuels). Sagebrush shrubland and dry grassland/ meadow habitat that would be spanned or used for structure locations comprise 1.8 acres. Other unforested lands include talus, highway, and open water, totaling 2.4 acres.

Temporary disturbance would include land that would be used during construction for overland access (off-road motorized vehicle use), fly yards, decking areas, and pulling and tensioning sites, and then rehabilitated after construction is completed. All temporary disturbances except pulling and tensioning sites (to be determined depending on engineering design) would occur on lands dominated by sagebrush shrubland, dry grassland and meadow, and smaller amounts of forested habitats, totaling 23.5 acres (see Table 3.4.7-6 in Forested Vegetation and Fire/Fuels). Pulling and tensioning and sites would be 53.6 acres for Alternative 2 and would likely disturb vegetation types similar to that of new permanent disturbances, so mostly Douglas-fir and lodgepole pine.

No sensitive plants have been documented on National Forest System (NFS) lands in the project area, despite targeted surveys. Suitable habitat for sensitive plants includes riparian and wetland areas (seeps, bogs, hummocks, mesic meadows, and stream banks); dry grassland and meadow; and sagebrush shrubland habitats. Dry grassland and meadow habitat is associated with large-leaved balsamroot (*Balsamorhiza macrophylla*), and comprises 5.2 acres (12.3%) of the Proposed Action area, most which would be affected by temporary disturbance (4.4 acres). Sagebrush shrubland habitat comprises 16.1 acres (37.8%) of the Proposed Action area, most which would be affected by temporary disturbance (15.1 acres). Roughly half of the sagebrush shrubland is mesic and is potentially suitable habitat for alpine meadowrue (*Thalictrum alpinum*).

Many of the sensitive plant species in Table 3.4.8-2 are associated with riparian and wetland areas. Alternative 2 would cross 0.21 mile of designated floodplains on federal lands, which is the same as Alternative 1. On federal lands, Alternative 2 crosses the Gallatin River eight times, perennial tributary streams 12 times, and intermittent streams seven times, which is the same as Alternative 1. Since all wetland, open water, and riparian habitat would be spanned for protecting wetland and other surface water resources, suitable habitat for potentially undetected sensitive plant species would also be protected.

Proposed Action activities would create favorable conditions for noxious and invasive weeds. This would contribute to degradation of potentially suitable habitat for sensitive species during and after construction is completed. The Weed Management, Reclamation, and Revegetation Plan (Appendix C) addresses management of noxious and invasive weeds, and the restoration and revegetation of disturbed areas.

Alternative 3 - Cave Creek and Cascade East LROs

Direct and Indirect Effects of Alternative 3

Alternative 3 would have the same land area of disturbance or impacts to dry grassland and meadow habitats, sagebrush shrubland habitats, and designated floodplains as Alternative 2. On federal lands, Alternative 3 crosses the Gallatin River six times, perennial tributary streams eight times, and intermittent streams seven times; which means there would be fewer crossings of the river and perennial tributary streams than Alternative 2.

Alternative 3 generally moves the transmission line further to the east of recreation residences. Existing ROW that would be abandoned for the Alternative 3 Local Routing Options (LROs) would remain permanently disturbed because these portions of ROW would be still used and maintained for distribution to residences. Alternative 3 would utilize the same alignment as Alternative 2, with the following exceptions:

Cave Creek LRO

Portions of this LRO would occupy the original 1950s 50 kV transmission line corridor that was abandoned in the early 1970s when the current 69 kV transmission line was upgraded. This LRO would require the removal of 1.9 acres of lodgepole pine forest.

Cascade East LRO

This LRO would eliminate two highway and two river crossings. This LRO would require marginal tree clearing due to the alignment moving east of US Hwy 191 along less forested slopes. This LRO would require the removal of 6.2 acres of predominantly Douglas-fir (mostly on open forested talus slopes), with lesser amounts of Engelmann spruce and lodgepole pine forests. In addition, 0.3 acre of talus slopes and 0.1 acre of river would be crossed.

Alternative 4 - Cave Creek and Cascade West LROs

Direct and Indirect Effects of Alternative 4

Alternative 4 would have the same land area of disturbance or impacts to dry grassland and meadow habitats, sagebrush shrubland habitats, and designated floodplains as Alternatives 2 and 3. On federal lands, Alternative 4 crosses the Gallatin River 6 times, perennial tributary streams 14 times, and intermittent streams seven times. This means there would be more crossings of the perennial tributary streams than Alternatives 1, 2, or 3; and the same number of crossings of the river as Alternative 3.

Alternative 4 generally moves the transmission line further to the west of recreational residences. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would be still used and maintained for distribution to residences. Alternative 4 would utilize the same alignment as Alternative 3, with the exception of using the Cascade West LRO instead of the Cascade East LRO.

Cascade West LRO

This LRO would eliminate two highway and two river crossings. This LRO would require the removal of 6.1 acres of predominantly lodgepole pine forests, with lesser amounts of Engelmann spruce and Douglas fir forests. These forested habitats are moist relative to the general area, and there are many interspersing unnamed creeks with downed logs that flow into Cascade Creek.

Summary for Action Alternatives (2, 3, and 4)

Project Design Features (PDFs) for avoiding wetland, open water, and riparian habitat through spanning or micrositing would protect most suitable habitat for sensitive plants. Dry grassland and meadow habitats and sagebrush shrubland habitats would mostly be in areas impacted by temporary disturbance and not permanent disturbance. Most mesic portions of sagebrush shrubland habitats would be protected as wetland habitat. Based on this and the fact that no sensitive plants were found during field surveys, Action Alternatives 2, 3, and 4 would have a negligible impact to sensitive plants and a negligible to minor impact to habitats in which sensitive plants are expected to occur.

Cumulative Effects of the Action Alternatives

Baseline condition is described in the affected environment section. Other current and future projects in the analysis area would have negligible to minor cumulative effects to sensitive plants. The proposed US Hwy 191 Gallatin Canyon Safety Improvements would involve widening and improving US Hwy 191, which could remove potential habitat for sensitive species by removing riparian trees. The GNF timber sale in the Jack Creek area, the Montana Opticom project, and GNF fuel reductions projects between the river and wilderness area would result in the removal of trees, which could result the loss of suitable habitat for sensitive plants. GNF annual noxious weed spraying, recreation home project requests, and Moose Creek Flat Campground fishing platform rebuild would likely have negligible cumulative effects. Habitat fragmentation from other projects would not likely be substantially increased, given that most cumulative projects would occur within the currently fragmented Gallatin River Canyon.

Effects Determination

Sensitive plants determination of no impact is based on absence of any sensitive plants being found in the Proposed Project Area during field surveys. Multiple surveys were conducted during the appropriate time of year by qualified botanists. It is unlikely any sensitive plants occur in the Proposed Project Area because these habitats were surveyed and no sensitive plants were discovered. There are also no records of sensitive plants in the Proposed Project Area on file with the Forest Service or the Montana National Heritage Program (MTNHP) (2009). Some suitable habitat for sensitive plant species was encountered in the Proposed Project Area and is indicated by species in Tables 3.4.8-2 and 3.4.8-3.

TABLE 3.4.8-3 EFFECTS DETERMINATION FOR SENSITIVE PLANT SPECIES FOR THE GALLATIN NF (2011) THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR

SPECIES NAME	LEGAL STATUS	EFFECTS DETERMINATION[1]			
		ALT. 1	ALT. 2	ALT. 3	ALT. 4
Musk-root *Adoxa moschatellina*	USFS Sensitive 3	MHN	MHN	MHN	MHN
Short styled columbine *Aquilegia brevistyla*	USFS Sensitive 3	MHN	MHN	MHN	MHN
Large-leaved balsamroot *Balsamorhiza macrophylla*	USFS Sensitive 2	MHN	MHN	MHN	MHN
Small yellow lady's slipper *Cypripedium parviflorum*	USFS Sensitive 3	MHN	MHN	MHN	MHN
English sundew *Drosera anglica*	USFS Sensitive 3	NI	NI	NI	NI
Beaked spike rush *Eleocharis rostellata*	USFS Sensitive 3	MHN	MHN	MHN	MHN
Giant helleborine *Epipactis gigantea*	USFS Sensitive 2	NI	NI	NI	NI
Discoid goldenweed *Haplopappus macronema var. macronema*	USFS Sensitive 3	NI	NI	NI	NI
Slender cotton grass *Eriophorum gracile*	USFS Sensitive 3	MHN	MHN	MHN	MHN
Hiker's gentian *Gentianopsis simplex*	USFS Sensitive 3	MHN	MHN	MHN	MHN
Northern rattlesnake plantain *Goodyera repens*	USFS Sensitive 3	NI	NI	NI	NI
Hall's rush *Juncus hallii*	USFS Sensitive 3	NI	NI	NI	NI
Dwarf purple monkey flower *Mimulus nanus*	USFS Sensitive 3	NI	NI	NI	NI
Whitebark pine *Pinus albicaulis*	USFS Sensitive 2	NI	NI	NI	NI
Austin's knotweed *Polygonum douglasii* ssp. *austiniae*	USFS Sensitive 3	NI	NI	NI	NI
Barratt's willow *Salix barrattiana*	USFS Sensitive 3	NI	NI	NI	NI
Shoshonea *Shoshonea pulvinata*	USFS Sensitive 3	NI	NI	NI	NI
Alpine meadowrue *Thalictrum alpinum*	USFS Sensitive 3	MHN	MHN	MHN	MHN
California false-hellebore *Veratrum californicum*	USFS Sensitive 3	MHN	MHN	MHN	MHN

[1]NI=no impact and MHN=may impact suitable habitat but not lead to listing.

Whitebark pine is a US Fish and Wildlife Service (USFWS) Candidate and GNF Sensitive species that occurs in the surrounding area in high elevations, upper montane habitats near tree line (see Figure 3.4.7-1 in Section 3.4.7 – Forested Vegetation and Fire/Fuels). The Proposed Project Area tends to be drier and of more moderate elevations than the surrounding area. Whitebark pine was not detected during the surveys, so this species does not occur and there is not suitable habitat present in the Proposed Project Area.

Comparison of Alternatives

Alternatives 2 (Proposed Action), 3, and 4 would require new permanent and temporary disturbance, while Alternative 1 (No Action) would not require any additional disturbance. Alternatives 3 and 4 would require new permanent habitat disturbances of 27.1 acres, 8.1 acres more than Alternative 2 (19.0 acres). Temporary habitat disturbance would be approximately 23.5 acres for Alternatives 2, 3, and 4. Vegetation removal and weed and hazard tree management associated with all alternatives would have negligible effects on sensitive plants.

No sensitive plants have been documented on NFS lands for any alternative; however suitable habitat exists in riparian and wetland areas; dry grassland and meadow; and sagebrush shrubland habitats. Alternative 3 has the fewest river and perennial stream crossings on federal lands (14); and all other alternatives have the same number of crossings (20). Alternatives 1 and 3 have the lowest acreage of wetlands crossed. Since all wetland, open water, and riparian habitat would be spanned for protecting wetland and other surface water resources, suitable habitat for potentially undetected sensitive plant species would also be protected for all alternatives. Some dry grassland/meadow and sagebrush shrubland habitat would be affected, but most direct impacts would be from temporary disturbance in areas that have been surveyed for sensitive plants. All alternatives would have a negligible to minor impact to habitats in which sensitive plants are expected to occur. Of these, Alternatives 1 and 3 would have the least impact to habitat, but Alternatives 2 and 4 would only have a slightly higher impact.

Summary Conclusion

Suitable habitat for Forest Sensitive plant species is limited or absent in all alternatives. Under the Proposed Action (Alternative 2), suitable habitat for sensitive plants would have negligible to minor impacts and be avoided through spanning or micrositing. Some dry grassland/meadow and sagebrush shrubland habitat would be affected, but most direct impacts would be from temporary disturbance or tower structure locations, as these habitats are easily spanned.

The loss of habitats would be expected to be negligible due the linear nature of these disturbances and its small proportion relative to surrounding habitats. Overall, the Proposed Action and alternatives would not contribute toward a trend toward federal listing or loss of viability to sensitive plant populations or species. Construction, operations, and maintenance under the Action Alternatives would have a low likelihood of affecting wetlands or riparian habitat.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

PDFs common to several issues and specific to biological resources are proposed to reduce or avoid effects to biological resources, including sensitive plants. Best management practices (BMPs) and PDFs applicable to sensitive plants (1.1, 1.2, 1.3, 1.5, 1.9, 5.1, 5.2, and 5.7) are listed in Chapter 2. These project design features would minimize impacts to sensitive plants from the Proposed Project.

Consistency with Laws, Regulations, and Forest Plan

The Proposed Action would comply with forest-wide standard 6.a.12 (USFS 1987) because there are no sensitive plants in the proposed ROW and PDFs would minimize impacts to suitable habitat of these species.

The Proposed Action would comply with Section 2670 of the Forest Service Manual (FSM) because all Forest Sensitive plant species for the GNF were evaluated.

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3.4.9 Wildlife

Description of Issue

Wildlife species were identified as an analysis issue during interdisciplinary team scoping discussions, initial public scoping, and the Notice of Intent (NOI) comment period. Right-of-way (ROW) clearing, construction, and maintenance activities, access road widening, and increased vehicle activity could cause impacts to wildlife species and their habitat.

Wildlife species were organized into the following species groups: 1) Threatened, Endangered, and Proposed Threatened species (TES); 2) Management Indicator Species (MIS); 3) Forest Service Region 1 Sensitive Species (Sensitive Species); 4) Migratory birds; and 5) Amphibians and reptiles. Table 3.4.9-1 lists the wildlife species that were evaluated for each species group and potential effects that were identified. Summarized information on these species is also provided in Chapter 1 (Analysis Issues). Wildlife species protection status, a brief habitat description, project area presence, and Final Environmental Impact Statement (FEIS) analysis status is summarized in Table 3.4.9-3.

TABLE 3.4.9-1 SPECIES GROUP AND SPECIES INCLUDED

SPECIES GROUP	SPECIES INCLUDED IN GROUP	POTENTIAL EFFECTS
Threatened, Endangered, and Proposed Threatened Species (TES)	Grizzly Bear[3],Canada Lynx, and Wolverine[4]	Habitat alteration, habitat loss, and helicopter and construction disturbance.
Management Indicator Species (MIS)	Marten, Elk, Northern Goshawk[1], and Bald Eagle[2]	Habitat alteration, habitat loss, helicopter and construction disturbance, increased collision risk, sedimentation, and water quality declines.
Sensitive Species	Gray Wolf, Bighorn Sheep, Peregrine Falcon[1], Harlequin Duck[1]	Habitat alteration, habitat loss, habitat fragmentation, helicopter and construction disturbance, increased perches for predatory raptors, increased collision risk, sedimentation, and water quality declines.
Migratory Bird Species of Concern	Black Rosy-Finch, Bobolink, Brewer's Sparrow, Brown Creeper, Burrowing Owl, Cassin's Finch, Clark's Nutcracker, Grasshopper Sparrow, Gray-crowned Rosy-Finch, Great Blue Heron, Great Gray Owl, Horned Grebe, Lewis's Woodpecker, Pacific Wren, Sage Sparrow, Loggerhead Shrike, and Golden Eagle	Habitat alteration, habitat loss, helicopter and construction disturbance, and increased collision risk.
Fisheries and Aquatic Resources	Wild Trout[3]	Habitat alteration, habitat loss, sedimentation, and water quality declines.
Amphibians and Reptiles	Western Toad	Habitat alteration, habitat loss, sedimentation, and water quality declines.

[1] Indicated that this is also a Migratory Bird Species of Concern (SOC)
[2] Indicates that this is also a Sensitive Species
[3] Indicates that this is also an MIS
[4]Proposed Threatened (USFS 2013)

Indicators

Indicators for wildlife species include potential effects to wildlife species for each alternative that would result in habitat loss (acreage) associated with ground disturbance as a result of the Proposed Project and the Alternatives. The amount of habitat loss and species specific impact would be variable for each species. Species specific indicators are discussed bellow. Table 3.4.9-2 defines the terms used to describe magnitude and duration of effects to wildlife species.

TABLE 3.4.9-2 DESCRIPTION OF IMPACTS LEVELS FOR WILDLIFE SPECIES

THRESHOLDS*	DESCRIPTION RELATIVE TO WILDLIFE
No Impact	No wildlife species or habitat would be affected.
Negligible	Wildlife species or habitat would not be affected to a biologically significant extent. Any change would likely not be detectable. If changes were detectable, the effects would be very slight, local, short-term (<2 years). No Project Design Features (PDFs) would be necessary.
Minor	Effects to wildlife species or habitat would be measurable, although would be small, likely short-term (<2 years), and localized within the Proposed Project. No PDFs would be necessary.
Moderate	Effects to wildlife species or habitat would be measurable and long-term (>10 years), but would be localized within the Proposed Project. PDFs would be necessary, but the measures would likely be successful.
Major	Effects to wildlife species or habitat would be readily measurable, long-term (>20 years), would have substantial consequences, and would be noticed throughout the Proposed Project. PDFs would be necessary and their success would not be guaranteed.

*Thresholds and descriptions are based on general ecological principals for wildlife and habitats.

Table 3.4.9-3 lists all of the special status wildlife species that are the subject of this analysis.

TABLE 3.4.9-3 THREATENED, ENDANGERED, AND PROPOSED THREATENED SPECIES, MANAGEMENT INDICATOR, SENSITIVE WILDLIFE, MIGRATORY BIRD, AND AMPHIBIAN AND REPTILE SPECIES THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR IN THE GENERAL PROJECT AREA

SPECIES NAME	HABITAT	LEGAL STATUS[1]	SPECIES PRESENT/ ABSENT[2]	HABITAT PRESENT/ ABSENT[3]	SENSITIVE PERIODS (NESTING & BREEDING)
THREATENED, ENDANGERED, AND PROPOSED THREATENED SPECIES (TES)					
Grizzly Bear *Ursus arctos* Note: the grizzly bear is also a Management Indicator Species	Moist, low elevation forested sites are utilized for spring and summer foraging. High vegetation concentration is important for foraging and escape cover. Can be found in mature forest and prairie ecosystems as well. Winter dens occur at higher elevation.	USFWS Threatened	Present	Present	May-July
Canada Lynx *Lynx canadensis*	Conifer and deciduous forests with closed canopies, consisting of mainly Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), moist Douglas-fir (*Pseudotsuga menziesii*), or quaking aspen (*Populus tremuloides*). Relies heavily on snowshoe hare (*Lepus americanus*) for prey so habitat that supports the hares has potential to support the lynx.	USFWS Threatened	Present	Present	March-June
Wolverine[4] *Gulo gulo*	High elevation alpine and boreal forests that are cold and receive enough winter precipitation to reliably maintain deep persistent snow late into the warm season (USFWS 2011).	USFWS Proposed Threatened,	Present	Present	January - April
MANAGEMENT INDICATOR SPECIES (MIS)					
Marten *Martes americana*	Late-successional forest types with complex structure and abundant coarse, woody debris on and near the ground (Coffin et al. 2002).		Present	Present	July-August (breeding)
Elk *Cervus elaphus*	Mature stands of deciduous and conifer forest habitats, with dense brush understory for security and thermal cover. Suitable winter range habitat is very important.		Present	Present	September-October (breeding)
Northern Goshawk *Accipiter gentilis*	Mature forests with many large diameter trees, closed canopy, and relatively open understory.		Present	Present	April-August
Bald Eagle[4] *Haliaeetus leucocephalus*	Areas immediately adjacent to wetlands, major water bodies, spring spawning streams, ungulate winter ranges and open water areas.	USFS Sensitive	Present	Present	March-July
SENSITIVE SPECIES					
Gray Wolf *Canis lupus*	Habitat generalists, and make use of a wide variety of habitat types. Typically avoids high use areas such as busy road corridors.	USFS Sensitive	Present	Present	N/A
Bighorn Sheep *Ovis canadensis*	Steep, open slopes and cliffs. Winter habitat is dependent on snow accumulation, so south facing slopes or slopes that are subjected to high winds are used.	USFS Sensitive	Present	Present	April-June (lambing)
Peregrine falcon[4] *Falco peregrines*	Open cliffs and generally open areas for foraging	USFS Sensitive	Present	Present	April-July
Harlequin Duck[4]	Streams with braided channels, islands, and eddies for loafing.	USFS	Present	Present	May-June

Species Name	Habitat	Legal Status[1]	Species Present/ Absent[2]	Habitat Present/ Absent[3]	Sensitive Periods (Nesting & Breeding)
Histrionicus histrionicus		Sensitive			(breeding)
MIGRATORY BIRDS					
Black rosy-finch *Leucosticte atrata*	Nest in crevices in cliffs and talus among glaciers and snowfields above, not within the Project Area. Utilizes fields, cultivated lands, brushy areas, and around human habitation during winter and migration (Johnson 2002).	MT SOC	Present	Present-Winter	July-August
Bobolink *Dolichonyx oryzivorus*	Nests built in tall grass and mixed-grass prairies (Martin and Gavin 1995).	MT SOC	Present	Present-Nest	May-September (summer migrant)
Brewer's sparrow *Spizella breweri*	Nests in shrublands dominated by big sagebrush, but may also occur in pinyon-juniper woodlands or coniferous forests (Rotenberry et al. 1999).	MT SOC	Present	Present-Nest	May-August
Brown creeper *Certhia americana*	Nest in coniferous and mixed coniferous-deciduous forests, preferring mature and old-growth stands with high canopy cover in the western US, and in mature western red-cedar-western hemlock, spruce-fir, and mixed-conifer forests than in pine or younger forests in western Montana and Idaho (Hejl et al. 2002b; Hutto and Young 1999).	MT SOC	Present	Present	May-July
Burrowing owl *Athene cunicularia*	Nests in open grasslands, where abandoned burrows dug by mammals such as ground squirrels, prairie dogs, and badgers are available (Klute et al. 2003).	MT SOC	UKN	Potential	April-May
Cassin's finch *Carpodacus cassinii*	Nest in every major forest type and timber-harvest regime in Montana, including riparian cottonwood, but are especially common in ponderosa pine and post-fire forests; they occur less often in lodgepole pine, sagebrush, and grassland (Hutto and Young 1999).	MT SOC	Present	Present	May-July
Clark's nutcracker *Nucifraga columbiana*	Typically occupy conifer forests dominated by whitebark pine at higher elevations, and ponderosa pine and limber pine along with Douglas firs at lower elevations, relying largely on seeds of these species for food (Mewaldt 1956).	MT SOC	Present	Present	March-May
Golden Eagle *Aquila chrysaetos*	Generally open coniferous forest. Prefers large trees or cliffs for nesting and roosting. Hunts for a variety of prey by soaring over open terrain or from a perch (USDA 1991:92)	MT SOC	Present	Present	March-July
Grasshopper sparrow *Ammodramus savannarum*	Primarily utilizes grasslands with moderate shrub cover; big sagebrush seems to be a preferred species (Vickery 1996).	MT SOC	Present	Present	May-August
Gray-crowned rosy-finch *Leucosticte tephrocotis*	Breeding, nesting, and winter roosting habitat in Montana is similar to other regions in the species' range (Johnson 1965; Hendricks 1981). Nest in crevices in cliffs and talus among glaciers and snowfields above timberline, and forage in barren, rocky or grassy areas adjacent to the nesting sites; in migration and winter they also occur in open situations, fields, cultivated lands, brushy areas, and around human habitation.	MT SOC	Present	Present-Winter	May-August

Species Name	Habitat	Legal Status[1]	Species Present/ Absent[2]	Habitat Present/ Absent[3]	Sensitive Periods (Nesting & Breeding)
Great blue heron *Ardea herodias*	Occur in urban wetlands and wilderness settings. Most Montana nesting colonies are in cottonwoods along major rivers and lakes; a smaller number occur in riparian ponderosa pines and on islands in prairie wetlands. Nesting trees are the largest available. Active colonies are farther from rivers than inactive colonies. The number of nests in the colony corresponds to the distance from roads (Parker 1980).	MT SOC	Present	Present	April-August
Great gray owl *Strix nebulosa*	Rangewide it is present in deciduous or coniferous forests; and in Idaho and Wyoming it is mostly present in areas dominated by lodgepole pine, Douglas-fir, and quaking aspen (*Populus tremuloides*) (Bull and Duncan 1993).	MT SOC	Present	Present	March-July
Horned grebe *Podiceps auritus*	Found in shallow freshwater ponds and marshes with beds of emergent vegetation (Dubois 1919).	MT SOC	Present	Potential	May-October
Lewis's woodpecker *Melanerpes lewis*	Occur in river bottom woods and forest edge habitats. Breeding habitat is open forest and woodland, often logged or burned, including oak and coniferous forest; primarily ponderosa pine, riparian woodland and orchards, and less commonly in pinyon-juniper (AOU 1983).	MT SOC	Potential	Potential	June-August
Pacific wren *Troglodytes pacificus*	Prefer large uncut stands of old-growth and mature coniferous forests, and also occur in riparian cottonwoods and aspens. In Montana they are especially common in cedar-hemlock, cedar-grand fir, and spruce-fir forests and are strongly associated with riparian areas within these forest types (Hutto and Young 1999; Casey 2000).	MT SOC	Present	Present	April-June
Sage sparrow *Amphispiza bellii*	The sage sparrow is associated with shrublands dominated by big sagebrush with a perennial bunchgrass understory (Braun et al. 1976; Paige and Ritter 1999).	MT SOC	Potential	Potential	February-April
FISHERIES AND AQUATIC RESOURCES					
Wild Trout *Salomonidae*[5]	Cool, clean streams and lakes.	-	Present	Present	-
REPTILES AND AMPHIBIANS					
Western toad *Bufo boreas*	Non-flowing aquatic habitats and adjacent uplands	USFS Sensitive	Present	Present	March-July

[1]Sources: USFS 2011, 2013; USFWS 2011. [2]Species present/ absent within one mile of proposed ROW corridor. Source: MTNHP 2009. [3]Habitat present/ absent within one mile of proposed ROW corridor. [4]Indicates that this is also a Migratory Bird Species of Concern (SOC). [5]Indicates that this is also a Management Indicator Species (MIS). [6]Indicates that this is also a Sensitive Species.

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Applicable Laws, Regulations, Forest Plan Direction

The following presents an overview of laws, regulations and Gallatin National Forest Management Plan of 1987 (Forest Plan) direction applicable to wildlife resources (including fish) potentially affected by the Proposed Project. Species or species group-specific laws, regulations and Forest Plan direction are discussed in detail under relevant wildlife subsections.

Endangered Species Act

The Endangered Species Act (ESA) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The ESA is implemented by two federal agencies, the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, which have the ability to officially list plant and animal species as "endangered" or "threatened." Section 7 of the ESA imposes an affirmative duty on federal agencies to ensure that their actions (including permitting) are not likely to jeopardize the continued existence of a listed species or result in the destruction or modification of their habitat.

Migratory Bird Treaty Act (16 U.S.C. 703-712)

Under the Migratory Bird Treaty Act (MBTA), which implements various treaties and conventions for the protection of migratory birds, it is unlawful to take, kill or possess any migratory birds, except as regulated by authorized programs. Executive Order (E.O.) 13186 is associated with the MBTA and requires agencies to ensure that environmental analyses evaluate the effects of federal actions and agency plans on migratory birds, with emphasis on Species of Concern (SOC).

Bald and Golden Eagle Protection Act (16 U.S.C. 668)

Under the Bald and Golden Eagle Protection Act (BGEPA), it is unlawful to take (to include harm, harass), kill or possess any bald or golden eagle, except as regulated by authorized programs. The United States Forest Service (Forest Service or USFS) has a responsibility to ensure that environmental analyses evaluate the effects of federal actions and agency plans on bald and golden eagles.

National Forest Management Act (1976)

The Forest Service is required by the National Forest Management Act (NFMA) to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives” 16 United States Code (U.S.C.) § 1604(g)(3)(B). On April 9, 2012 the Department of Agriculture issued a final planning rule for National Forest System (NFS) land management planning (2012 Rule) 77 Code of Federal Regulation [CFR] 68 [21162-21276]). None of the requirements of the 2012 Rule apply to projects and activities on the GNF, as the Gallatin Forest Plan was developed under a prior planning rule (36 CFR 219.17(c)). Furthermore, the 2012 Rule explains, “[The 2012 Rule] supersedes any prior planning regulation. No obligations remain from any prior planning regulation, except those that are specifically included in a unit’s existing plan. Existing plans will remain in effect until revised” (36 CFR 219.17). NFMA requires that projects and activities be consistent with the governing Forest Plan (16 U.S.C. § 1604 (i)).

Gallatin National Forest Plan (1987)

Management direction for the Gallatin National Forest (GNF) is found in the Forest Plan (USFS 1987). The following section highlights Forest wide standards that are applicable to the proposed action:

> Big game winter range will be managed to meet the forage and cover needs of deer, elk, moose, and other big game species in coordination with other uses (USFS 1987: II-18).
>
> Emphasis will be given to the management of special and unique wildlife habitats such as wallows, licks, talus, cliffs, caves and riparian areas (USFS 1987: II-18).
>
> Habitat for waterfowl, shorebirds, and wading birds will be maintained and improved through coordination of land use activities and direct habitat improvements (USFS 1987: II-18).
>
> Habitat that is essential for species identified in the Sensitive Species list developed for the Northern Region will be managed to maintain these species (USFS 1987: II-18).
>
> "Indicator species," which have been identified as species groups whose habitat is most likely to be affected by Forest management activities, will be monitored to determine population change (USFS 1987: II-18).
>
> A biological assessment will be completed prior to implementation of activities that have potential to affect threatened and endangered species (USFS 1987: II-19).

The project area identified falls predominantly within Management Area (MA) 25 (electrical and transmission lines and pipelines, climatic and snow measuring sites and electronic site). As well as Forest-wide standards listed above, the following standard applies in MA 25:

> Design facilities to mitigate adverse impacts on raptors and other wildlife (USFS 1987: III-69).

All alternatives including the No Action Alternative would not conflict with any laws, regulations and Forest Plan direction indicated above.

General Affected Environment for all Wildlife Species

The existing 69 kilovolt (kV) transmission line roughly parallels United States Highway 191 (US Hwy 191) and the Gallatin River, crossing the highway eight times and the river eight times on NFS lands. For the purpose of a general affected environment discussion, the analysis area is defined as the land that would be used for widening the ROW, access roads, and new ROW associated with Local Routing Options (LROs). Timber stand compartments surrounding the ROW were considered to provide landscape scale context. The Gallatin River flows from south to north and within the analysis area is primarily restricted to a relatively narrow, winding channel in a mountain canyon. Much of the river banks are forested with stretches of meadows and steep rocky slopes. There are no lakes, but there are numerous perennial and intermittent streams and the mainstem river within the analysis area. Within the analysis area, the primary tributaries to the Gallatin River include the following: West Fork Gallatin River, Deer Creek, Portal Creek, Moose Creek, Swan Creek, Cascade Creek, Hell Roaring Creek, Storm Castle Creek (also known as Squaw Creek), and Logger Creek. Numerous unnamed intermittent streams and ephemeral drainages also drain the area.

Within the GNF, the existing ROW traverses both forested and non-forested habitats. In forested areas, the maintained ROW is predominantly vegetated by sapling tree, shrub, grass and forb species adjacent to stands of Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), and/or Engelmann spruce (*Picea engelmannii*). Shrub communities within the forested sections of the ROW are dominated by huckleberry (*Vaccinium* spp.), common snowberry

(*Symphoricarpos albus*), mallow ninebark (*Physocarpus malvaceus*), Woods' rose (*Rosa woodsii*), and other species that benefit from sunlight penetration created by openings in the forest canopy. These shrubs are often associated with a mixture of evergreen and deciduous tree saplings with Douglas-fir, lodgepole pine, Engelmann spruce and Rocky Mountain maple (*Acer glabrum*) being the most prevalent species.

Where adjacent to high canopy cover forested stands, the ROW presents important understory vegetation, providing forage, nesting habitat, thermal protection, and security cover for a variety of wildlife species. Currently down woody debris ranges from 1.0 to 15 tons per acre (Mean=5.8 tons per acre) in the analysis area, providing structural complexity and additional thermal cover for wildlife. Non-forested portions of the existing ROW extend through shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grasslands.

The Forest Service manages vegetation data (or "strata") for timber compartments using the Timber Stand Management Record System (TSMRS) (USFS n.d.). The land in the nine timber compartments surrounding the Proposed Project Area is 82 percent forested, 16 percent unforested, and two percent unidentified. The forested lands are dominated by lodgepole pine, Douglas-fir, Engelmann spruce, subalpine fir (*Abies lasiocarpa*), and whitebark pine (*Pinus albicaulis*). The unforested lands are comprised of grasslands, meadows, sagebrush shrublands, willows (*Salix* spp.), marshes and fens, talus, tundra, streams, rivers, bedrock, cliffs, avalanche chutes, and civilized areas. Unidentified TSMRS areas are mostly likely forested habitat based on field observations.

During approximately 35 years of operation, the current 40-foot wide ROW supporting the 69 kV line has been maintained for safety and system reliability, but has been allowed to re-vegetate with natural vegetation communities. Although the current Special Use Permit (SUP) allows for the lopping of vegetation to within 18 inches of the ground, vegetation has been generally left in its natural state unless it inhibits normal maintenance activities or presents a safety or operational risk. As warranted, hazard trees that are an immediate threat to the transmission line and present a risk of fire, equipment damage or power outage are removed from the ROW as allowed by the current SUP. Line-related human disturbance in the form of patrols and routine maintenance occurs annually or more often, if needed.

Habitat for the Proposed Project Area is described further and analyzed in Section 3.4.4 – Water Resources; Wetlands and Section 3.4.7– Forested Vegetation and Fire/Fuels of this FEIS.

Affected environment and effects analysis for species in each species group is provided below.

Threatened, Endangered and Proposed Threatened Animal Species

Threatened, endangered, and proposed threatened species (TES) described in this section include federally (i.e., USFWS) listed species protected under the ESA. According to the ESA, endangered species are animals or plants in danger of extinction within the foreseeable future throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range. This section addresses threatened and endangered animal species. Species proposed for listing are those candidate species that were found to warrant listing as either threatened or endangered and were officially proposed as such in a Federal Register notice after the completion of a status review and consideration of other protective conservation measures.

There are no endangered species currently known or suspected to occur on the GNF. Threatened species analyzed in this FEIS include grizzly bear (*Ursus arctos*) and Canada lynx (*Lynx*

canadensis), and their habitat which could potentially be affected by construction, operation of the transmission line, and access roads. Proposed threatened species analyzed in this FEIS include the wolverine (*Gulo gulo*) and their habitat which could potentially be affected by construction, operation of the transmission line, and access roads. Impacts may include habitat loss, noise disturbance from human presence and construction equipment.

Grizzly Bear

Introduction

Grizzly bears are listed as a Threatened species under the ESA. In April 2007, the USFWS designated the grizzly bear in the Greater Yellowstone Ecosystem as a Distinct Population Segment (DPS) and removed this segment from the Endangered Species List, at which time it was added to the Sensitive Species list for the GNF. On September 21, 2009, an order was issued by the US District Court for the District of Montana, Missoula Division (Greater Yellowstone Coalition v. Servheen, 07-cv-00134-DWM), which enjoined and vacated the delisting of the Greater Yellowstone area grizzly population.

Grizzly bears were identified as an analysis issue during interdisciplinary team scoping discussions, initial public scoping, and the NOI comment period. This species was included as an issue because the Proposed Project could affect individuals of this species, and associated habitat where grizzly bears could occur. A single population of grizzly bears occurs inside and outside the wilderness, and inside and outside the grizzly bear recovery zone. Because of current high levels of human use and the extensive network of roads (including US Hwy 191) within the Proposed Project Area, grizzly bear presence is considered minimal and the area would be presumed to have very limited value to bears. Potential impacts to grizzly bears were addressed to take into account the low potential that an individual would occur in the Proposed Project Area.

Applicable Laws, Regulations, Policy, and Forest Plan Direction

The grizzly bear was listed as Threatened under the ESA on July 28, 1975 and is subject to the rules and regulations of this act. Under Section 7(a)(2) of the ESA, the Forest Service must ensure that any action it authorizes is not likely to jeopardize the continued existence of this species or negatively impact federally designated critical habitat. Effects of the selected alternative were analyzed in a Biological Assessment (BA) prepared for the Proposed Project.

In 2007, the USFWS delisted the DPS of the grizzly bear for the Greater Yellowstone area (72 CFR 14866). This resulted in Forest Plan Amendment 27, which formally adopted a Conservation Strategy direction for grizzly bear management in the GNF. However, the grizzly bear was then again listed as Threatened in 2009 (75 CFR 14496 14498). Under this relisting, Forest Plan Amendment 27 is nullified and grizzly bear management in the GNF reverts to Forest Plan direction in place prior to delisting. This direction includes Forest Plan Amendment 19, which applies to access management inside the grizzly bear recovery zone, and requires that there be:

no increases in open motorized access route density;
no increases in total motorized access route density; and
no decreases in the amount of core area from the current levels.

Additional GNF Forest Plan direction for grizzly bears includes applying the grizzly bear guidelines in Appendix G of the Forest Plan (USFS 1987: II-4). Forest Plan direction prior to Amendment 27 applies only to the area inside the Grizzly Bear Recovery Zone. The Proposed Project is located entirely outside the Grizzly Bear Recovery Zone; therefore, Amendment 19 and Appendix G of the Forest Plan, which contain management standards, are not directly applicable to the Proposed Project. However, under the regulations of the ESA the grizzly bear is still

protected wherever it occurs, although there are currently no management *standards* that apply to actions conducted outside the recovery zone. The Forest Plan lists the grizzly bear as an MIS for Threatened species (USFS 1987: II-19) and directs that "indicators species" be monitored to determine population change.

The GNF Travel Management Plan (USFS 2006b) provides direction pertaining to the construction and use of roads for projects both within and outside the recovery zone, and includes a guideline (G-3 p. I-13) to consider applying temporary localized restrictions to prevent conflicts with TES. In addition, a forest-wide Special Order (#07-11-00-01) regulates the storage of food and other attractants on NFS lands within the entire GNF boundary, for the purpose of minimizing adverse interactions between humans, bears and other wildlife. Also, the USFWS has issued two Biological Opinions, each with terms and conditions that apply to GNF management actions outside the grizzly bear recovery zone. These opinions were issued in response to BAs prepared by the GNF for: *Effects of the Forest Plan on Grizzly Bears that Occur outside the Greater Yellowstone Area Recovery Zone* (2004) and *The Gallatin National Forest Travel Management Plan FEIS* (2006a).

Affected Environment

A general habitat description for the Proposed Project Area is included above. The GNF is included in the Greater Yellowstone Ecosystem. Preferred habitat for grizzly bears in the Greater Yellowstone Ecosystem varies depending on what food source the bears are seeking. Upon emergence from hibernation dens, grizzly bears seek lower elevations, drainage bottoms, avalanche shoots, and ungulate winter ranges where high-energy foods would be more readily available. Throughout the late spring and early summer, grizzlies would follow edible plant phenology back to higher elevations. No matter what elevation grizzly bears may be found at, the presence of forest cover in the immediate vicinity is important to grizzly bear habitat. Blanchard (1978) found that 90 percent of all radio-collared bear locations were within forest cover too dense to observe the bear from the air. Schallenberger and Jonkel (1980) found that grizzly bears occurred in forests in over 80 percent of their radio relocations. One major attribute to suitable grizzly bear habitat is the absence of maintained roads. Numerous studies using radio-collared grizzly bears have shown that individuals rarely occur near occupied roads (Mattson et al. 1987; McLellan and Shackleton 1988; Kasworm and Manley 1990). Kasworm and Manley (1990) found that grizzly bears in low population densities avoided habitat within approximately 900 meters (0.5 mile) of roads. Mattson et al. (1987) found that grizzly bears in the high density population of Yellowstone National Park avoided habitat within 500 meters (0.31 mile) of roads in the spring and summer and within three kilometers (1.86 miles) of roads in the fall.

Dens are typically dug on steep slopes where wind and topography cause an accumulation of deep snow, which is unlikely to melt during warmer periods and insulates the bear from extreme external temperatures. The entire analysis area is well below the elevation level at which grizzly bears typically establish den sites. Grizzly bears are mainly solitary animals, except for brief interactions during the breeding season. Other social interactions are generally restricted to family groups of mother and offspring, or siblings that may stay together for several years after being weaned (Craighead 1976; Egbert and Stokes 1976). Grizzly bears rarely actively patrol and defend established home ranges, and home ranges frequently overlap (USFWS 1993). However, they would frequently defend food concentrations from conspecifics (other bears). Dispersing young males leave their mothers between one to two years after their birth. Males typically disperse farther than females and would actively avoid territories held by larger, more mature adult males. McLellan and Hovey (2001) observed juvenile males dispersed 29 kilometers (18 miles) on average, while females dispersed 10 kilometers (6 miles) on average. However, home range size and dispersal distance is each heavily influenced by habitat suitability.

While the Project Area contains some cover and foraging habitat in its vicinity to support grizzly bears, the general Project Area is believed to be utilized by grizzly bears mostly as linkage habitat between other large contiguous areas of habitat, in this case the Gallatin and Madison Ranges. Grizzly bears are known to occur in the Gallatin River Canyon. Suitable prey and other food sources are present in the Proposed Project Area and its vicinity. The canyon serves as lowland large game winter refuge that could provide some winter-kill food sources for grizzly bears. In addition, during high snowpack years, bears may linger at lower elevations and have a higher probability of occurring in the canyon. The Montana Natural Heritage Program (MTNHP) (MTNHP 2010) has records of 71 grizzly bear occurrences in Gallatin County ranging in year from 1915 to 2006. Secure habitat for grizzly bears is at least 500 meters (~1/3 mi) from an open or gated motorized access route or reoccurring helicopter flight line. The Proposed Project Area is within 0.25 mile of US Hwy 191 and/or Montana State Highway (MT Hwy) 64 (i.e., within non-secure habitat due to the influence zones associated with these highways and connected secondary roads). Given the Proposed Project Area's close proximity to US Hwy 191 and MT Hwy 64, occurrence potential of grizzly bears is low.

Private lands north of the GNF boundary and dispersed though the GNF land as inholdings has a combination of rural, agricultural, residential and business uses. Concentrated development within the Gallatin River Canyon (inside the Forest boundary) began with construction of the modern US Hwy 191 in the early 1960s. Along with the creation of this modern transportation facility came development of year-round residences and businesses, recreation residences (i.e., summer homes), recreation facilities (e.g., campgrounds, trailheads, river access sites, rock climbing areas, fishing accesses), secondary road systems, and the small community of Big Sky, Montana. MT Hwy 64 provides the primary access to the Big Sky community and resort. All of this development has resulted in a high level of concentrated human activity centered along the highway access routes and Big Sky development.

Timber production has occurred on public and private lands in the analysis area, with peak activity in the 1960s and 1970s, tapering off on public lands and concentrating on private, corporate timber lands in the 1980s and 1990s, with very low levels of timber management activity in the past decade. Two large wildfires burned slightly into the analysis area in recent years: the Purdy fire, which burned roughly 2,500 acres in 2001, and the Millie fire, which burned approximately 10,500 acres in 2012. While these fires burned at the periphery of the analysis area, the majority of burned area lies outside of the analysis area. Other small wildfires in the analysis area have typically been controlled at less than 10 acres. Prescribed burns (approximately 2,900 acres) have been conducted in the area over the past decade, mainly in non-forest habitat (big game winter range), producing mosaic burn patterns in upland forested habitats. Higher elevations in the analysis area include small portions of the Lee Metcalf Wilderness Area in the Madison Range and the Hyalite Porcupine Buffalo Horn Wilderness Study Area in the Gallatin Range. These areas receive substantial amounts of use, but far lower levels, and more primitive (i.e., generally non-motorized) use compared to the high use of the US Hwy 191 and MT Hwy 64 corridors where the project corridor is located.

Methodology for Analysis

Effects to grizzly bear were evaluated by accessing occurrence data on grizzly bears provided by the MTNHP (MTNHP 2010); comparing occurrence data to geographic information system (GIS) data and topographic maps for habitat characteristics; and consulting with GNF biologists on the potential for grizzly bears to occur. Additionally, the analysis evaluated the distance of the Proposed Project to the Yellowstone Grizzly Bear Recovery Zone and GNF Bear Management Units (BMUs) using GIS files. Timing, duration, and magnitude of potential impacts to individual grizzly bears, bear habitat, bear movements and linkages, and bear use of habitats were evaluated.

Potential impacts included in the analysis related to construction, operation, and maintenance of the Proposed Project includes noise, habitat loss, human presences, helicopter use, and others.

Scale of Analysis

Spatial Boundary

Direct and indirect effects of disturbance (e.g., noise, human presence) for the Proposed Project included the existing ROW and access road use, the proposed ROW expansion, structures, widening of some existing roads required for construction and approximately 600 feet of proposed new temporary access road at the proposed Indian Ridge staging area. The spatial boundary used to quantify habitat was an 800-foot corridor centered on the transmission line. An additional one mile corridor was used to qualitatively assess impacts of disturbance effects for the Proposed Project Area. The ROW for the Proposed Project would include the following amount of NFS lands; approximately 72 acres for Alternative 1; and 90 acres for the Proposed Action Alternatives 2, 3, and 4 (89.8, 89.9, 89.9 acres respectively).

The spatial boundary typically used for the analysis of potential cumulative effects on grizzly bears is the subunit of a Bear Management Unit (BMU). While BMUs represent the expected life range for a female grizzly bear within the Greater Yellowstone Ecosystem, subunits represent the expected annual home range for adult females in the Greater Yellowstone Ecosystem. BMUs and their subunits are delineated for areas within the Recovery Zone, but not outside of it (see Figure 3.4.9-1). Because the Proposed Project falls outside of the Recovery Zone, there are no BMUs or subunits that apply to it. Therefore, we delineated an analysis area that approximates the BMU subunit size for analysis of cumulative effects. BMU subunits on the GNF range from 83,200 to 202,240 acres, with an average size of 138,880 acres. Since the entire route proposed for the upgraded transmission line is south of I-90 where grizzly bears sometimes occur, the analysis area was delineated to include the entire route within the GNF boundary, as well as that portion outside the Forest boundary, but within the most current estimated grizzly bear distribution area (Bjornlie et al. unpublished). This analysis area included a three mile buffer on each side of the proposed line to capture effects of adjacent development and use (both public and private). This process produced an analysis area of approximately 111,360 acres, which is within the size range of Bear Management Subunits on the GNF.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to grizzly bears as a result of the Proposed Project covers the period of active construction. Construction impacts would be short-term; occurring over approximately two years, with periods of higher intensity activities occurring during non-winter months.

Cumulative impacts considered are habitat loss and disturbance (i.e., noise, road traffic, and helicopter use), and travel impediment effects created by the project in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects therefore is the life of the SUP (20 years) into the future. The cumulative temporal boundary is extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the construction of the modern US Hwy 191.

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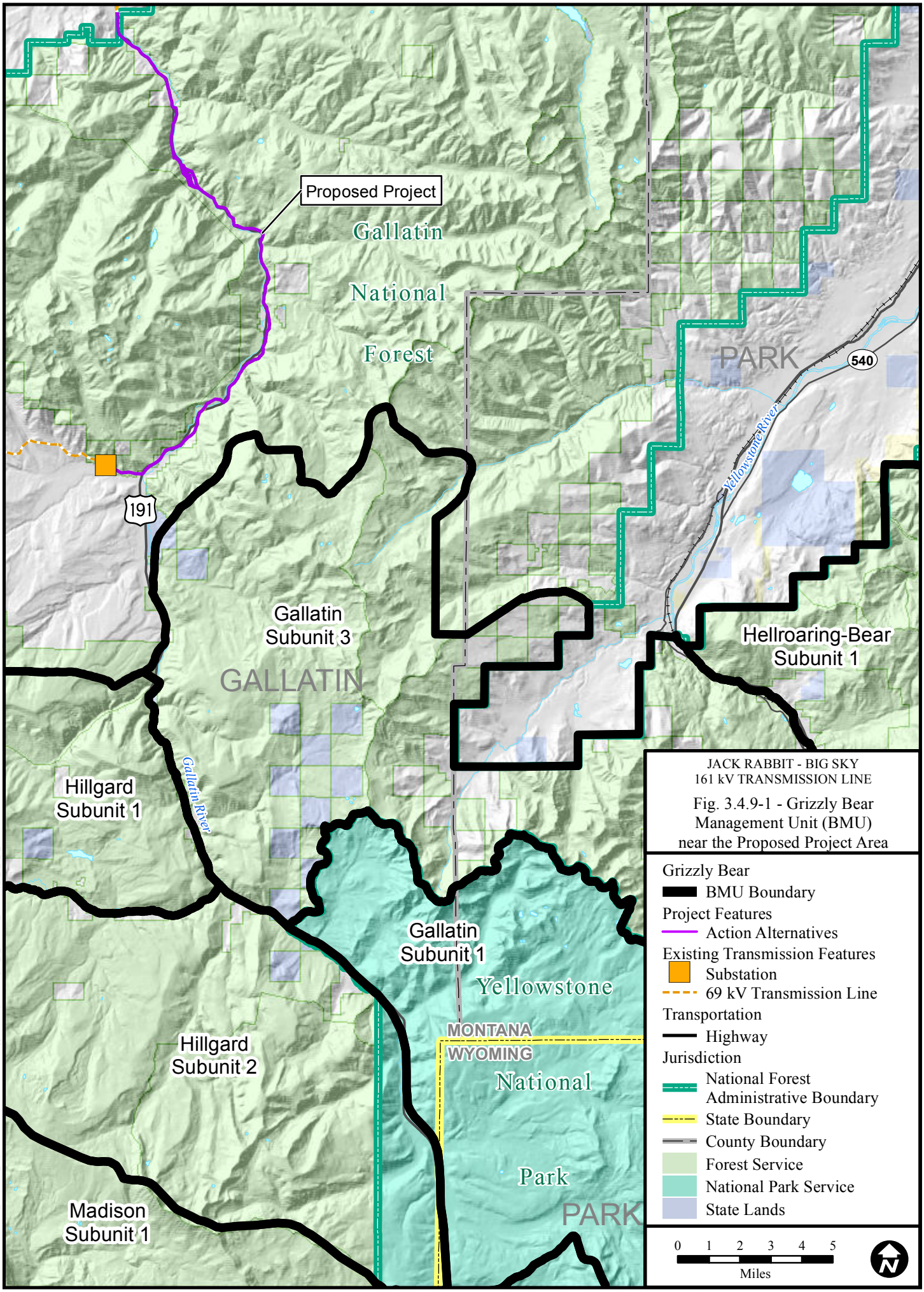

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Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1 the existing 69 kV transmission line would continue to function in its current state. The existing 69 kV transmission line within the analysis area would remain on existing structures along with the existing three-phase, 12.5 kV underbuild distribution line. ROW vegetation maintenance, and operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, hazard tree removal, and transmission structure replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue.

Although continued activities associated with ongoing maintenance of the existing transmission line could have impacts on grizzly bears due to minor habitat alterations and possible disturbance effects due to noise and human presence associated with such activities, a decision to select the No Action alternative would have no direct or indirect effects to grizzly bears beyond those occurring under the existing condition.

Effects Common to Action Alternatives 2, 3, and 4

The proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. Under the Proposed Action-Alternative 2 and other action alternatives (Alternatives 3 and 4), an existing angle would be removed (i.e., ROW straightened) in a meadow area on the floor of the canyon south of Deer Creek. This refinement would improve the alignment by potentially reducing structure numbers, and removing an existing wildlife hazard and visual impact associated with a large group of guy wires. All portions of the existing line (as well as proposed modifications under any action alternative) are confined to within 0.25 mile of US Hwy 191. Approximately 600 feet of new temporary road is proposed at the Indian Ridge staging area to provide construction access. This road would run at a roughly 45° angle to US Hwy 191, heading southwest. The new temporary road would fall entirely within the influence zone of existing open roads (US Hwy 191 and access roads to private residences) and would have no effect on secure habitat. Because this proposed road would only be open for administrative access for facility development and would be permanently closed upon completion of construction activities, it would have only negligible effects on motorized access route densities. Some existing roads would be widened for equipment access and some off-route travel would be required. All dispersed off-route use, as well as the new temporary construction access road at the Indian Ridge staging area, would be reclaimed as temporary disturbance areas upon completion of the construction phase of the project.

Grizzly bears would be considered rare or transient near the Proposed Project Area because the existing transmission line is less than 500 meters from MT Hwy 64 and US Hwy 191 and bears typically avoid maintained roads. The Proposed Project would be constructed in stages, rather than simultaneous construction across the entire route at once. This would allow grizzly bears to be able to cross through the area during times of low activity and traffic, so effects on bear movement as a result of the Proposed Project would be minor. Noise from construction equipment and helicopter activity, where required (e.g., for tree removal and construction), would create a disturbance to bears and may deter them from crossing through or into areas close to the helicopters, potentially resulting in temporary displacement. Because the Proposed Project is linear in nature, helicopter activity in any one location would be limited in duration. The departure from normal activity would likely result in grizzly bears moving farther away from human activity, including US Hwy 191. However, grizzly bears avoiding construction-related activity may move into areas that are subject to recreational activities, such as near hiking trails.

Areas that would otherwise present suitable screening cover (from US Hwy 191) are present in patches throughout the Proposed Project Area and would be removed in some cases for ROW widening. Habitat close to the highway includes forested lands, talus slopes, shrublands, and grasslands; other areas farther from the highway are predominantly forested. Construction would also remove portions of security cover within areas where the ROW is to be expanded.

Foraging habitat would be affected within the Proposed Project Area. The Proposed Project would require vegetation removal where the ROW is expanded, although these areas are close to the highway and have a lower potential to be utilized by grizzly bears. Any canopy removal would be more likely to stimulate understory growth due to the increased sunlight exposure potentially increasing habitat for prey species and thus foraging habitat for bears. However, routine ROW maintenance would likely reduce use of the ROW by prey and bears to a minimum. Construction activity and noise would potentially affect the presence of grizzly bears and prey species, including small mammals and ungulates which occur within the Proposed Project Area. Land disturbed during construction would be reclaimed with an approved Forest Service seed mix (see Appendix B). This seed mix would not use palatable species such as clover type species that could be an attractant to grizzly bears in areas of higher human use (e.g., near trailheads, campground, and residences).

Direct and Indirect Effects of Alternative 2 (Proposed Action)

The existing ROW converted 53.0 acres of forested habitat to non-forest due to ROW maintenance. The Proposed Action-Alternative 2 would result in an additional 14.8 acres of forest that would be converted to non-forest due to vegetation clearing that is associated with the ROW expansion and structure placement. The loss of forest habitat removes some hiding cover for bears. The non-forested habitat may still provide some limited cover if shrub species return, and may still contain foraging habitat. Permanent disturbance to unforested habitat where grizzly bears may forage or travel is estimated to be 3.9 acres in the Proposed Action-Alternative 2.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Under Alternative 3 there would be similar effects to those under the Proposed Action-Alternative 2, except that Alternative 3 would involve two short LROs at Cave Creek and Cascade Creek. The Cave Creek LRO would move the transmission line ROW behind some existing recreation cabins and would require additional tree clearing due to the alignment moving upslope, approximately 200 feet in places, from the existing 69 kV transmission line. While transmission structures that are required to maintain the distribution line in the current ROW would remain, those that are not essential for the distribution would be removed after the transmission lines are re-routed. With the Cascade East LRO, the transmission line would be moved to the eastern, less forested, side of US Hwy 191, requiring tree clearing of predominantly drier, Douglas-fir on talus slopes.

Permanent disturbance to forested habitat that could provide cover, foraging, and linkage habitat to grizzly bears in Alternative 3 is estimated to be approximately 22.4 acres; permanent disturbance to unforested habitat that could provide limited cover, foraging, and linkage habitat would be approximately 4.3 acres. These are areas that would be permanently impacted by the vegetation clearing that is associated with the ROW expansion and structure placement.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Under Alternative 4 there would be similar effects as those under Alternative 3, except that Alternative 4 would involve a different LRO at Cascade Creek. Under the Cascade West LRO, the new alignment would move the transmission line west of the recreation residences at Cascade Creek. It would require tree clearing due to the alignment moving upslope, approximately 500 feet in places, in lodgepole pine habitat which is more densely forested and moister compared to the existing route and Cascade Creek East LRO. The habitat associated with the Cascade West

LRO would have a slightly higher potential to provide cover, foraging, and linkage habitat due to the structures and further distance from roads. While transmission structures that are required to maintain the distribution line in the current ROW would remain, those that are not essential for the distribution would be removed after the transmission lines are re-routed.

Permanent disturbance to forested habitat that could provide cover, foraging, and linkage habitat to grizzly bears in Alternative 4 is estimated to be approximately 22.5 acres; permanent disturbance to unforested habitat that could provide foraging areas will be approximately 4.2 acres. These are areas that would be permanently impacted by the vegetation clearing that is associated with the ROW expansion and structure placement.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Proposed Project would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives

The cumulative effects analysis below is based on the spatial analysis area described above and it takes into account the entire new transmission line that would traverse a distance of approximately 37 miles. The 37 miles consist of about 16 miles that cross NFS lands with the remainder of the transmission line (21 miles) on private or other lands outside the jurisdiction of the GNF. Inside the forest boundary, the route crosses private land inholdings.

Projects analyzed for cumulative effects to grizzly bear within the cumulative effect analysis area included development along the US Hwy 191 corridor, US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale and timber production on both private and public lands (however, very low levels of timber management activity has occurred in the past decade), wildfire, noxious weed spraying, a fishing platform at the Moose Creek Flat Campground, recreation activities such as campgrounds, trailheads, river access sites, rock climbing areas, fishing, hunting, etc., and private land in the analysis area which includes a combination rural, agricultural, residential and business uses. Cumulative effects to grizzly bear resulting from the action alternatives, in addition to the activities mentioned above in the cumulative effects analysis area, could result in increased human presence, development, and habitat alternations. The proposed widening and improvements on US Hwy 191 exacerbate impairment of grizzly bear linkage habitat through the Gallatin River Canyon. However, the project would only contribute minimally to the already heavy development that currently exists in the Gallatin Canyon along US Hwy 191 and MT Hwy 64. Other specific projects, including the Jack Creek timber sale, noxious weed spraying, a fishing platform at the Moose Creek Flat Campground, and systematic upgrades to private homes could all result in the disturbance of bears and the alteration or loss of potential habitat. While changes or expansions to hiking, hunting, skiing, and fishing may increase or decrease the likelihood of grizzly bear and human incidents, it is expected that these would be managed appropriately to reduce these interactions.

The current condition described in the Affected Environment section above reflects past projects and on-going activities in the Project Area (to include the cumulative effects analysis area). Montana Opticom has submitted a proposal to install an underground fiber-optic line from Four Corners to Big Sky, which would be in the general area of the Proposed Project. While the proposed route is currently unknown, this Proposed Project would result in a negligible amount of ground disturbance for a length of approximately 34 miles, from Four Corners to the outskirts of Big Sky. This ground disturbance would be restricted to mobilization areas and potential vegetation trimming, as the cable would be installed directly into the highway ROW (where existing ground disturbance is present). Noise from the construction activity would be the main disturbance to bears.

The GNF has several planned forest maintenance projects that may also affect grizzly bear foraging habitat. Fuel reduction projects (that are ongoing for stand management) in the cumulative effects analysis area would potentially remove plants that grizzlies may normally forage on, although the extent of reduction activities for this action is unknown. An ongoing timber sale in the Jack Creek area along the southern end of the Proposed Project Area may improve grizzly bear foraging habitat, as tree removal allows more sunlight to hit the forest floor, which stimulates growth of understory plants that grizzlies utilize. However, cover habitat, noise, and human presence impacts may negativity impact grizzly bear habitat.

Weed management would remove noxious weeds within the spray area and could benefit grizzlies by reducing competition for preferred native forage. In addition, ongoing and future public recreation activities could continue to have disturbance effects on grizzly bears in the area. Public recreation would include activities such as camping, hiking, hunting, skiing, rafting, fishing, the presence of pets, and general traffic. Grizzly bears tend to avoid coming within 500 meters (0.31 mile) of roads (Mattson et al. 1987), so the continued use of campsites that are close to US Hwy 191 is less likely to have a detrimental impact because bears are less likely to venture that close to the road. Campsites that are farther and more isolated may have greater impacts if they are close to grizzly use areas, but because these are already established campsites, they are not likely to have any different effects than the current baseline unless recreational campsites expand or grizzlies alter their migration routes. This is also likely the case for hiking trails.

Hunting is one of the top recreational uses of the GNF, and nearby grizzly bears are attracted to game kills and gut piles (USFS 2006). Increases or decreases in hunting visits to the forest may lead to increases or decreases in the numbers of hunter/grizzly bear incidents. These incidents may have cumulative effects, along with any stressing effects from the Proposed Project, on grizzly bears in the general vicinity. Skiing, another popular activity in the GNF, may have impacts on denning grizzly bears where snow machine clearance areas are in or near denning habitat (USFS 2006).

In summary, the existing permanent habitat alteration is a result of human development within the cumulative effects analysis area for grizzly bears The minimal disturbance proposed by the new transmission line would not significantly add to the existing disturbance already present. Cumulative effects to grizzly bears would be further minimized because: the project is located entirely outside the grizzly bear recovery zone, but within an area where grizzly bears are known or suspected to occur; the proposed transmission line is proposed within an existing power transmission right-of-way, adjacent to federal and state highways, in an area with concentrated human development and activity; grizzly bear use is documented in the area, but on an infrequent and most likely transitory basis; and the proposed project would be constructed in stages, rather than simultaneously along the entire route. This would allow grizzly bears to cross through the project corridor in places, and during times, of lower activity and traffic; construction would occur during the busiest time of the year for the project corridor, so noise and disturbance from construction activities would be a minor addition to existing traffic noise and human presence in the project corridor.

The cumulative activities associated with the action alternatives would result in negligible impacts to grizzly bears.

Comparison of Alternatives

The No Action-Alternative 1 currently has converted 53 acres of forested habitat to unforested habitat due to ROW clearing that would have provided potential cover, foraging, and linkage habitat for grizzly bears. The unforested habitat in the ROW would potentially provide a limited amount of cover (shrub species encroach, foraging, and linkage habitat). Overall, the existing

ROW would provide minimal habitat for grizzly bears due to the proximately to roads and adjacent development near the ROW. Impacts from the existing 69 kV transmission line to grizzly bears would remain unchanged under Alternative 1.

The Proposed Action-Alternative 2 would result in approximately 14.8 acres of forested habitat disturbance and 3.9 acres of shrubland habitat that may provide cover, foraging, and linkage habitat for grizzly bears. This would be the lowest increase among the action alternatives.

Alternative 3 would result in approximately 22.4 acres of forested and 4.3 acres of shrubland habitat disturbance that may provide cover, foraging, and linkage habitat for grizzly bears. This would be the second highest increase among the action alternatives.

Alternative 4 would result in approximately 22.5 acres of forested and 4.2 acres of shrubland habitat disturbance that may provide cover, foraging, and linkage habitat for grizzly bears. This would be the highest increase among the action alternatives.

Consistency with Laws, Regulations, and Forest Plan

In compliance with the ESA, the Forest Service conducted Section-7 consultation with the USFWS regarding potential impacts of the proposed federal action.

The Forest Plan identifies the grizzly bear as an MIS for Threatened species in Forest-wide Standard 6.a.13 that directs "indicators species" will be monitored for population trends. Grizzly bear population trends are stable to increasing on the Gallatin Forest (USFS 2011). Bears and their habitat will continue to be monitored under the established Forest-wide monitoring program.

Proper storage and disposal of all food, refuse, and attractants used by construction, operation, and maintenance personnel would be enforced in compliance with the GNF's Occupancy and Use Order #07-11-00-01.

The GNF Travel Management Plan (USFS 2006b) provides direction pertaining to the construction of new roads for administrative/project purposes, as well as the use of existing roads. The Proposed Project would be in compliance with the Travel Management Plan through the administrative use of roads and road restrictions as necessary to avoid conflicts with ESA species. As needed, temporary localized restrictions to access roads could be applied to prevent conflicts with TES, which would reduce potential impacts to grizzly bears. As per Travel Plan direction, the temporary road built to access the Indian Ridge staging area would be permanently closed and re-vegetated upon project completion.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

In order to limit the potential interaction between people and grizzly bears, all food, refuse, and other attractants would be stored and disposed of in accordance with Occupancy and Use Order #07-11-00-01, also referred to as the GNF Expanded Food Storage Order (PDF 5.2). The order will require that unattended food, refuse and attractants be stored in hard-sided vehicles or bear-resistant containers (or hung above the ground out of the reach of wildlife) at all locations in the GNF.

To reduce potential helicopter impacts to grizzly bears, helicopter flights would be restricted to within 0.5 mile of US Hwy 191 east of the highway, between the Deer Creek Trailhead bridge and Big Sky spur (MT Hwy 64). This specific mitigation measure would eliminate potential helicopter disturbance to grizzly bears within the Yellowstone Recovery Zone while not creating unsafe flight conditions within the canyon.

Forest Service personnel would specify access road restrictions needed to avoid conflict with ESA species, in compliance with the GNF Travel Management Plan (USFS 2006b).

Canada Lynx

Introduction

The Canada lynx (*Lynx canadensis*) was listed as Threatened under the ESA on March 24, 2000. The Proposed Action would involve the operation of heavy construction equipment and the construction of linear utility infrastructure within forested lands. Associated activities such as access road improvements, disturbance from noise and human presence, and ROW clearance in Canada lynx habitat could potentially reduce security cover, remove coarse woody debris from potential denning habitat, and alter the preferred habitat of their primary prey species, snowshoe hare (*Lepus americanus*). Additionally, several segments of the current transmission line ROW and Proposed Project Area intersect the margins of federally designated Canada lynx Critical Habitat. The loss of denning and foraging opportunities, as well as potential impacts to critical habitat, were analyzed.

Affected Environment

The Canada lynx is a medium sized cat with a body length of 30 to 35 inches, and weighs 18 to 23 pounds (Ruediger et al. 2000; Kays and Wilson 2002). The winter coat consists of long, thick fur that is yellowish gray to grizzled grayish brown. The summer coat is similar to the winter coat except it is much shorter and less dense (Tumlison 1987). Canada lynx have a short, stubby tail with a solid black tip. The ears have long black tufts which may be one to two inches and a white spot on the back. The legs are long and the feet are large and insulated as an adaptation for living and hunting in deep snow (Kays and Wilson 2002).

In the contiguous United States, Canada lynx occur almost exclusively in the southern extensions of the boreal forest habitat types. Recovery regions for the Canada lynx are broken down into five units: Maine, Minnesota, Northern Rocky Mountains, North Cascades, and the Greater Yellowstone Area (USFWS 2009). Canada lynx on the GNF fall within the Greater Yellowstone Area unit (Unit 5). On the GNF, Canada lynx habitat is generally defined by Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), or moist Douglas-fir (*Pseudotsuga menziesii*) habitat types between 6,000 and 8,000 feet elevation that produce boreal forest conditions, and persistent deep fluffy snow in winter. Canada lynx require broad areas of differing age-class forests with a variety of structural conditions to meet habitat requirements such as foraging, reproductive denning, resting and travel/dispersal.

The main prey source of the lynx is the snowshoe hare. As such, the primary foraging habitat of the lynx consists of areas supporting substantial populations of snowshoe hare. This includes dense boreal forests of conifers and shrub understories that provide forage and escape cover for hares and protection during extreme weather (Wolfe et al. 1982). In a study focusing on Yellowstone National Park, Murphy et al. (2006) documented occurrences in mature lodgepole pine (*Pinus contorta*) or Engelmann spruce forests with an understory dominated by saplings. This study considered prime lynx habitat to be conifer and deciduous forests with closed canopies, typically 40 to 300 years of age, that were dominated by lodgepole pine, Engelmann spruce, subalpine fir, or quaking aspen (*Populus tremuloides*). While the lynx typically inhabits dense forests, it hunts along edges within these habitats to increase the ease of locating and capturing prey (Mowat et al. 2000). As such, natural disturbance processes such as fire, wind, and insect infestation may be key aspects of suitable lynx habitat.

The diet of the lynx is largely dependent on snowshoe hare populations. In years of high density, snowshoe hare may comprise upwards of 97 percent of lynx diets (Koehler and Aubry 1994).

However, during the summer and times of lower snowshoe hare densities, lynx diet may shift away from snowshoe hare and incorporate other small mammals (Mowat et al. 2000). These may include red squirrel (*Tamiasciurus hudsonicus*), various species of grouse, ground squirrels, and other small mammals, and carrion of large ungulates (Ruediger et al. 2000). Younger, smaller deer may also occasionally be taken as prey.

Lynx are solitary animals that only come together to breed and as family groups (e.g., females with young). Breeding occurs through March and April, and kittens are typically born in May and June. Reproduction is typically linked to snowshoe hare populations. In years of abundant snowshoe hare, most female lynx in a population would reproduce; however, in years of low snowshoe hare populations, only mature females with experience raising kittens would reproduce (Mowat et al. 2000; Ruediger et al. 2000). Lynx reproductive dens are typically found in mature forests with overturned stumps and deep blowdown or deadfall trees in regenerating stands. Down material and overhead cover produced by mature forests provide security and escape cover for lynx kittens (Ruediger et al. 2000).

Home ranges for lynx vary depending on the density of prey. During years of abundant snowshoe hare populations, home ranges may be as small as 11 square kilometers (km^2; 2,718 acres) or as high as 221 km^2 (54,610 acres) in dispersing populations with low snowshoe hare abundance (Tumlison 1987). Long-distance dispersal of young lynx is not uncommon during times of low snowshoe hare abundance. For example, Poole (1997) found one lynx dispersed over 900 kilometers (km; 559 miles).

Canada lynx are secretive creatures, whose occurrence is often difficult to detect. The MTNHP (2010) has records of lynx occurring within two km (1.2 miles) of the Proposed Project Area, and 17 occurrences with Gallatin County during 1963 through 2006. Abundant suitable habitat is present in Lynx Analysis Units (LAUs) adjacent to the Proposed Project Area, including: North Madison, total 173,111acres with 102,275 acres mapped as lynx habitat; and West Gallatin, 131,362 acres with 79,380 acres mapped as lynx habitat. With limited recent history of human activity and lack of recent large fires in these LAUs, lynx habitat is largely in a condition that is currently suitable for Canada lynx. In contrast, the Proposed Project Area is at a lower elevation and within an existing utility corridor that parallels US Hwy 191 through a heavily disturbed travel and recreation corridor. The Proposed Project Area occurs along the boundaries of the two afore-mentioned LAUs (Figure 3.4.9-2). Habitat in the Proposed Project Area tends to be fragmented and generally consists of drier forest types than those found upslope. Thus, the Proposed Project Area contains very little of the boreal forest types that provide lynx habitat.

Within the GNF, the existing 40-foot wide power transmission line ROW traverses a patchwork of both forested and non-forested habitats. Within forested areas, the existing ROW has been maintained as non-forested, predominantly vegetated by sapling tree, shrub, grass and forb species adjacent to stands dominated by dry Douglas-fir with small areas of lodgepole pine, and/or Engelmann spruce. Shrub communities within forested areas are dominated by huckleberry (*Vaccinium spp.*), common snowberry (*Symphoricarpos albus*), mallow ninebark (*Physocarpus malvaceus*), Woods' rose (*Rosa woodsii*), and other species that benefit from sunlight penetration created by openings in the forest canopy. These shrubs are often associated with a mixture of evergreen and deciduous tree saplings with Douglas-fir, lodgepole pine, Engelmann spruce and Rocky Mountain maple (*Acer glabrum*) being the most prevalent species. Where adjacent to high canopy cover forested stands, the ROW contains important understory vegetation, providing forage, nesting habitat, thermal protection, movement corridors, and security cover for a variety of wildlife species (potential prey species). The existing ROW is maintained for transmission line safety and reliability and provides little canopy cover. Some down woody debris (range 1.0 to 15.0 tons per acre (Mean = 5.8 tons per acre)) is present in the

analysis area, providing structural complexity and additional thermal cover for wildlife. However, deep suspended deadfall and upturned stumps are not present. In non-forested areas, the existing ROW extends through shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grasslands.

The elevation of the Proposed Project Area ranges between 5,234 to 6,162 feet, almost entirely below the elevation range characterizing Canada lynx habitat on the GNF. The bulk of the Proposed Project Area is below 6,000 feet, except for at the extreme southern end near Meadow Village. Mean total snowfall depth at the Big Sky 3S weather station, located at the southern part of the Proposed Project Area, was 157 inches from 1984 to 2010. Mean total snowfall depth at the Gallatin Gateway 10SSW weather station, located at the northern part of the Proposed Project Area, was 88 inches from 1950 to 2008 (WRCC 2010). These data indicate that snowfall depth is typically greater in the southern part of the Proposed Project Area and decreases substantially toward the northern end. The Proposed Project Area consists of a patchwork of un-forested areas and steep exposed sites with forests canopies opened by US Hwy 191, the Gallatin River, numerous recreation sites, trails, and the existing ROW. Thus, deep fluffy persistent snow is not a characteristic of the Proposed Project Area.

Squires et al. (2010) evaluated seasonal resource selection of Canada lynx in the Bob Marshall Wilderness of western Montana (Northern Rocky Mountains, Unit 3) from 1998 to 2002. Based on their research, preferred habitat for lynx is that which supports high densities of snowshoe hares, and includes physical characteristics of mature conifers in the overstory, including Engelmann spruce, subalpine fir, Douglas-fir, western larch (*Larix occidentalis*), and lodgepole pine; high visual obstruction, and deep snow. To evaluate snowshoe hare habitat suitability within the Proposed Project Area, these physical characteristics were compared to field data collected in 2010 for the analysis area. Based on field surveys, 21 of 24 total sample plots in the Proposed Project Area met the physical structure criteria for at least marginal snowshoe hare habitat as presented by Squires et al (2010), at least in terms of conifer presence in the overstory, and high visual obstruction. However, only three of the sample plots were located in boreal forest types where either snowshoe hares or lynx would be expected to occur. Of these three sites shown to have both boreal forest habitat types favored by lynx and structural qualities preferred by snowshoe hares, none are within the proposed construction footprint for the project. More detailed discussion of the Canada lynx study methods and field survey plot locations are contained in the Project File (Biological Technical Report).

In 2009, the USFWS published the Final Rule designating Critical Habitat for lynx. Federally designated lynx Critical Habitat in the Proposed Project Area occurs in Unit 5 – Greater Yellowstone Area, roughly east of US Hwy 191 from south of Big Sky, Montana to the northern end of the Gallatin Mountain Range. The Final Rule for Critical Habitat designation identifies the primary constituent elements (PCEs) or those physical and biological features that are essential to the conservation of the species, and that may require special management considerations or protections. PCEs for lynx include: boreal forest landscapes supporting a mosaic of differing successional stages and containing snowshoe hares and their preferred habitat conditions to provide foraging opportunities for lynx; winter snow conditions that are generally deep and fluffy for extended periods of time; sites for denning that contain abundant coarse woody debris such as downed trees and root wads; and matrix habitat types that do not support snowshoe hares, but occur between patches of boreal forest such that lynx are likely to travel through such habitat to access patches of boreal forest within a home range. Currently, the existing transmission line ROW overlaps 66.4 acres (55.8 acres on GNF land and 10.6 acres outside of GNF land) of designated Critical Habitat.

Applicable Laws, Regulation, Policy, and Forest Plan Direction

The Canada lynx was listed as Threatened under the ESA on March 24, 2000 and is subject to the rules and regulations of this act. Under Section 7(a) (2) of the ESA, the Forest Service must ensure that any action it authorizes is not likely to jeopardize the continued existence of this species or result in adverse modification of federally designated Critical Habitat. Effects of the Proposed Action to the Canada lynx and Critical Habitat are also analyzed in a Biological Assessment.

The Northern Rockies Lynx Management Direction (NRLMD) issued in March, 2007 established management guidelines and standards to be used by land management agencies, including the GNF. While the NRLMD addresses specific vegetation requirements of lynx habitat at great length, vegetation management objectives, standards, and guidelines do not apply to the removal of vegetation for permanent developments, such as the Proposed Action (NRLMD Record of Decision [ROD], Attachment 1, p.2). However, several programmatic and Human Use (HU) objectives, standards, and guidelines apply to the Proposed Action, and are listed below:

> Objective ALL (Applicable to all Management Activities and Practices) O1: Maintain or restore lynx habitat connectivity between LAUs and in linkage areas.
>
> Standard ALL S1: New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.
>
> 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 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 to lynx habitat.
>
> Guideline HU G4: For mineral and energy development site and facilities, remote monitoring should be encouraged to reduce snow compaction.
>
> 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.

Methodology for Analysis

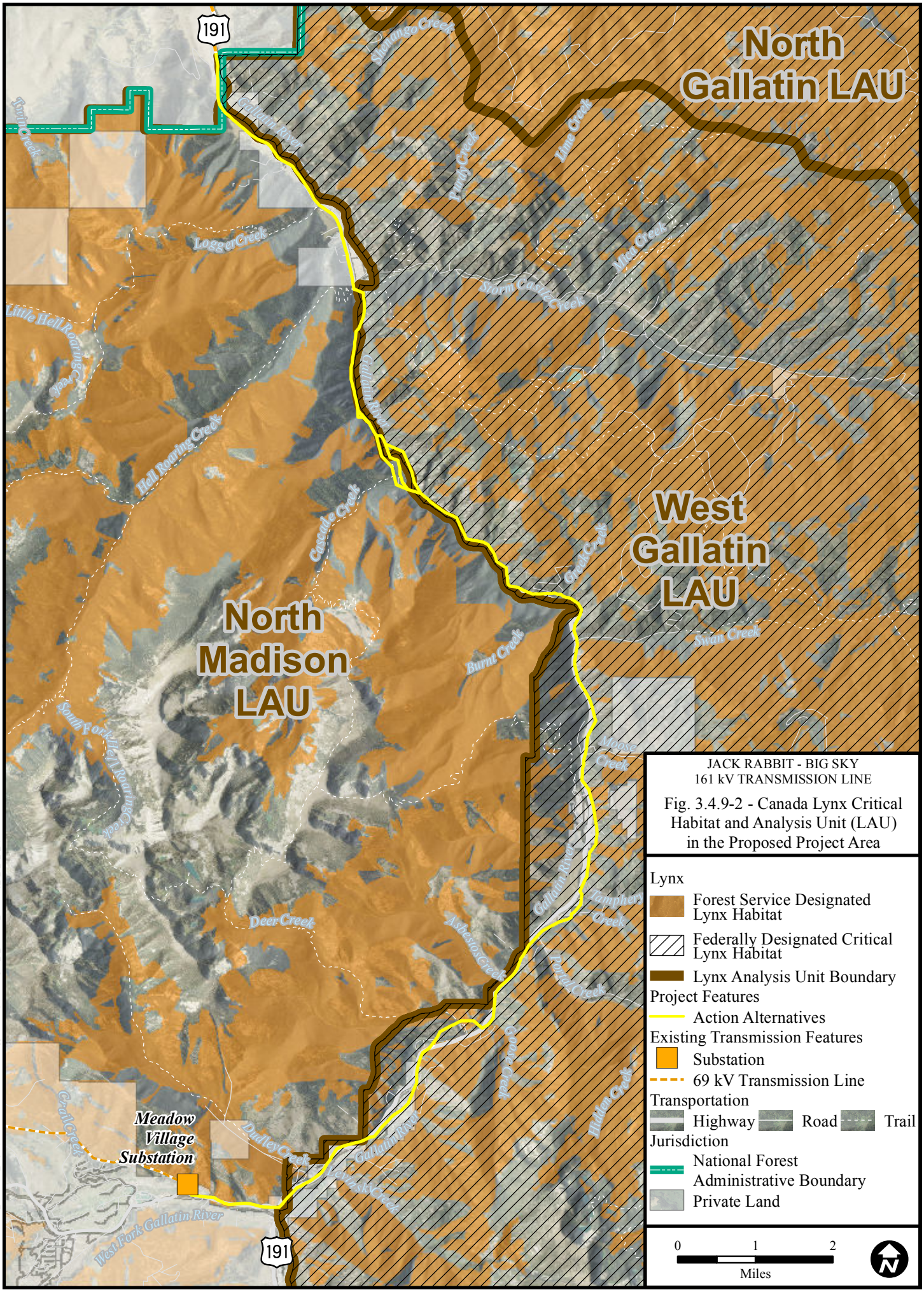
Directions for evaluating federal actions relative to lynx habitat conditions are provided in the Canada Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000), and later amended through the NRLMD ROD (USFS 2007). Impacts from the Proposed Action were evaluated for compliance with applicable direction contained in these guiding documents.

Although vegetation management standards do not apply to the removal of vegetation for permanent developments such as the Proposed Action, resulting habitat alterations can have impacts on lynx and lynx Critical Habitat. Therefore, effects to lynx were evaluated by assessing potential impacts to suitable denning habitat, foraging (snowshoe hare), and travel/resting habitat (including habitat connectivity) as well as the potential for human-related disturbance during construction and maintenance operations. Habitat alteration impacts can be quantified; however, disturbance impacts related to noise and human presence are addressed qualitatively. The extent

of any indirect disturbance effects associated with noise and human presence would be difficult to quantify due to the Proposed Project Area's steep, uneven terrain and close proximity (within 0.25 mile) to an existing, heavily used traffic and recreation corridor .

Spatial Boundary

The spatial boundary used for the analysis of direct impacts associated with ground disturbing activities would be limited to areas directly impacted by the Proposed Action (e.g., cleared ROW, access). To capture other, non-ground disturbing, direct and indirect impacts (i.e., those associated with construction-related noise and human presence) this area is bounded by a 1.2-mile buffer on either side of the ROW (i.e., the distance of the closest historic lynx location record; MTNHP 2010). The LAU represents an area of at least the home range size used by an individual lynx, and therefore served as the spatial boundary used in consideration of potential cumulative effects for lynx. LAUs analyzed included the West Gallatin LAU and the North Madison LAU. The North Madison LAU is 173,111 acres in size, 102,275 acres of which is classified as lynx habitat. The West Gallatin LAU is 131,362 acres in size, 79,380 acres of which is classified as lynx habitat (Figure 3.4.9-2).



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Temporal Boundary

The temporal boundary for analysis of direct and indirect impacts to Canada lynx as a result of the Proposed Action covers the period of active construction, and general line operations and maintenance for the life of the SUP. Construction associated with the upgrade would take approximately two years, with no construction occurring during winter months. Once constructed, the widened ROW would re-vegetate with horizontal shrub cover and small conifers, similar to its baseline state. This would take approximately 15 years. Thus, residual effects associated with construction disturbance may persist for as many years. Operation and maintenance related direct and indirect effects would continue for as long as the line is permitted to be present. This is considered the length of the SUP, approximately 20 years.

The Proposed Action would be a man made feature on the landscape, interacting with other man made features and natural processes to produce cumulative effects. Most of the Proposed Project Area is located in lower elevation, drier forest habitat types that do not present boreal forest types, and at best might serve as matrix habitat that lynx may travel through to access suitable habitat. As such, the key cumulative impacts considered were habitat fragmentation and barrier effects as related to habitat connectivity. The temporal boundary for cumulative effects extends 50 years into the past to consider the construction of the modern US Hwy 191 through Gallatin Canyon, an important barrier to Canada lynx movement in the Proposed Project Area.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under the No Action Alternative, the existing 69 kV transmission line would continue to function in its current state. The existing 69 kV transmission line within the analysis area would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. ROW vegetation maintenance, and operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, hazard tree removal, and transmission structure replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue. Under the current conditions, the existing ROW creates a permanent habitat alteration of 7.1 acres that would otherwise provide Canada lynx habitat.

Although continued activities associated with ongoing maintenance of the existing transmission line could have impacts on lynx due to minor habitat alterations and possible disturbance effects due to noise and human presence associated with such activities, a decision to select the No Action Alternative would have no direct or indirect effects to lynx beyond those occurring under the existing condition.

Effects Common to Action Alternatives 2, 3, and 4

For the Proposed Action and Alternatives 3 and 4, trees would be cleared where increased ROW width is required. The ROW width would increase ten to 40 feet, depending on location. Under all action alternatives, the amount of lynx habitat (i.e., those habitat types that produce boreal forest conditions) that would be physically altered by the Proposed Action is very small (less than two acres; described by Alternative below). The small patches of lynx habitat that would be impacted by ROW expansion do not currently provide the structural characteristics associated with snowshoe hare habitat; i.e., they do not currently provide the dense vegetation near the ground (lower tree limbs, saplings or shrubs), that produce food and shelter for snowshoe hares. Other sites that would require tree clearing currently meet structural criteria (overstory tree species, high visual obstruction) associated with snowshoe hare habitat, but all of these sites are located in drier forest types that do not provide boreal forest conditions associated with lynx or snowshoe hare occurrence, and are therefore not considered lynx foraging habitat. So while

proposed treatments would affect small amounts of lynx habitat, none would affect lynx foraging habitat.

Lynx denning habitat consists of suitable foraging habitat (or within close proximity to foraging habitat) with abundant large woody debris or other landscape features that provide the kittens with protection. Den sites are typically located within 3.5 miles of foraging habitat. The Proposed Project Area does not support sufficient downed wood at the scale required for denning habitat. Although some potential denning habitat may exist within the surrounding analysis area, dens are unlikely to occur near the area to be cleared for expanded ROW due to the presence of existing disturbance factors. Koehler and Brittell (1990) concluded that sites selected for denning must provide for minimal disturbance from humans and be located in close proximity to foraging habitat. Immediate tree removal associated with new construction, and future removal of trees that pose hazards to the powerline, would maintain the ROW in a perpetual condition unlikely to provide suitable denning habitat for lynx.

Snow compaction associated with the action alternatives would not be an issue for new construction because construction activities would not occur during winter months. For future maintenance, plowed highways (MT Hwy 64 and US Hwy 191) would be used to access the majority of the line. Winter access to facility sites on secondary, unplowed roads would only be required for emergency repairs, so snow compaction associated with facility repair and maintenance would be infrequent, affect only short segments of secondary road, and generally of very limited duration (i.e., one trip in, one trip out per day).

No key linkage areas are identified in the Proposed Action vicinity; although the Proposed Action Area has the potential to serve as travel habitat for Canada lynx moving between contiguous patches of boreal forest habitat, existing fragmentation of the Gallatin River corridor is high. MT Hwy 64 and US Hwy 191, the existing transmission line corridor, developed campgrounds, and private residences all contribute to the current fragmentation of the lands immediately adjacent to the action alternatives. The Proposed Project Area is within an already heavily impacted area. Further fragmentation of lynx habitat under the action alternatives is unlikely because the route would primarily follow the existing transmission line ROW. The ROW would be increased by ten to 40 feet for the length of the action alternatives; however, this slight increase would not create an opening too wide for lynx to cross or substantially increase fragmentation. Post-construction growth of vegetation within the wider ROW could eventually provide some cover to better facilitate lynx travel.

Results of studies on how roads and highways affect lynx dispersal are mixed. Apps (2000) observed two dispersing juvenile lynx traveling parallel to the Trans-Canada Highway. However, these individuals never crossed the highway, suggesting it limited lynx dispersal. A number of studies cited in Aubry et al. (2000) observed lynx crossing two or four lane highways or major rivers. Mowat et al. (2000) stated that lynx readily crossed highways, were regularly sighted along roadsides, and established home ranges adjacent to roads in the Northwest Territories of Canada. Squires and Laurion (2000) observed one male cross a two lane highway and the Blackfoot River in Montana. McKelvey et al. (2000) found that road densities in the analysis area did not have a significant effect on habitat selection, and lynx crossed roads at frequencies that did not differ from random expectation; however, roads in this analysis area were primarily narrow unpaved Forest Service roads. The Recovery Outline for Canada lynx published by the USFWS (2000) states that lynx movements may be negatively influenced by high traffic volume on roads which bisect suitable habitat. Koehler and Brittell (1990) found that lynx readily travelled along roads with less than a 50-foot ROW where cover is present on both sides. MT Hwy 64 and US Hwy 191 and the associated ROWs are much wider than 50 feet. Given the high traffic volume along MT Hwy 64 and US Hwy 191, there is likely some impediment to lynx

movement and dispersal. The action alternatives are located within 0.25 mile of MT Hwy 64 and US Hwy 191, so any additive effects to dispersing lynx would be negligible.

Widening the ROW would not likely impede lynx movement and dispersal where it is farthest from MT Hwy 64 and US Hwy 191. Lynx have been shown to avoid crossing forest openings greater than 300 feet (Koehler and Brittell 1990), but a small opening such as the ROW for the action alternatives would not pose as a barrier to lynx movement and dispersal.

Lynx which may be present in the vicinity of the action alternatives during construction could be disturbed by noise produced by construction equipment. Noise related disturbance from construction equipment, including helicopters, would extend up slope beyond the limits of the new ROW. These impacts would be temporary in nature and would diminish quickly as distance from the activity increases. Lynx occurring on lands adjacent to the Proposed Action Area could potentially return to normal activities immediately after construction of that portion of the project is completed. Additionally, the majority of construction would coincide with the busiest time of the year for the Gallatin River Canyon, MT Hwy 64, and US Hwy 191. The high volume of summer traffic, high occupancy of campgrounds and private residences, and increased whitewater rafting trips each summer already produce noise related disturbance to the surrounding areas. Increased noise and disturbance from construction related equipment is not expected to produce notable effects to lynx beyond existing conditions.

In 2006 (and revised in 2009), the USFWS designated Critical Habitat for lynx under the ESA. Administratively, areas within the Gallatin River Canyon which fall east of US Hwy 191 are within federally designated lynx Critical Habitat. The majority of the Proposed Action Area within the critical habitat designation is considered matrix habitat; i.e., those habitat types that do not support snowshoe hares, but occur between patches of boreal forest such that lynx are likely to travel through such habitat while accessing suitable habitat within a home range (USDI 2009:8638). In matrix habitat, activities that change vegetation structure or condition would not be considered an adverse effect to lynx Critical Habitat unless those specific activities create a barrier or impede lynx movement between patches of foraging habitat, or between foraging and denning habitat within a home range, or if they would adversely affect adjacent foraging or denning habitat (USDI 2009:8645). Given the lack of lynx foraging and denning habitat in proximity to project activities, the above conditions would not be triggered by the action alternatives.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under the Proposed Action-Alternative 2, new permanent disturbance to mapped lynx habitat is estimated to be approximately 1.7 acres. These small areas consist of boreal forest habitat types, but the existing structural characteristics do not present denning or foraging habitat for lynx. These sites provide cool, moist conditions and some forest cover associated with boreal forest, but lack the substantial amounts of coarse woody debris (e.g., downfall and root wads) associated with lynx denning habitat, and also lack the dense vegetative structure close to the ground (e.g., lower tree limbs, seedlings, saplings and shrubs) that provide food and cover for snowshoe hares. Therefore, this alternative would have no direct effect on lynx foraging habitat or denning habitat, but would alter a very small amount of habitat that currently provides cover for travel or resting purposes. However, the Proposed Action would result in a permanent habitat loss, with indirect effects that would prevent these areas from achieving conditions suitable for denning or foraging habitat in the future.

USFWS designated Critical Habitat is present in the Proposed Project Area. Under the Proposed Action-Alternative 2, ROW widening would result in the new ROW overlapping an additional 13.9 acres of Critical Habitat (mostly matrix habitat) on NFS lands. The Proposed Action would

have very minor indirect effects on PCEs snowshoe hare (lynx foraging) habitat, winter snow conditions, and denning habitat as described above.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)
Under Alternative 3, new permanent disturbance to mapped lynx habitat would be identical to Alternative 2 with approximately 1.7 acres of boreal forest types affected. As in Alternative 2, this alternative would have no direct effect on existing lynx foraging or denning habitat, but would result in a permanent habitat loss, preventing these area from achieving conditions suitable for denning or foraging opportunities in the future.

Under Alternative 3, ROW widening would result in the new ROW overlapping an additional 17.4 acres of critical habitat (mostly matrix habitat) on NFS lands. The proposed action would have very minor indirect effects on PCEs snowshoe hare (lynx foraging) habitat, winter snow conditions, and denning habitat as described above.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)
Under Alternative 4, new permanent disturbance to lynx habitat would be slightly greater than under Alternative 2 and 3 at approximately 2.2 acres. As in the other action alternatives, this alternative would have no direct effect on existing lynx foraging or denning habitat, but would result in a permanent habitat loss, preventing these area from achieving conditions suitable for denning or foraging opportunities in the future. Similar to Alternatives 2 and 3, this alternative would have minor effects on lynx habitat that currently provides cover for resting and travel purposes.

Under Alternative 4, ROW widening would result in the new ROW overlapping an additional 12.0 acres of Critical Habitat (mostly matrix habitat) on NFS lands. The Proposed Action would have very minor indirect effects on PCEs snowshoe hare (lynx foraging) habitat, winter snow conditions, and denning habitat as described above.

Cumulative Effects of Alternative 1 (No Action)
Under Alternative 1, the Proposed Action or Action Alternatives would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives
The Proposed Project Area provides limited boreal forest habitat for lynx (lower elevation river bottom lands, mostly drier forest types, and generally low snow conditions). Existing conditions (heavily used river and travel corridor with a major highway, recreation sites, forest roads, trail heads etc) described in the Affected Environment and Analysis sections above reflect the net effects of past projects and ongoing uses in the analysis area. Concentrated human use in the Gallatin River Corridor establishes an environment of habitat fragmentation and a potential impediment to Canada lynx movements between West Gallatin and North Madison LAUs. Projects analyzed for cumulative effects to Canada lynx included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. These projects would further reduce forest cover, increase human presence, and further increase habitat fragmentation.

Ongoing public recreation includes activities such as camping, hiking, rafting, fishing, pets, and general traffic. Hikers and pets that are exploring in more isolated areas, away from the highway and other prominent disturbance, may be more likely to temporarily disturb lynx in adjacent suitable habitats as well as any transient lynx that may occur in the area. Because of its limited scale and scope (10 to 40 foot widening of an existing utility ROW primarily affecting matrix habitat), the Action Alternatives would have an inconsequential contribution to these cumulative

effects within the cumulative analysis area. With 102,275 acres of mapped lynx habitat in the North Madison LAU, most of which is in designated Wilderness, and 79,380 acres of mapped lynx habitat in the West Gallatin LAU, much of which is in a Wilderness Study Area, the small amounts of habitat alteration associated with the action alternatives would contribute only miniscule amounts of added habitat impacts. In addition, disturbance impacts associated with the action alternatives would be concentrated in an area of existing high levels of human use, at the edge of both LAUs; cumulative impacts to lynx from project-associated actions would be negligible.

Critical Habitat that would be affected by the Proposed Action alternatives occurs within the West Gallatin LAU. Currently, the existing ROW (Alternative 1) overlaps 66.4 acres (55.8 acres on GNF land and 10.6 acres outside of GNF land) of designated Critical Habitat. Under the Proposed Action-Alternative 2, ROW widening would result in the new ROW overlapping an additional 16.6 acres. Thus the new ROW would occupy a total of 83.0 acres (69.7 acres on GNF land and 13.3 acres outside of GNF land) of designated Canada lynx Critical Habitat. Under Alternative 3, ROW widening would result in the new ROW including an additional 20.8 acres of Canada lynx Critical Habitat. Thus the new ROW under Alternative 3 would occupy approximately 86.5 acres total (73.2 acres on GNF land and 13.3 on other land) of designated Canada lynx Critical Habitat. Under Alternative 4, ROW widening would result in the new ROW including an additional 14.7 acres of Canada lynx Critical Habitat. Thus the new ROW would occupy approximately 81.1 total acres (67.8 acres on GNF land and 13.3 acres on non-GNF land) of designated Canada lynx habitat. Considering that the West Gallatin LAU is 131,362 total acres in size, and the Greater Yellowstone Critical Habitat Unit for lynx is over six million acres (9,500 mi^2), the action alternative's incremental impact on primarily matrix habitat would have an inconsequential contribution of cumulative effects to lynx critical habitat.

Comparison of Alternatives

All action alternatives would consist of creation of additional ROW associated with rebuilding an existing transmission line. The amount of new habitat cleared would equal between 1.7 and 2.2 acres of lynx habitat in boreal forest types. While the lynx habitat affected provides cover suitable for travel or resting, these sites do not currently provide the structural characteristics associated with denning or foraging habitat for lynx. Lynx that may be present in the project vicinity could be disturbed and/or displaced by noise and human presence associated with construction activity. However, the project is located in an area of concentrated human use, with existing high levels of noise and human presence. Compared to the existing condition, none of the action alternatives would produce additive disturbance effects that would have any notable impacts on lynx. Direct habitat alteration of 1.7 acres boreal forest habitat (Alternatives 2 and 3) vs. 2.2 acres of boreal forest type (Alternative 4) would have indistinguishable effects at the landscape scale that is biologically meaningful to lynx. ROW overlap with designated lynx critical habitat would be greatest under Alternative 3 (20.8 acre increase over existing) followed by the Proposed Action-Alternative 2 (16.6 acre increase), Alternative 4 (14.7 acre increase), and Alternative 1, which would have the least impact to lynx critical habitat with no increase over existing. Most of critical habitat impacted by the project (regardless of alternative) would be in matrix habitat.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Multiple Project Design Features (PDFs) are proposed to reduce or avoid adverse environmental effects to Canada lynx and other wildlife. The PDFs are described in Chapter 2. Implementation of Best Management Practices (BMPs) described in Appendix D and PDFs applicable to biological resources would minimize impacts and maintain habitat quality.

Consistency with Laws, Regulations, and Forest Plan

A BA would be completed for the Proposed Action, followed by consultation with the USFWS, to fulfill the requirements of the ESA.

NRLMD objectives, standards, and guidelines that apply to the Proposed Action, and project compliance, are outlined below:

Objective ALL O1: Maintain or restore lynx habitat connectivity within and between LAUs and in linkage areas. Since the proposed action is located at the edge of two affected LAUs (W. Gallatin and N. Madison), habitat connectivity would be maintained within both LAUs. Habitat between the affected LAUs is already highly impacted by US Hwy 191, MT Hwy 64, the Gallatin River, and associated human development and use. The incremental effects of ROW expansion in this case, would have no notable impacts on habitat connectivity between LAUs. There are no key linkage areas identified in the project vicinity.

Standard ALL S1: New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area. See the discussion under Objective ALL O1 above.

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. Construction under the Action Alternatives would occur during summer and not cause the expansion of snow compacting activities. For future maintenance and repair, routine maintenance would occur during snow-free periods. In winter, plowed highways (MT Hwy 64 and US Hwy 191) would be used to access the majority of the line. Winter access to facility sites on secondary, unplowed roads would only be necessary for emergency repairs, so snow compaction associated with facility repair would be infrequent, affect only short segments of secondary road, and generally of very limited duration (typically one day).

Objective HU O3: Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat. The Action Alternatives would utilize an existing utility corridor adjacent to paved highways, and numerous recreation and residential areas. The project is proposed in the most highly developed area of affected LAUs.

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 to lynx habitat. The Action Alternatives are located at the lowest elevations (generally not boreal forest conditions), and in the most highly developed area of affected LAUs. It is at the edge of two adjacent LAUs, so would not impact lynx habitat or connectivity within LAUs.

Guideline HU G4: For mineral and energy development site and facilities, remote monitoring should be encouraged to reduce snow compaction. See discussion under Objective HU O1 above.

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. Brush cutting along access roads for new construction would be done to the minimum level necessary to provide for safety. Future line maintenance would not require brush cutting along

access roads. Understory vegetation that does not pose a safety or utility reliability risk would be permitted to grow in ROWs.

Summary Conclusion

The Proposed Action Alternatives would meet all applicable direction. ROW expansion would affect minor amounts of boreal forest and lynx critical habitat (<= 2.2 acres and <= 20.1 acres respectively). There would be no impacts to existing lynx foraging or denning habitat, and indirect impacts to potential future denning/foraging habitat would be <= 2.2 acres. Project-associated activities would be concentrated in the most highly developed area of affected LAUs. The Proposed Action would occur along the edge of two adjacent LAUs, so would not impact lynx habitat or connectivity within LAUs.

Wolverine

On February 4, 2013, the USFWS published a proposed rule to list the wolverine in the contiguous US as a threatened species under the Endangered Species Act (78 FR 7864). There is no proposed critical habitat for wolverine at this time. Consultation with the USFWS is not required for a species proposed for listing, and conferencing with the USFWS is not required for anything less than a ***likely to jeopardize*** determination (USFS 2013). As discussed in the following analysis, implementation of the proposed transmission line upgrade ***is not likely to jeopardize the continued existence*** of wolverines.

Affected Environment

Wolverines prefer high elevation alpine and boreal forests that are cold and receive enough winter precipitation to reliably maintain deep persistent snow late into the warm season (USFWS 2011). This can include high alpine basins in alpine and arctic tundra to boreal and mountain forests, and roads are often avoided.

Aubry et al. (2007) reported that wolverine presence in southern latitudes (e.g., Montana) appears to be restricted to high elevation habitats. Inman et al. (2003), in a progress report for a long term study that includes parts of the GNF, reported that wolverines seem to use higher elevations (> 6,900 feet), steeper slopes (>16°) and northerly aspects disproportionately to their availability. In a study of wolverines in northwest Montana, Hornocker and Hash (1981:1291) found that large areas of mature forest and associated ecotonal habitats of open, rocky and alpine area accounted for the majority of wolverine locations. Hornocker and Hash (1981:1299) also reported that wolverines seemed reluctant to traverse large openings such as recently harvested or burned areas. The wolverine is typically associated with vast, remote, undisturbed areas of limited human intrusion. However, they are known to cross through human developments and high human use areas during long-range movements (Hash 1987).

This opportunistic omnivore feeds on roots, berries, and small mammals, as well as larger prey such as deer and elk hampered by deep snow (Hatler 1989). Females give birth to one to six young in high alpine dens, mainly between February and March. Dens are typically located under rocks or tree roots, in hollow logs, under fallen trees, or in dense vegetation and rely on heavy snowfall late into the spring. Females may abandon den locations due to human disturbance in the winter and early spring. Wolverines range widely and transient occurrences have been reported within one mile of the Proposed Project Area. The Proposed Project Area is dominated by lower elevation (below 6,000 feet), drier forest types that lack deep snows than are typically considered habitat for wolverines. In addition, this species is heavily impacted by roads and would be less likely to find habitat in the Proposed Project Area, which is located within 0.25 mile of adjacent highways (MT Hwy 64 and US Hwy 191). Transient individuals may cross the area to move between more suitable habitats at higher elevations in the Gallatin and Madison Ranges.

Methodology for Analysis

Project activities were assessed for potential disturbance impacts to wolverines, such as habitat alteration, habitat loss, habitat fragmentation, helicopter and construction disturbance, and increased collision risk.

Spatial Boundary

The Project Area does not contain highly suitable habitat (e.g., high elevation, remote areas) and consequently, wolverine presence is likely associated with transitory movements across the Proposed Project Area. Therefore, direct and indirect effects were assessed within the ROW expansion footprint.

To capture potential cumulative impacts, the analysis area was derived from a two-mile buffer around the Proposed Project corridor, resulting in a cumulative effects analysis area of approximately 23,000 acres. This area was selected to capture collective effects along the project corridor (16 miles), as well as to consider cumulative impacts from noise and other disturbance factors within a known distance of wolverine occurrence in the project vicinity.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to wolverines as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts considered were habitat loss, and potential disturbance/displacement effects to wolverines and prey species, created by the project in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary was extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1, the existing 69 kV transmission line would continue to function in its current state. Line inspection patrols and other periodic maintenance activities would continue under the existing regime. There would be no effects to existing habitat and no additional habitat fragmentation. There would be no construction activities, so there would be no associated disturbance, and collision risk would not change. Although continued activities associated with ongoing maintenance of the existing transmission could have impacts on wolverines, a decision to select the No Action Alternative would have no direct or indirect effects to wolverines or prey species, and therefore would have no impact beyond those occurring under the existing condition.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under Alternative 2, there would be tree clearing of 14.8 acres of forested habitat (predominantly dry-type Douglas-fir with some lodgepole), which may provide screening cover for wolverines moving through the project area. This alternative also includes removal of excessive vegetation in 3.9 acres of unforested habitat (predominantly dry sagebrush shrubland), which might support wolverine prey species. Wolverines typically inhabit alpine areas and boreal forests at higher elevations, whereas the Proposed Project is located at lower elevation relative to other areas on the GNF. Habitat loss and direct disturbance to wolverine would be negligible, due to the lack of preferred habitat conditions and consequent infrequent occurrence of wolverines in the project corridor.

Wolverines are wide-ranging animals and could presumably pass through the Proposed Project Area during long-range movements. Throughout the construction period, wolverines in transit could be negatively affected by noise and human presence associated with project activity. The noise and related disturbances could increase the search time for loafing and foraging areas. The use of helicopters for project operations could decrease the likelihood of wolverines passing through the area during this disturbance. However, due to existing high volumes of high speed traffic on US Hwy 191, it is likely that wolverines would not attempt crossing during the day, but rather would wait until night time when traffic volume decreases. Increased construction traffic in the Proposed Action area could increase the risk of vehicle collisions with wolverines, but again, due to existing high traffic levels during daylight hours, wolverines would probably not attempt crossings during peak traffic periods, which would coincide with project activities.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Alternative 3 would be similar to the other action alternatives, except that it would require permanent clearing on a total of 22.4 acres of forested lands. The additional tree clearing (beyond that proposed in Alternative 2) would involve predominantly drier Douglas-fir, mostly on open forested talus slopes, which could provide screening cover for wolverines moving through the project area. This alternative would include 4.3 acres of clearing on un-forested land (talus, grassland, and dry sagebrush shrubland), which might support wolverine prey species. Existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently altered because these portions of ROW would be still used and maintained for distribution to residences. Over time, vegetation re-growth in cleared areas (both forested and un-forested could again provide grass and shrub cover and forage for wolverines and prey species. Noise disturbance impacts and risk of vehicle collision would be similar to those described above for Alternative 2.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Alternative 4 would be similar to the other action alternatives, except that it would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO. This alternative would require permanent clearing of a total of 22.5 acres of forested habitat, with about one-third of this in denser, moister forest types that generally produce better screening cover for wolverines moving through the project area. In addition, Alternative 4 would require 4.2 acres of permanent clearing of non-forest types, primarily in dry sagebrush shrubland, which might support wolverine prey species. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would be still used and maintained for distribution to residences. Over time, vegetation re-growth in cleared areas (both forested and un-forested could again provide grass and shrub cover and forage for wolverines and prey species. Noise disturbance impacts and risk of vehicle collision would be similar to those described above for Alternative 2.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts. Therefore, the No Action alternative would have no impact on wolverines.

Cumulative Effects of the Action Alternatives

Because the Proposed Project Area does not provide preferred habitat (e.g., high elevation, remote areas) for wolverines, but rather likely serves some linkage role for wolverine dispersal, cumulative effects would be less related to suitable habitat loss, and more associated with increased habitat fragmentation and potential intensification of impediments to movement across the Proposed Project Area. Past activities and practices establish the existing habitat fragmentation conditions in the Proposed Project Area. Other current and future projects in the Proposed Project Area would have the potential to affect wolverines cumulatively with this project to increase habitat fragmentation and intensify impediments to movement.

The proposed US Hwy 191 Gallatin Canyon Safety Improvements, the GNF timber sale in the Jack Creek area, and fuel reductions projects between the river and wilderness area would result in the removal of trees, which would further reduce hiding cover for wolverines in transit, and add to habitat fragmentation in the project area. Cumulative habitat loss and associated increases in fragmentation associated with the proposed action and other development in the project area could affect availability of wolverine prey species, but since wolverine use of the area is largely transitory, this impact would be minimal. Further, given the existing high levels of human activity occurring on a daily basis in the project area, dispersing wolverines have likely already adapted behaviorally, attempting to cross the project area at night when human activity decreases appreciably. Therefore, all action alternatives are not likely to jeopardize the continued existence of wolverine.

Comparison of Alternatives

Under Alternative 1, there would be no changes to the current baseline conditions, therefore no added impacts to wolverines or their habitat. Under the action alternatives, there would be 14.8 to 22.5 acres of tree clearing that could otherwise provide some degree of screening cover for wolverines moving through the project area. Habitat impacts to wolverines are expected to be negligible under the action alternatives due to the lack of preferred habitat, small amounts of habitat affected, and existing high levels of human development in the project area. Noise disturbance impacts and risk of vehicle collision would be similar under all action alternatives.

Forest Service Management Indicator Species

Introduction

Management Indicator Species (MIS) are wildlife species whose habitat is most likely to be affected by management practices, thereby serving as indicators for other wildlife species groups and habitat quality. They provide a measure of assessing the effectiveness of vegetation and land management practices.

The grizzly bear, bald eagle, northern goshawk, American marten, elk, and wild trout are identified as MIS in the Forest Plan 1987: II-19 (USFS 1987). Potential effects to these species and their habitats were raised during scoping as issues related to the Proposed Project. Grizzly bear was discussed above, under Threatened and Endangered Animal Species; bald eagle, northern goshawk, American marten, and elk are discussed in this section below; wild trout are discussed in the Fisheries and Aquatic Resources section later in Chapter 3.

> The American marten is a species of boreal coniferous forest strongly associated in Montana with late-succession, mesic forests. Martens are identified in the Forest Plan as a management indicator for cool, moist late-succession forest.
>
> Elk are a desirable big game species found in grassy areas for grazing, adjacent to wooded areas for cover. Elk are identified in the Forest Plan as a management indicator for big game species.
>
> The northern goshawk utilizes dense, closed canopied forests. Northern goshawk are identified in the Forest Plan as a management indicator for old-growth dependent species occupying dry Douglas-fir sites.
>
> Bald eagles are a former federally listed (endangered, threatened) species, and now a Forest Service Sensitive Species, associated with large surface waters with adjacent mature conifers or hardwoods. Bald eagles are identified in the Forest Plan as an MIS.

Minimal impacts from the Proposed Project are reasonably expected from re-building the JRBS 69 kV transmission line along existing ROW near US Hwy 191. The affected environment and effects analysis for MIS are discussed below except for the grizzly bear which is discussed above in the Threatened and Endangered Animal Species section; wild trout are included in the Fisheries and Aquatic Resource section below.

Applicable Laws, Regulations, Forest Plan Direction

The following presents an overview of laws, regulations and Forest Plan direction applicable to MIS potentially affected by the Proposed Project.

National Forest Management Act (1976)

The Forest Service is required by the NFMA to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" 16 U.S.C. § 1604(g)(3)(B). To aid in meeting this requirement, the Gallatin Forest Plan identifies MIS. MIS are selected because their population changes are believed to indicate the effects of management activities.

Migratory Bird Treaty Act (16 U.S.C. § 703-712)

Under the MBTA, which implements various treaties and conventions for the protection of migratory birds, it is unlawful to take, kill or possess any migratory birds, except as regulated by authorized programs. E.O. 13186 is associated with the MBTA and requires agencies to ensure that environmental analyses evaluate the effects of federal actions and agency plans on migratory birds, with emphasis on species of concern, which include the bald eagle and northern goshawk, identified as MIS in the Gallatin Forest Plan.

Bald and Golden Eagle Protection Act (BGEPA, 16 U.S.C. § 668)

Under the BGEPA, it is unlawful to take (to include harm, harass), kill or possess any bald or golden eagle, except as regulated by authorized programs. The Forest Service has a responsibility to ensure that environmental analyses evaluate the effects of federal actions on bald eagles as an MIS.

Gallatin National Forest Plan (1987)

Management direction for the GNF is found in the Forest Plan (USFS 1987). The following section highlights Forest wide standards for species addressed under the MIS section below:

> MIS will be monitored to determine population change (USFS 1987: II-18).
>
> Big game winter range will be managed to meet the forage and cover needs of deer, elk, moose, and other big game species in coordination with other uses (USFS 1987: II-18).
>
> Habitat that is essential for species identified in the Sensitive Species list (e.g., bald eagle) will be managed to maintain these species (USFS 1987:II-18).
>
> A biological assessment will be completed prior to implementation of activities that have potential to affect threatened species (e.g., grizzly bear – see analysis under Threatened and Endangered Species Section above) (USFS 1987:II-19).
>
> General management direction for bald eagle habitat is provided in "A Bald Eagle Management Plan for the Greater Yellowstone Ecosystem" (USFS 1987:II-19).
>
> The area identified for the Proposed Action and Alternatives falls predominantly within MA 25 (electrical and transmission lines and pipelines, climatic and snow measuring sites and electronic site). As well as Forest-wide standards listed above, the following

standard applies in MA 25: Design facilities to mitigate adverse impacts on raptors and other wildlife (USFS 1987: III-69).

American Marten

Affected Environment

The American marten (*Martes americana*) is primarily a species of boreal forests. In Alaska and Canada, it finds habitat in vast continuous blocks extending across the continent. Further south in the contiguous United States, habitat becomes more fragmented with suitable sites restricted to higher elevation mountain ranges providing cool, moist old growth or late-successional coniferous forest (Clark et al. 1987; Fisher and Wilkinson 2005). Habitat is characterized with abundant down woody debris, stumps, and standing dead tree boles. American marten avoid open habitats and are strongly affected by logging, wildfire, and other events that remove mature forested vegetation (Buskirk and Ruggiero 1994; Clark et al. 1987). In Montana and the GNF populations appear to be secure (USFS 2011).

Diet of the American marten is varied and somewhat omnivorous with bird eggs, nestlings, amphibians, small fish, rodents (red squirrels, mice, voles) and berries taken, depending on seasonal availability. Often single prey species are dominant because of availability. The preferred prey species in many areas is the red-backed vole, a species strongly associated with mature, old growth moist forest habitats (Buskirk and Ruggiero 1994; Coffin 2002).

American marten give birth in March and April with den sites found in logs, snags, rock piles and trees located in habitats with characteristics of old growth. These areas have high snag densities, large diameter woody debris, and layered canopies. They are typically dominated by high elevation spruce and subalpine fir (Buskirk and Ruggiero 1994).

In the Proposed Project Area, Engelmann spruce stands are present but no subalpine fir is documented. A single old growth limber pine stand overlaps the ROW, accounting for 0.5 percent of the Proposed Project Area. No American marten territories area known in the Proposed Project Area.

Methodology for Analysis

Project activities were assessed for potential disturbance impacts to American marten, such as habitat alteration, habitat loss, habitat fragmentation, and increased human disturbance during construction and operations.

Spatial Boundary

The spatial boundary for analysis of direct and indirect impacts to American marten includes all areas that would experience disturbance as a result of the Proposed Project. The spatial scale of habitat impacts was developed considering typical male and female American marten home ranges, which are larger than would be predicted for comparably-sized mammals (Buskirk and Zielinski 2003). Males typically have home ranges 30 to 50 percent larger than females, with overall home ranges driven by habitat quality and resource density. Home ranges vary from 198 acres to 8,000 acres in fragmented logged areas. Because of its linear nature through Gallatin Canyon, the 16-mile Proposed Action Area could possibly span an area crossing several American marten habitat types. The linear nature of the project would result in minor intersections with several home ranges, and potentially affect numerous individuals transiting through the area. Therefore, the spatial boundary for cumulative analysis was a two-mile corridor (centered on the proposed centerline), which encompasses an area of approximately 23,000 acres, roughly the size of three or more American marten home ranges.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to American marten as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts to consider are habitat loss and disturbance (i.e., noise, road traffic, and helicopter use), and barrier effects created by the project in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects therefore is the life of the SUP (20 years into the future) and, for analysis purposes, the cumulative temporal boundary is extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1 the existing 69 kV transmission line would continue to function in its current state. Line inspection patrols and other periodic maintenance activities would continue under the existing regime. Under Alternative 1, there would be no effects to existing habitat, and no additional habitat fragmentation or effects to habitat linkages because there would be no marten habitat alternation. There would be no construction activities, so there would be no construction disturbance. Based on this, there would be no added impacts to American martens under Alternative 1.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under the Proposed Action-Alternative 2, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. All portions of the existing line (as well as proposed modifications under Alternative 2) are confined to within 0.25 mile of US Hwy 191. The Proposed Action-Alternative 2 is within 0.25 mile of the US Hwy 191 travel corridor and traverses an adjacent network of roads, trails, recreation areas and cabins.

Under the Proposed Action-Alternative 2, there would be tree clearing of 14.8 acres of forested habitat in narrow strips along existing access roads and ROW (predominantly Douglas-fir with some lodgepole) and removal of 3.9 acres of un-forested habitat. This habitat loss is not associated with habitat structurally suitable for American martens. American martens are strongly associated with mature un-fragmented higher elevation spruce and subalpine fir forest types. Habitat along the existing ROW would be considered unsuitable because of the absence of boreal forest types, including a lack of abundant down woody debris, stumps and snags. Habitat loss would therefore be negligible.

Construction noise could negatively affect American martens that are transiting the area. The noise and related disturbances could increase the search time for loafing and foraging areas; however, the corridor is already heavily impacted by noise disturbance due to the large volume of traffic on US Hwy 191, and high levels of human use related to the presence of residential and recreational areas in the corridor. Further, since American martens are generally nocturnal they would not likely be active during construction times. Since the project corridor provides limited suitable habitat for marten, and the very low level of noise disturbance impacts expected, overall project impacts would be negligible.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Alternative 3 would be similar to the other action alternatives, except that it would require permanent clearing on a total of 22.4 acres of forested lands. The additional tree clearing (beyond that proposed in Alternative 2) would involve predominantly drier Douglas-fir, mostly on open forested talus slopes. This alternative would include 4.3 acres of permanent clearing on unforested land (talus, grassland, and dry sagebrush shrubland). Existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently altered because these portions of ROW would be still used and maintained for distribution to residences. This means there would be some new habitat fragmentation under Alternative 3. However, this habitat fragmentation would be negligible to American martens as the area does not provide suitable habitat due to the lack of boreal forest conditions and structure. Noise disturbance impacts would be similar to those described above for Alternative 2.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Alternative 4 would be similar to the other action alternatives, except that it would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO. This alternative would require permanent clearing of a total of 22.5 acres of forested habitat, with about one-third of this in denser, moister forest types that provide more favorable conditions for marten. In addition, Alternative 4 would require 4.2 acres of permanent clearing of non-forest types, primarily in dry sagebrush shrubland. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would be still used and maintained for distribution to residences. This means there would be some new habitat fragmentation under Alternative 4, and would include a small amount roughly 7.7 acres in forest types more favorable (e.g., denser, moister lodgepole pine) to marten, although not in the preferred habitat (dense, cool, moist spruce and subalpine fir) types.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Proposed Project would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives

Other current and future projects in the Proposed Project Area would have the potential to affect American martens cumulatively with this project. The proposed US Hwy 191 Gallatin Canyon Safety improvements would involve widening and improving US Hwy 191, which could remove potential habitat by removing riparian trees. The GNF timber sale in the Jack Creek area, the Montana Opticom project, and GNF fuel reductions projects between the river and wilderness area would result in the removal of trees, which could result in the disturbance and the loss of habitat, and increased habitat fragmentation. GNF annual noxious weed spraying, recreation home project requests, and the Moose Creek Flat Campground fishing platform rebuild would likely have negligible cumulative effects. Habitat fragmentation from other projects would not likely be substantially increased, given that most cumulative projects would occur within the currently fragmented Gallatin River Canyon.

The existing permanent habitat alteration from development within the cumulative effects analysis area for American marten is approximately 1.4 percent of the two-mile analysis corridor. Given the lack of large scale vegetation altering processes such as timber harvest and fire in the analysis area, habitat is currently largely intact. However, recent insect outbreaks have begun, and are expected to continue to have impacts on forest structure. In any event, the area is only comprised of approximately 2.2 percent of Engelmann spruce/alpine fir habitat that would provide the habitat preferred by American martens. The majority of the existing development is concentrated in the US Hwy 191 corridor where the action alternatives are proposed. Given the lack of suitable habitat for marten in the analysis area, the low level of direct and indirect impacts identified above coupled with the existing development and associated disturbance in the

cumulative effect analysis area, incremental impacts from the action alternatives would result in negligible cumulative impacts to American martens.

Comparison of Alternatives

Under Alternative 1, there would be no changes to the current baseline conditions to American martens and their habitat. Under the action alternatives, there would be 14.8 (Alternative 2) to 22.5 (Alternative 4) acres of tree clearing and 3.9 (Alternative 2) to 4.3 (Alternative 3) acres of unforested habitat removed. Alternative 4 not only has the largest total acreage of forested habitat alteration, but also includes some impact to more suitable habitat for marten compared to the other action alternatives. Nevertheless, given the lack of preferred habitat conditions (boreal forest types, abundant coarse woody debris), and small amounts of marginal habitat (drier Douglas fir and lodgepole pine) affected by the proposed action alternatives, habitat loss to American martens is expected to be negligible under all action alternatives. Noise and associated disturbance effects are also expected to be negligible under all action alternatives because the marginal habitat conditions are primarily suitable only for transitory use by martens, and being nocturnal creatures, martens would likely use the area while traveling between suitable habitats at night, when construction activities would not occur.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

PDFs are proposed to reduce or avoid adverse environmental effects to biological resources, including American marten. These are described in Chapter 2 of the FEIS. Implementation of best management practices and PDFs applicable to biological resources would minimize impacts and maintain habitat quality by implementing sediment control measures (8.4), requiring the applicant or its contractor(s) to stay within construction limits (1.1), restricting equipment to pre-designated access (1.3), minimizing ground disturbance (1.5 and 1.2), controlling weed intrusion (1.9), prepare a re-vegetation plan (1.9), restore areas disturbed surrounding construction areas (1.9), and imposing timing restrictions (5.3).

Consistency with Laws, Regulations, and Forest Plan

The Forest Plan identifies the American marten as an MIS, which are those species whose habitat is most likely affected by forest management activities. The Forest Plan gives direction to monitor MIS for population trends (USFS 1987, page II-17). Marten population trends on the GNF are generally considered stable at this time (USDA 2011). All alternatives, including No Action, would be consistent with applicable law, regulation, policy and direction.

Elk

Affected Environment

Elk (*Cervus elaphus*) require mature stands of deciduous and conifer forest habitats, with dense brush understory for hiding and thermal cover. Elk generally range to higher elevations during summer, feeding on forbs and grasses, and winter in lower elevation grasslands, with their spring range falling between summer and winter ranges. Calving usually occurs in May or June (Peek 2003), in the upper elevation limits of the winter range. Summer forage consists mainly of forbs and grasses, while winter forage is comprised mainly of grasses. The Proposed Project Area contains some winter and spring habitat for elk, but the ROW corridor itself mainly serves as a transitional area crossed during migration between seasonal ranges. Habitat security is an important component for maintaining healthy big game herds. Secure habitat for elk is defined by Hillis et al. (1991) as areas at least 250 acres in size and at least one half mile from an open road. Because the Proposed Project Area is within 0.25 mile of year-round open roads, limited secure habitat is present in the immediate project vicinity. Secure habitat is available to big game in unroaded areas upslope from the project corridor, primarily on the west side.

Methodology for Analysis

Project activities were assessed for potential habitat impacts to elk, such as loss of hiding and thermal cover, impacts to foraging habitat, fragmentation, and increased human disturbance during construction and operations.

Spatial Boundary

Potential direct and indirect effects (mechanized and human disturbance) related to Proposed Project activities would be confined to areas along the ROW and adjacent bottomlands. Elk may move across the landscape between summer and winter habitats and typically have home ranges in excess of 2,500 acres. Because of the linear nature of the Proposed Project Area (16 miles through Gallatin Canyon) the Proposed Action has the potential to intercept a variety of elk habitats and seasonal use areas. To capture potential cumulative impacts, the analysis area was derived from a two-mile buffer around the Proposed Project, resulting in a cumulative effects analysis area of approximately 23,000 acres. This area was selected to capture collective effects along the entire project corridor, as well as to consider cumulative impacts from noise and other disturbance factors that might displace elk upslope, or result in other behavioral changes.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to elk as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts considered include habitat loss, and potential disturbance/displacement effects created by the Proposed Project in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary is extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under the No Action Alternative, the existing 69 kV transmission line within the Proposed Project Area would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. ROW vegetation maintenance and operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, hazard tree removal, and transmission structure replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue. Although continued activities associated with ongoing maintenance of the existing transmission line could have impacts on elk and other big game species due to minor habitat alteration and possible disturbance effects from noise and human presence associated with such activities, a decision to select the No Action Alternative would have no direct or indirect effect to wildlife beyond those occurring under the existing condition.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under the Proposed Action-Alternative 2, there would be permanent clearing of 14.8 acres of forested habitat (predominantly Douglas-fir with some lodgepole pine) in narrow strips along the existing ROW, which would slightly reduce hiding and thermal cover in some areas. Forested cover is not limited for big game in the Gallatin Canyon, and widening the ROW would improve visibility of animals near, or seeking to cross US Hwy 191, potentially reducing the risk of vehicle collisions. Over time, some re-growth of grasses, forbs, brush and shrubs may again provide some concealment and forage for big game within the ROW, but the area would be maintained free of large mature trees.

This alternative also includes the removal of 3.9 acres of un-forested habitat (predominantly along the highway with some dry sagebrush shrubland). The overall habitat loss would involve marginal cover and foraging values, mainly in transitional habitat that elk would use moving to feeding and bedding areas, as well as between seasonal ranges. In a large meadow area on the floor of the canyon south of Deer Creek an existing transmission line angle would be removed (i.e., ROW straightened). This refinement would improve the alignment by reducing structure number, removing an existing wildlife hazard associated with large group of guy wires, and spanning a wetland. This would involve a small amount (< 1 acre) of sagebrush removal in calving habitat. Loss of security, cover, foraging, calving, and winter habitat for elk through ROW widening and access roads would be negligible from a direct and indirect stand point.

Due to the proposed ROW expansion area's proximity (within 0.25 mile) to year-round, high volume open roads (US Hwy 191 and MT Hwy 64), the bulk of clearing and construction associated with the Proposed Action would have no effect on secure habitat, because none exists within 0.50 mile of open roads. Approximately 600 feet of new temporary road is proposed (under all action alternatives) to access the Indian Ridge staging area. This road would run at a roughly 45° angle to US Hwy 191, heading southwest. The new temporary road would fall entirely within the influence zone of existing open roads (US Hwy 191 and access roads to private residences) so would have no effect on secure habitat. This proposed road would only be open for administrative access for facility development, and would be permanently closed upon completion of construction activities. With the exception of this new temporary road, all other access to project construction sites would be on existing open public or administrative roads.

Construction activities associated with the Proposed Action-Alternative 2 would be generally limited to summer months when elk are likely at higher elevation sites. Some temporary displacement of elk may occur at the beginning and end of construction seasons but this would be brief, limited in area, and occur in locations already experiencing high levels of human disturbance. Some minor winter activities such as yard maintenance, equipment staging, and slash removal may occur in areas already experiencing high levels of human activity. Potential winter stress related to mechanized and human disturbance would not be notably increased by the Proposed Project.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)
Alternative 3 would be similar to the other action alternatives, except that it would require permanent clearing on a total of 22.4 acres of forested lands. The additional tree clearing (beyond that proposed in Alternative 2) would involve predominantly drier Douglas-fir, mostly on open forested talus slopes, which do not currently provide good hiding or thermal cover for elk. This alternative would include 4.3 acres of clearing on un-forested land (talus, grassland, and dry sagebrush shrubland), which would reduce forage (grass), and cover (shrubs) on small amounts of winter range and calving grounds. Existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently altered because these portions of ROW would be still used and maintained for distribution to residences. Over time, vegetation re-growth in cleared areas (both forested and un-forested could again provide grass and shrub forage and cover for elk and other big game. Noise disturbance impacts and effects to secure habitat would be similar to those described above for Alternative 2.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)
Alternative 4 would be similar to the other action alternatives, except that it would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO. This alternative would require permanent clearing of a total of 22.5 acres of forested habitat, with about one-third of this in denser, moister forest types that generally produce better hiding and thermal cover for big game. In addition, Alternative 4 would require 4.2 acres of permanent clearing of non-forest types, primarily in dry sagebrush shrubland, which would reduce forage and cover on a small

amount of winter range and calving area. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would be still used and maintained for distribution to residences. Over time, vegetation re-growth in cleared areas (both forested and un-forested could again provide grass and shrub forage and cover for elk and other big game. Noise disturbance impacts and effects to secure habitat would be similar to those described above for Alternative 2.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Proposed Project would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives

Projects analyzed within the spatial boundary for cumulative effects to elk included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Smith timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. Cumulative effects to elk resulting from Proposed Project and other planned projects in the Proposed Project Area could result in increased human presence, the removal of hazard trees, and removal of trees for other future projects. The proposed widening and improvements on US Hwy 191 exacerbate and impair elk movement through and across the Gallatin River Canyon. Other projects, including GNF fuel reduction efforts, Jack Smith timber sale, and systematic upgrades to private homes could all result in the disturbance of big game species and the potential loss of habitat. Weed maintenance would remove noxious weeds which could benefit elk and other big game by reducing weed competition for preferred native forage. The proposed action alternatives would not cumulatively reduce secure habitat, since the only new temp road would fall within the influence buffer of existing open roads. The action alternatives would, however, have a small contribution to the overall reduction of hiding cover on (or near) elk winter range and calving areas. Cumulative effects to elk and other big game species due to disturbance impacts from the action alternatives would be negligible when added to currently existing noise and human presence associated with high traffic volume on US Hwy 191, campgrounds, trailheads, fishermen, whitewater rafting trips on the Gallatin River, private residences, and the existing transmission line.

The current permanent habitat alteration from development within the cumulative impacts assessment area for elk is approximately 1.4 percent of the two mile analysis corridor. Adding the small amounts of habitat disturbance associated with ROW expansion would not appreciably change this condition. Human development has been concentrated in the Gallatin River canyon, and upslope areas have been relatively undisturbed by recent fires or timber harvest, leaving much of the habitat within the analysis area intact with respect to cover and forage availability. However, the presence of US Hwy 191 and a considerable secondary road system on the east side of the highway limits the amount of secure habitat in the cumulative effects analysis area. Secure habitat is readily available to elk and other big game species in the nearby Lee Metcalf Wilderness area and the Hyalite Porcupine Buffalo Horn Wilderness Study Area. Due to the minimal about of habitat loss and temporary disturbance proposed by the action alternatives, coupled with the proposed actions occurring in an already concentrated area of disturbance, the action alternatives would have a negligible cumulative impact to elk.

Comparison of Alternatives

All action alternatives would consist of rebuilding an existing transmission line. Under the Proposed Action-Alternative 2, a small amount of forested habitat, including some hiding and thermal cover, would be lost as the result of ROW widening and hazard tree removal (14.8 acres). This would not be significant, given the wide availability of forested habitat within and adjacent to the Proposed Project Area. Impacts from Alternatives 3 and 4 would be similar, 22.4 and 22.5 acres, respectively; although forested habitat loss would be slightly greater because of LROs.

Forested cover reduction would be greatest under Alternative 4, since it involves denser forest conditions to begin with. Understory vegetation clearing would occur in ROWs for all alternatives, but would affect elk similarly with similar amounts of habitat affected.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

PDFs are proposed to reduce or avoid adverse environmental effects to biological resources, including elk. These are described in Chapter 2 of the FEIS. Implementation of BMPs and PDFs applicable to biological resources would minimize impacts and maintain habitat quality by implementing sediment control measures (8.1), requiring the applicant or its contractor(s) to stay within construction limits (1.1), restricting equipment to pre-designated access (1.3), minimizing ground disturbance (1.2 and 1.5), controlling weed intrusion (1.9), prepare a re-vegetation plan (1.9), restore areas disturbed surrounding construction areas (1.9), and imposing timing restrictions (5.3).

Consistency with Laws, Regulations, and Forest Plan

The GNF Plan states that MIS will be monitored to determine population change (USFS 1987: II-18). Elk are identified as having a stable population trend across the entire Gallatin Forest. However, some individual herds are currently below population objectives in the project area (USFS 2011). Elk populations and habitat trends will continue to be monitored in coordination with Montana Fish Wildlife and Parks (MFWP) personnel.

The GNF Plan states that big game winter range will be managed to meet the forage and cover needs of deer, elk, moose and other big game species in coordination with other uses (USFS 1987: II-3.). While there are small amounts of big game winter range in the Proposed Project Area, the minute amounts of habitat alteration associated with project activities would not have an appreciable effect on forage or cover values, and the power transmission line is an acceptable use of NFS lands.

Change from the existing ROW condition (69 kV transmission line), to the ROW condition for the Proposed Project (161 kV transmission line) would result in minimal change to all elk habitat components. All alternatives, including No Action, would be consistent with applicable law, regulation, policy and direction.

Northern Goshawk

Affected Environment

Three key spatial components of nesting northern goshawks include: nesting areas, post-fledging areas, and foraging areas (Reynolds et al. 1992). In the GNF, nesting stands average 40 acres in size and are typically located in dense, mature, closed canopy stands (USFS 2006b). Nests are constructed with small to medium sized sticks placed close to the bole of the tree, typically just beneath the canopy (Saunders 1982). Nests are typically placed in old growth forests or stands with large trees and a high degree of canopy closure (Hayward and Escaño 1989), of coniferous or deciduous trees, depending on the region and availability, near the bottom of moderate hill slopes, with sparse ground cover (Reynolds et al. 1982). No old growth Douglas fir stands are present within the Proposed Project Area. Only one small stand of old growth, dominated by limber pine, was found in the Proposed Project Area.

Adults return to breeding grounds for courtship and egg-laying in mid-April to early May. Eggs are laid shortly thereafter and chicks typically hatch in early June. Egg-laying may be delayed in years of heavy snowfall or cold, wet springs. June is characterized as the nestling period. The female rarely leaves the nest during the nestling period and is fed by prey brought to the nest by the male.

July and August is characterized as the fledgling dependent period. Both parents actively hunt away from the nest during this period. During this time period family groups occupy the post-fledging area. Post-fledging areas are typically 300 to 600 acres and exhibit similar forest structure to nesting areas (Reynolds et al. 1992). Post-fledging areas may correspond with the defended home ranges of nesting northern goshawks. Chicks grow rapidly during the fledgling dependent period and may move out around the nest, but do not leave the immediate area. Independence is attained in late August or early September, approximately 70 days post hatching (Cramp and Simmons 1980).

The northern goshawk utilizes dense, closed canopied forests, conducting its foraging in a series of short surveying flights with brief periods of prey searching from elevated hunting perches. The northern goshawk is an opportunist which will take a wide variety of prey depending on the region, season, vulnerability, and availability. The main sources of prey include ground and tree squirrels, rabbits and hares, large passerines, woodpeckers, game birds, and corvids (Boal and Mannan 1994). Galliforms such as ruffed grouse (*Bonasa umbellus*), spruce grouse (*Dendragapus canadensis*), and blue grouse (*Dendragapus obscurus*) typically make up a large portion of the northern goshawk diet.

Foraging areas are much larger than nesting and post-fledging areas, and are used by adult northern goshawks throughout the breeding season. Foraging areas are large, approximately 5,000 to 6,000 acres, and typically cover a wide array of forest structure. Mature forests with an established herbaceous understory, small openings within closed canopy forests, and an abundance of snags and downed logs are all important components of foraging habitat for their ability to support a varied prey base (Reynolds et al. 1992).

The MTNHP documents northern goshawk occurring within one mile of the Proposed Project Area, and 77 records of northern goshawk in Gallatin County, ranging from 1958 to 2010. However, to evaluate the Proposed Project Area for northern goshawk presence, protocol-level goshawk nest surveys were conducted for all reaches of the Proposed Project within the GNF. Broadcast Acoustical Survey for nesting goshawks occurred July 13th–15th, 2010 and again August 9th–12th, 2010. No individual goshawks, goshawk nesting areas, or goshawk post-fledging areas were identified during these surveys.

Nesting northern goshawks prefer the bottoms of relatively moderate slopes with closed canopy forests (Reynolds et al. 1982; Hayward and Escaño 1989). The Gallatin River Canyon has closed canopy forests surrounding the Proposed Project Area, but is steeply sloped, with the bottom of the canyon occupied by the Gallatin River, open riparian areas, recreational developments, and US Hwy 191. There is little or no closed canopy forest in the existing ROW or in the proposed expansion area.

Scientific literature indicates that northern goshawks generally avoid nesting near roads (Kimmel and Yahner 1994). The Proposed Project Area lies within the steep confines of the Gallatin River Canyon and is within 0.25 mile of MT Hwy 64 and US Hwy 191, which have a high traffic volume as the main highway system feeding the resort town of Big Sky, Montana, the town of West Yellowstone, Montana and Yellowstone National Park. As such, MT Hwy 64 and US Hwy 191 have heavy daily traffic, including large trucks to and from Big Sky and West Yellowstone. The presence of heavy traffic, particularly the frequent travel of large trucks, creates loud noise along the proposed route. Other existing disturbances include recreational activities and infrastructure, and private residences.

Methodology for Analysis

Effects to northern goshawks were evaluated by assessing potential impacts from collision with the transmission line, to nesting areas, post fledging areas, and foraging areas, along with data derived from protocol level field surveys, as outlined in the Northern Goshawk Inventory and Technical Guide (Woodbridge and Hargis 2006).

Scale of Analysis

Spatial Boundary

The spatial scale of direct and indirect impact analysis to northern goshawks was evaluated to include the areas directly affected by the Proposed Project, and a buffer area 400 meters (0.25 mile) from the edge of ground disturbance. This buffer was also used to analyze potential noise disturbance. The 400 meter analysis buffer was derived from the Forest Service Northern Goshawk Inventory and Monitoring Technical Guide (Woodbridge and Hargis 2006). For cumulative impacts a two mile corridor centered on the Proposed Project centerline was used to capture collective impacts along the entire ROW expansion area, as well as upslope from the proposed construction areas. This represents an area of approximately 23,000 acres, or roughly the size of 4-5 northern goshawk home ranges. However, the linear analysis area is not considered representative of a typical goshawk home range configuration.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to northern goshawk as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts to consider are habitat loss, particularly foraging, nesting, and post-fledging habitat, and disturbance (i.e., noise, road traffic, and helicopter use) in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary is extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under the No Action Alternative, the existing 69 kV transmission line within the Proposed Project Area would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. ROW vegetation management, and operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, hazard tree removal, and transmission structure replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue. Although continued presence of the transmission line and activities associated with ongoing maintenance could have impacts on northern goshawks due to minor habitat alterations and possible disturbance effects from noise and human presence, a decision to select the No Action Alternative would have no direct or indirect effects to wildlife beyond those occurring under the existing condition.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under the Proposed Action-Alternative 2, there would be tree clearing of 14.8 acres of forested habitat (predominantly Douglas-fir with some lodgepole), but it does not include dense, mature, closed canopy stands preferred by goshawks for nesting, foraging, and post-fledging areas. This alternative includes removal of 3.9 acres of non-forested habitat (predominantly dry sagebrush shrubland) which could be used for foraging. This small amount of habitat alteration would be distributed along the entire 16-mile construction corridor.

Habitat fragmentation would be minimal when compared to its existing state. MT Hwy 64 and US Hwy 191, the existing transmission line, developed campgrounds, and private residences currently fragment northern goshawk foraging habitat within the Proposed Project Area. As the action alternatives would largely follow the route of the existing transmission line, additional habitat fragmentation would be negligible.

Increasing the underbuild portion of the proposed transmission line may potentially increase the risk of goshawk collision with conductors. In addition, Alternative 2 may call for the use of guyed structures in some locations to support a change in direction of the line. Northern goshawks are highly maneuverable raptors that forage in highly cluttered habitats; however they would have some risk of collision with guy-wires. Research has shown that avian collision is typically the result of birds seeing the conductor, gaining altitude, and colliding with the overhead shield wire (Brown 1987; Morkill and Anderson 1991). The increased diameter of the new 161 kV conductor under the action alternatives may result in increased visibility of the line, thus potentially allowing avian species more time to maneuver and avoid collision. The risk of northern goshawk collision with Alternative 2 would be negligible.

Disturbance to potential nesting and post-fledging northern goshawks from construction-related equipment, including helicopters, is unlikely because dense, mature, closed canopy stands are not present in the Proposed Project Area. The northern goshawk typically forages by scanning from an open perch for a short period of time (seconds), then making a short flight to another perch and continuing the process (Kenward 1982; Widen 1985; Reynolds 1992). Because of this mobile foraging method, northern goshawks can forage over large tracts of forest during a day. Construction-related disturbance would be temporary and northern goshawks would be able to re-occupy the surrounding areas for foraging once construction in that area has been completed.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Alternative 3 would be similar to other action alternatives, except that it would require tree clearing a total of 22.4 acres of forested lands, predominantly Douglas-fir (mostly on open forested talus slopes), and a total of 4.3 acres of unforested land (talus and dry sagebrush shrubland). Dense, mature, closed canopy stands would not be affected under Alternative 3. The existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently disturbed under this Alternative because these portions of ROW would be still used and maintained for distribution to residences. New habitat fragmentation would be minimal under Alternative 3 as the area does not provide suitable dense, mature, closed canopy stands due to the proximity to US Hwy 191, roads, trails, recreation areas and cabins and lack of habitat and habitat structure preferred by goshawks.

Alternative 3 would require only six crossings over the Gallatin River instead of the eight river crossings for Alternatives 1 and 2, thus reducing the likelihood of collision with the transmission line.

General noise disturbance factors would be the same as those described above for Alternative 2.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Alternative 4 would be the same as the other action alternatives, except that it would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO, and it would require tree clearing for a total of 22.5 acres in forested habitat. The 7.7 acres of tree clearing in denser forest habitat under this alternative could potentially impact nesting and post-fledging habitat, but would not affect old growth forest. Alternative 4 would require removal of 4.2 acres of unforested vegetation (dry sagebrush shrubland), that could be used for foraging purposes. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently

disturbed because these portions of ROW would be still used and maintained for distribution to residences. This means there would be some new canopy loss under Alternative 4.

Like Alternative 3, Alternative 4 would require only six crossings over the Gallatin River whereas Alternatives 1 and 2 require eight crossings. Thus, the likelihood of collision with the transmission line would be reduced with this alternative when compared to the existing condition.

Noise and disturbance associated with construction activities and human presence may be a bit higher with this alternative, since it includes a small amount (7.7 acres) of tree clearing in denser forest habitat that would be more suitable for goshawk nesting and post-fledging activities, although lodgepole pine is not considered preferred nesting habitat for goshawks.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives

Current and future projects in the Proposed Project Area would have the potential to affect northern goshawks cumulatively with this project. The proposed US Hwy 191 Gallatin Canyon safety improvements would involve widening and improving US Hwy 191, which could remove riparian trees. The GNF timber sale in the Jack Smith area, the Montana Opticom project, and GNF fuel reductions projects between the river and wilderness area would result in the removal of trees, which could result in the disturbance and the loss of habitat, and increased habitat fragmentation. GNF annual noxious weed spraying, recreation home project requests, and Moose Creek Flat Campground fishing platform rebuild would likely have negligible cumulative effects because of the location outside of dense, mature, closed canopy stands (preferred habitat for goshawks).

Existing fragmentation and disturbances listed above would reduce the habitat suitability along the bottom of the Gallatin River Canyon to the point where northern goshawks would not likely establish nesting or post-fledging areas. Habitat fragmentation from other projects would not likely increase to substantially higher levels than currently exist, given that most cumulative projects would occur within the currently fragmented Gallatin River Canyon. In addition, ongoing and future public recreation activities could have effects on northern goshawk that may be in the area. Public recreation would include activities such as camping, hiking, rafting, fishing, pets, and general traffic. Hikers and pets that are exploring in more isolated areas, away from the highway and other prominent disturbance, may be more likely to temporarily disturb any goshawks that may be foraging or nesting. However, this is unlikely to have a cumulative effect with the Action-Alternatives, as the Action Alternatives do not occur in or propose to disturb dense, mature, closed canopy stands, which is the preferred northern goshawk habitat.

The current permanent habitat alteration from development within the cumulative impacts assessment area for goshawk is approximately 1.4 percent of the two mile analysis corridor. Adding the small amounts of habitat disturbance associated with ROW expansion would not appreciably change this condition. Human development has been concentrated in the Gallatin River canyon, and upslopes have been relatively undisturbed by recent fires or timber harvest, leaving much of the habitat within the analysis area intact Approximately 43 percent of this area is comprised of Douglas fir and approximately 2.2 percent of the area is Engelmann spruce/alpine fir habitat that could serve as potential habitat for northern goshawks. Due to the minimal about of habitat loss and temporary disturbance proposed by the action alternatives, coupled with the proposed actions occurring in an already concentrated area of disturbance, the action alternatives would have a negligible cumulative impact to goshawks.

Comparison of Alternatives

Under Alternative 1 (No Action), there would be no changes to the current baseline conditions. Under Alternative 2, a small amount (14.8 acres) of forested habitat would be permanently lost as the result of ROW widening and hazard tree removal; however, this would not include the loss of dense, mature, closed canopy stands that could provide suitable nesting or post-fledging areas. Loss of forested habitat from Alternatives 3 and 4 would be similar, 22.4 and 22.5 acres, respectively, although Alternative 4 includes tree clearing in the more suitable (though not optimal) nesting and post-fledging habitat (7.7 acres of dense lodgepole pine). The northern goshawk is an MIS for old-growth Douglas fir habitat (USFS 1987:II-19). Alternative 2 includes the removal of 9.8 acres of Douglas-fir habitat, Alternative 3 has 14.3 acres, and Alternative 4 involves 10.1 acres of Douglas-fir removal. However none of this habitat is currently providing old-growth characteristics, or the dense, mature, closed canopy stands, which are the preferred nesting habitats for northern goshawks. This small amount of forested habitat loss under all action alternatives is negligible compared to the almost 10,000 acres of Douglas-fir habitat present within one mile of the project area.

While forested habitat loss would be slightly greater under Alternatives 3 and 4 because of LROs, risk of goshawk collision with the transmission line would likely be slightly less because the number of river crossings (six) would be reduced compared to Alternatives 1 and 2 (eight). Temporary disturbance to foraging goshawks could occur during construction, but would not likely disturb nesting goshawks. Research suggests that goshawks avoid major roads and would likely reject the Proposed Project Area for nesting habitat due to the presence of MT Hwy 64 and US Hwy 191. The highly mobile foraging method of goshawks may reduce the impact of temporary disturbance from construction related equipment; i.e., birds could easily move to foraging habitat elsewhere.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Various PDFs are proposed to reduce or avoid effects to biological resources, including northern goshawk. These are described in Chapter 2 of the FEIS. Implementation of BMPs and general PDFs applicable to biological resources would minimize impacts and maintain habitat quality by restricting activity to ROW and approved areas (1.1), minimizing ground disturbance (1.2 and 1.5), controlling weed intrusion (1.9), and imposing timing restrictions (5.3).

The northern goshawk is an MIS; however, no active nests are known to occur within 400 meters of the Proposed Project Area, no habitat for which it is an indicator (old growth Douglas-fir) and no individuals were observed during the protocol surveys. If an active nest is detected in the vicinity of the Proposed Project prior to or during construction, timing restrictions would be imposed (no ground disturbing activities within a 420-acre buffer of the nest (post-fledging area)) during the period of 15 April through 15 August, as suggested by the Forest Service (USFS 2006b), and known occupied nest trees would not be cut during construction.

Consistency with Laws, Regulations, and Forest Plan

The Migratory Bird Treaty Act (MBTA) and Executive Order (EO) 13186 make it unlawful to "take" migratory bird species, except as regulated by authorized programs, and to ensure that environmental analyses evaluate the effects of federal actions on migratory bird species. The proposed transmission line ROW is an authorized use of NFS lands. The effects analysis presented here meets the requirements of the MBTA and EO 13186.

The Gallatin Forest Plan identifies the northern goshawk as a management indicator species for Douglas-fir old growth, and requires that MIS be monitored to determine population change (USFS 1987:II-18, 19). There is no Douglas-fir old growth present in the Proposed Project Area, so none would be affected by the Proposed Action. A recent assessment

of MIS populations on the GNF (USFS 2011) reports that, based on detection surveys, goshawks are present and well-distributed across the forest, but population trends are difficult to determine without a more rigorous sample design. Regional habitat assessments indicate that potential goshawk habitat on the Gallatin Forest exceeds the amount predicted to maintain goshawk populations over time. Combined, these factors (detection surveys and habitat assessments) suggest that goshawk populations are stable and cycling at low numbers on the Gallatin Forest.

MA 25 includes a standard to "Design and mitigate adverse impacts on raptors and other wildlife" (USFS 1987:III-69) The Proposed Project would be developed consisted with the Avian Power Line Interaction Committee's (APLIC) guidelines (APLIC 2006) for avian safety and operated under and Avian Protection Plan to reduce risk of collision and electrocution.

Bald Eagle

The Gallatin Forest Plan identifies the bald eagle as an MIS for endangered species, because the bald eagle was listed as such under the Endangered Species Act when the Plan was written. In June 2007, the USFWS announced the recovery of the bald eagle and removed it from the list of threatened and endangered species. The bald eagle remains an MIS in the Gallatin Forest Plan, but is now managed as a Forest Service Sensitive Species.

Affected Environment

Bald eagles are typically associated with large surface water features such as rivers, lakes, reservoirs, or marshes, which support a suitable prey base. Large trees, hardwoods or conifers, along the edges of water provide important hunting perches and roosts for bald eagles, and are an important part of suitable bald eagle habitat (Sibley 2003a and 2003b). Light to moderate human development of shoreline may not create a negative impact on bald eagles, if suitable perching habitat is left in place (McGarigal et al. 1991). Potential suitable habitat in the Proposed Project Area occurs along the Gallatin River corridor.

The diet of the bald eagle is mainly composed of fish, but may be supplemented by waterfowl, galliformes, or large ungulate carrion at times when fish are not available (Swenson et al. 1986). Rainbow trout, cutthroat trout, and brown trout would be the most likely prey base for bald eagles occurring in the Proposed Project Area. Large ungulate carrion may also supplement the diet during winter months in the Proposed Project Area. Suitable foraging habitat in the Proposed Project Area may include all reaches of the Gallatin River, including river stretches on Forest Service lands. Large trees overhanging the Gallatin River may provide suitable foraging and roosting perches.

Some bald eagles may migrate depending on the climate and prey availability of their nesting location. Migratory individuals typically arrive on nesting grounds in late February and March, and begin nest construction shortly after arrival. Nests are large stick structures placed near the top of older, mature trees near water (Swenson et al. 1986). Eggs are typically laid throughout April and May; incubation is approximately 35 days (Herrick 1932). Young are brooded by both sexes until they successfully leave the nest at eight to 14 weeks. Migratory individuals leave nesting grounds and begin arriving on wintering grounds between early September and mid-November. Suitable nesting habitat in the Proposed Project Area may include large trees along all reaches of the Gallatin River, including river stretches on Forest Service lands.

A bald eagle nest is located in the Project Area near the Gallatin Canyon turn-off to Big Sky (MTNHP 2010). This nest is on the opposite side of US Hwy 191 and the Gallatin River from the Proposed Project Area. The nest is currently located in a dense patch of forest that provides a visual screen from the highway and the Proposed Project Area. In addition to this known nest, several incidental observations of bald eagles flying along the Gallatin River in the Proposed

Project Area were made during field data collection for this project. These observations probably involved "floaters" or eagles that are not currently breeding, and were likely involved in general foraging behavior. Average home range size for bald eagles is generally smaller for eagles associated with river systems verses bald eagles associated with lake systems which can exceed 27 square-miles (BOR 1994). However, eagle home range is variable depending on the time of year, with smaller areas used by nesting birds.

For the Proposed Project, potential effects to bald eagles were analyzed by assessing the proximity of Proposed Project activities to known bald eagle nest territories, removal of potential nest trees, and by the alteration of suitable, but unoccupied nest territories and foraging areas. Changes in the number or locations of river crossings could alter collision risk for bald eagles and were also assessed below.

Methodology for Analysis

Effects to bald eagles were evaluated by assessing potential impacts to nesting, roosting, and foraging habitat, and collision risk to bald eagles from the transmission line, to evaluate potential direct, indirect and cumulative effects from the Proposed Project and its alternatives. Spatial and temporal scales used for analysis are described below.

Spatial Boundary

The spatial scale of analysis of impacts to bald eagles was evaluated to include the areas directly affected by the Proposed Project (proposed ROW expansion, structures, widening of some existing access roads, creation of new temporary roads, and overland travel access that would be required for construction). The spatial scale of analysis was also extended out 0.5 mile to buffer the primary use area surrounding an active nest, as recommended in the Greater Yellowstone Bald Eagle Management Plan (GYBEMP) (GYBEMP 1995:23).

For cumulative impacts, a 5.0 mile corridor centered on the Gallatin River was used. This represents the typical foraging distance of 2.5 miles from an active nest as described in the Greater Yellowstone Bald Eagle Management Plan (GYBEMP 1995:23).

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to bald eagle as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts to consider are habitat loss, particularly foraging, nesting, and post-fledging habitat, and disturbance (i.e., noise, road traffic, and helicopter use) in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary was extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1 (the No Action Alternative), the existing 69 kV transmission line would continue to function in its current state. The 69 kV transmission line would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. ROW vegetation management and operations and maintenance would continue under their current regime. This would include maintaining the existing 40 foot ROW width, hazard tree removal, and transmission structure replacement to minimize failure. The current alignment crosses the Gallatin River eight times within GNF lands. The risk of collision between conductors and bald eagles would remain at its

current level under Alternative 1. The single known eagle nest in the project area was established under conditions associated with the existing transmission line and associated operation and maintenance activity. Although continued activities and conditions associated with ongoing presence and maintenance of the existing transmission line could have impacts on bald eagles as described above, a decision to select the No Action Alternative would have no direct or indirect effects to bald eagles beyond those occurring under the existing condition, and would therefore have no impact on bald eagles.

Effects Common to All Action Alternatives

Known Nest Area: The transmission line upgrade is located on the opposite side of the Gallatin River and US Hwy 191 from the current bald eagle nest location. There would be no habitat alteration associated with any of the action alternatives within 0.25 mile of this nest. One-quarter mile (Zone I) is the distance at which the presence of humans first causes significant stress or behavior in eagles that could result in inattentiveness to young or eggs (GYBEMP 1995:24). Given that this pair has established their nest in close proximity to the junction of two highways (US Hwy 191 and MT Hwy 64) that experience high volumes of vehicle traffic year-round, project-related equipment noise would not be a significant factor in Zone I above existing noise levels. There would be no increased human presence associated with project activities within Zone I of the nest.

Transmission line and structure upgrades, and vegetation clearing associated with ROW expansion would occur within 0.5 mile of the nest. One-half mile (Zone II) is the distance at which eagles exhibit territorial behavior, and in which over 75 percent of the adults' foraging and loafing activity occurs during the nesting season (GYBEMP 1995:24). Habitat alterations would involve a small amount of vegetation clearing, including a few trees and shrubs in mostly open forested habitat and dry shrublands. This activity would not affect preferred nesting habitat (found in Zone I), and it is unlikely that foraging habitat would be affected in Zone II, since the highway is between the proposed construction location and the river, leaving trees along both sides of the river intact to provide perches for fishing. Equipment noise and increased human presence may be a bit more of a disturbance factor in Zone II, but would be a temporary increase over existing disturbance created by high traffic volume on US Hwy 191. No helicopter use would be required for construction activities in this area. No blasting is anticipated within Zone II of the active nest at this time. However, use of explosives depends on the substrate where individual towers are placed. If blasting is deemed necessary for construction of the new line, the use of explosives within Zone II during the breeding season would require prior Forest Service approval. Construction activities within Zone II of the nest are expected to be completed within 2-4 weeks total time.

Zone III (between 0.5 mile and 2.5 miles of the nest) is the area that typically accounts for all foraging habitat and associated eagle movements during the nesting and brood rearing season (GYBEMP 1995:24). Although a bit more project-related habitat alteration would occur in Zone III, it would involve minor amounts of tree clearing in open forest types, and some additional brush clearing in dry shrublands. Preferred nesting habitat would not be affected, and perch trees would remain intact along both sides of the river for foraging. Equipment noise and increased human presence could be a disturbance to foraging eagles. This disturbance would be minor in addition to existing noise levels produced by high traffic volumes on US Hwy 191, and would be temporary. Helicopter use may be required for tree removal or other activities within Zone III of the nest, which would be a different disturbance factor than noise associated with use of ground equipment. However, since Zone III accounts for a relatively small proportion of nesting eagle use, this added disturbance would not be significant. The GYBEMP does not address helicopter use when discussing effects of human activity. National Bald Eagle Management Guidelines (USDI 2007) developed by the USFWS upon de-listing, recommend avoiding aircraft use within

1000 feet of an occupied nest during the breeding season. Helicopter use associated with the Proposed Project (under all action alternatives) would be at least twice that distance away from the nest.

All action alternatives may call for the use of guyed structures in some locations, to support a change in direction of the line, which might increase the risk of collision. A potential exists for bald eagles to collide with guy-wires. Currently, there is one guyed transmission structure within Zone II and 19 guyed structures within Zone III, with no reported eagle collisions to date. Engineering design may allow for alternatives to guyed structures in Zones II and III; however, such alternatives would require Forest Service approval. Under all action alternatives, an existing angle would be removed (i.e., ROW straightened) in a meadow area on the floor of the canyon south of Deer Creek (within Zone III). This refinement would improve the alignment by reducing structure number, removing an existing collision hazard associated with a large group of guy wires, and spanning a wetland.

Research has shown that avian collision is typically the result of birds seeing the conductor, gaining altitude, and colliding with the overhead shield wire (Brown et al. 1987; Morkill and Anderson 1991). The increased diameter of the new 161 kV conductor under the action alternatives may result in increased visibility of the line, thus potentially allowing avian species more time to maneuver and avoid collision. The Proposed Project would be developed consistent with the APLIC guidelines (2006) for avian safety, and would be operated under an Avian Protection Plan to reduce risk of collision and electrocution.

Entire Project Area: Under all action alternatives throughout the entire 16 mile stretch of the Proposed Project, existing single transmission structures would be replaced with taller single transmission structures as much as possible, with larger H-frame structures being used when necessary. ROW width would be increased from approximately 40 feet to 50 feet wide for new single transmission structures, and 80 feet wide for H-frame structures (representative of an increased widening of 10 to 40 feet). New transmission structure height would be approximately 60 to 90 feet, an increase of approximately ten feet over existing transmission structures. The existing two-phase underbuild currently in place would be replaced by a three-phase, four-wire 12.5 kV distribution circuit.

Foraging bald eagles have been observed within the Gallatin River Canyon by project-related field crews surveying for other biological resources. Construction-related disturbance associated with the action alternatives could cause direct effects on foraging bald eagles within the Proposed Project Area. These individuals may be flushed off of foraging perches by construction activities, including during helicopter use. These disturbances would be minor compared with existing noise levels associated with high traffic volume on US Hwy 191, and would be temporary in nature. Disturbed bald eagles would be able to return to normal activities once the disturbance has ceased. Given the amount of suitable foraging perches in the analysis area, bald eagles forced off of foraging perches would be able to locate other suitable perches within the Gallatin River Canyon without difficulty.

Trout species (brown trout, cutthroat trout, and rainbow trout) make up the bulk of bald eagle forage within the Proposed Project Area. These species are reliant on cold, high water-quality streams and rivers for successful reproduction. Siltation of these rivers and streams could cause a drop in trout reproduction, thus causing a drop in the bald eagle's primary prey base and indirectly affect eagles. However, potential siltation would be addressed by spanning rivers, streams, riparian areas, and other wetland areas; avoiding the removal of riparian vegetation; compliance with the State of Montana BMPs for Forestry, Forest Service Soil and Water Conservation Practices; and State of Montana Streamside Management Zone Requirements.

Additionally, disturbed areas would be rehabilitated with a native seed mix to prevent erosion and sedimentation of streams. Therefore, no impacts to water quality or trout productivity are expected, and thus no decrease in bald eagle prey availability would occur.

Habitat fragmentation of the action alternatives would be minimal as compared to its existing condition. MT Hwy 64 and US Hwy 191, the existing transmission line, developed campgrounds, and private residences currently fragment bald eagle habitat within the Proposed Project Area. Habitat fragmentation would be negligible since the action alternatives would predominantly follow the route of the existing transmission line, except for the refinement south of Deer Creek (Zone III of known nest), and in the Cascade Creek and Cave Creek LROs where there are no known bald eagle nests. In these areas, small segments would create new alignments. This would only slightly increase fragmentation due to these new alignments occurring in cabin areas or in close proximately to the existing transmission line.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Expansion of the existing ROW under Alternative 2 would result in approximately 14.8 acres of tree removal on forested habitats over approximately 16 miles. Larger trees removed could potentially serve as roost or nest trees. The Gallatin River corridor provides adequate habitat for bald eagles and nest, roost and perch trees are not limited within the analysis area. No substantial loss of roost, forage, or nest trees is anticipated, nor is an increase in search time for such trees expected. Permanent disturbance to non-forested habitat is estimated to be approximately 3.9 acres in Alternative 2. Foraging bald eagles have been observed within the Proposed Project Area utilizing perches directly over the Gallatin River. Removal of potential fishing perches would only occur when trees directly adjacent to the Gallatin River are removed, most likely at a proposed river crossing. The Proposed Action-Alternative 2 would cross the Gallatin River eight times, requiring an additional 10 to 40 feet of ROW at each crossing.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Alternative 3 would be similar to the other action alternatives, but because LROs would create new ROW, this alternative would require tree clearing on a total of 22.4 acres of forested lands, predominantly Douglas-fir (mostly on open forested talus slopes), and 4.3 acres of unforested land (talus and dry sagebrush shrubland). Existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently disturbed because these portions of ROW would still be used and maintained for distribution to residences. Alternative 3 would only cross the Gallatin River six times, reducing potential for bald eagle collision with transmission line conductors from the existing alignment with eight river crossings.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Alternative 4 would be similar to other action alternatives, except that it would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO, and it would require total tree clearing of 22.5 acres in forested habitat. In addition, Alternative 4 would require removal of an additional 4.2 acres of unforested vegetation. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would still be used and maintained for distribution to residences. Like Alternative 3, Alternative 4 would cross the Gallatin River six times, reducing potential for bald eagle collision with transmission line conductors from the existing alignment with eight river crossings.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts. Therefore, the No Action alternative would have no impact on bald eagles.

Cumulative Effects of the Action Alternatives

Current conditions described in the Affected Environment section above reflect past projects in the analysis area. Projects analyzed for cumulative effects to bald eagles included US Hwy 191

Gallatin Canyon safety improvements, Montana Opticom fiber optic cable, recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. US Hwy 191 improvements and the Jack Creek timber sale could further reduce potential roost, forage, and nest trees in addition to trees lost as part of the Proposed Action Alternatives. However, the abundance of potential roost, forage, and nest trees would make this effect negligible. Habitat fragmentation from other projects would not likely increase to substantially higher level than currently exists, given that most cumulative projects are located within the already fragmented Gallatin River Canyon. In addition, ongoing and future public recreation activities could have effects on bald eagles that may be in the area. Public recreation would include activities such as camping, hiking, rafting, fishing, pets, and general traffic. Because bald eagles forage in water bodies and take trout as their main prey, continued recreation in the Gallatin River (e.g., rafting, fishing) may dissuade bald eagles that are actively foraging or may reduce the amount of available fish in the river. Hiking or pets that are in areas where bald eagles are perched may alarm the eagles and cause them to leave the area, potentially causing increased stress. Constant human disturbances, such as traffic on MT Hwy 64 and US Hwy 191, may already dissuade bald eagles from fully utilizing otherwise suitable habitat within the Proposed Project Area.

The existing ground disturbance from permanent development within the cumulative impacts assessment area for bald eagles used in this FEIS affects about 0.5 of one percent of the five-mile wide cumulative effects analysis corridor. The majority of permanent disturbance in the analysis area is concentrated in the US Hwy 191 corridor where the action alternatives are proposed. The direct and indirect impacts identified above, when summed with the known disturbance in the cumulative effect analysis, would result in negligible cumulative impacts to bald eagles. When accounting for the impacts for all action alternatives, the overall permanent disturbance in the cumulative effects analysis area would remain at less than one percent of the analysis area for bald eagles. Given the existing concentration of human use along the Gallatin River corridor, coupled with a minimal amount of additional habitat loss and temporary disturbance proposed by the action alternatives, plus effective mitigation measures to minimize impacts around the known nest, cumulative impacts to bald eagles would be negligible, therefore, the proposed action alternatives may impact individuals or habitat, but would not lead to a trend toward re-listing for the bald eagle.

Comparison of Alternatives

Under Alternative 1 (No Action), there would be no changes to the current baseline conditions. Under the action alternatives, there would be 14.8 (Alternative 2) to 22.5 (Alternative 4) acres of forest vegetation removal and 3.9 to 4.3 acres of unforested habitat removal. Impacts around the known bald eagle nest would be the same under all action alternatives. Since fish are the bald eagle's primary food source during the nesting season, transmission line crossings over the Gallatin River pose the greatest risk for collision with eagles. Alternatives 1 and 2 each contain eight river crossings, whereas Alternatives 3 and 4 each have only six river crossings proposed.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

Various PDFs are integrated into the Proposed Project and the alternatives to reduce or avoid effects to biological resources, including bald eagle. These are described in Chapter 2 of the FEIS. Implementation of BMPs and general PDFs applicable to biological resources would minimize impacts and maintain habitat quality by restricting activity to ROW and approved areas (1.1), minimizing ground disturbance (1.2 and 1.5), controlling weed intrusion (1.9), and imposing timing restrictions (5.3). The Proposed Project would be developed consistent with the Avian Power Line Interaction Committee (APLIC) guidelines (2006) for avian safety, and would be operated under an Avian Protection Plan to reduce risk of collision and electrocution.

Because of the presence of a known bald eagle nest within the project area, mitigation measures as recommended in the GYBEMP (1995) would be applied as follows:

Zone I:

None needed given the location of the existing nest. Should additional nests be established or located prior to project completion, project-related construction activity would be restricted within 0.25 mile of the nest tree from 1 February through 15 August.

Zone II:

Habitat alterations should be carefully designed and regulated to insure preferred nesting and foraging habitat are not degraded.

Structures that have the potential for increasing mortality due to collision (i.e., power and telephone lines) should not be constructed where none currently exist. Existing lines posing a potential problem should be modified to minimize collision or electrocution (APLIC 2006 guidelines would be applied).

Zone III:

Habitat alterations should insure important components are maintained (i.e., trees and snags, visual screening from existing or anticipated areas of human activity, and potential nesting habitat).

Utility lines should be limited and restricted to locations where the potential for eagle collisions and electrocutions is minimal (APLIC 2006 guidelines would be applied).

Consistency with Laws, Regulations, and Forest Plan

The Migratory Bird Treaty Act (MBTA) and Executive Order (E.O.) 13186 make it unlawful to "take" migratory bird species, except as regulated by authorized programs, and to ensure that environmental analyses evaluate the effects of federal actions on migratory bird species. The proposed transmission line ROW is an authorized use of NFS lands. The effects analysis presented here meets the requirements of the MBTA and E.O. 13186.

The Bald and Golden Eagle Protection Act (BGEPA) contains language similar to the MBTA, but specific to eagles. The proposed transmission line ROW is an authorized use of NFS lands. The effects analysis shows that with prescribed mitigation measures, impacts to bald eagles would be minimized.

The Gallatin Forest Plan states that Management Indicator Species will be monitored to determine population change. The bald eagle is identified as an MIS in the Forest Plan (USFS 1987:II-19). A recent MIS Assessment of Population and Habitat Trends (USFS 2011) reported that bald eagle population trends on the Gallatin Forest are trending upward, similar to national trends. This assessment concluded that management activities have not affected bald eagle habitat due to the incorporation of effective mitigation measures around known nest sites.

The Gallatin Forest Plan contains a forest-wide standard that habitat essential for species identified in the Sensitive Species list will be managed to maintain these species (USFS 1987:II-18). Upon removal from the list of threatened and endangered species, the bald eagle was automatically added to the Regional Forester's List of Sensitive Species. Habitat essential for the bald eagle would be maintained by implementing mitigation measures to maintain habitat structure, and minimize project-associated disturbance around known nest sites. Adequate nesting and foraging habitat would be retained within the Gallatin River corridor to support additional occupation of nesting bald eagles within the project area.

The Gallatin Forest Plan contains a forest-wide standard that General management direction for bald eagle habitat is provided in "A Bald Eagle Management Plan for the Greater Yellowstone Ecosystem" (USFS 1987:II-19). Management recommendations from the GYBEMP (1995) applicable to the proposed action are listed above. These measures would be adopted as mandatory mitigation measures under all action alternatives. It should be noted that the measures prescribed under this Plan are more restrictive than the revised Montana Bald Eagle Management Plan (2010) and the National Bald Eagle Management Guidelines (2007), both of which have been published since the bald eagle was de-listed.

Under all action alternatives, project-related activities would not affect preferred known nesting habitat (Zone I), and it is unlikely that foraging habitat would be affected in Zone II, since the highway is between the proposed construction location and the river, leaving trees along both sides of the river intact to provide perches for fishing. The increased diameter of the higher voltage conductor under the action alternatives may result in increased visibility of the line, thus potentially allowing avian species more time to maneuver and avoid collision. These conditions are consistent with recommendations in the GYBEMP.

MA 25 includes a standard to "Design and mitigate adverse impacts on raptors and other wildlife" (USFS 1987:III-69). The Proposed Project would be developed consisted with the APLIC guidelines (APLIC 2006) for avian safety and operated under and Avian Protection Plan to reduce risk of collision and electrocution.

Sensitive Species

Introduction

Sensitive species are those species identified by the Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trend in population numbers or habitat capability. General issues associated with sensitive species were identified during interdisciplinary team scoping discussions, initial public scoping, and the NOI comment period, particularly for bald eagle (addressed above under MIS), peregrine falcon and bighorn sheep – all of which are known to be present and occupy breeding habitat within the project vicinity. Specific sensitive species discussed in this section include gray wolf, bighorn sheep, peregrine falcon and harlequin duck. The western toad is discussed in a separate section under amphibians and reptiles. Other sensitive species were eliminated from detailed analysis based on lack of suitable habitat, species occurrence, or both in the project area (See Chapter 1).

Applicable Laws, Regulations, Policy and Forest Plan Direction

The following presents an overview of laws, regulations and Forest Plan direction applicable to Sensitive Species potentially affected by the Proposed Project.

The Migratory Bird Treaty Act (MBTA) and Executive Order (E.O.) 13186 make it unlawful to "take" migratory bird species, except as regulated by authorized programs, and to ensure that environmental analyses evaluate the effects of federal actions on migratory bird species. This would pertain to the peregrine falcon and harlequin duck, which are Forest Service Sensitive Species.

Forest Service Manual (FSM) states that all Forest Service planned, funded, executed or permitted programs and activities are to be reviewed for possible effects on sensitive species (FSM 2672.4).

The Gallatin Forest Plan (USFS 1987) contains a forest-wide standard that habitat essential for species identified in the Sensitive Species list developed for the Northern Region will be managed to maintain those species (p. II-18).

The Gallatin Forest Plan (USFS 1987:II-18) contains a Forest-wide Standard that Habitat for waterfowl, shorebirds, and wading birds will be maintained and improved through coordination of land use activities.

The area identified for the Proposed Action and Alternatives falls predominantly within Forest Plan MA 25 (electrical and transmission lines and pipelines, climatic and snow measuring sites and electronic site). As well as Forest-wide standards listed above, the following standard applies in MA 25:

> Design facilities to mitigate adverse impacts on raptors and other wildlife (USFS 1987: III-69).

Gray Wolf

Gray wolves (*Canis lupus*) were reintroduced into the Greater Yellowstone Ecosystem in 1995 and 1996 as a non-essential, experimental population under the ESA. In April 2011, legislation was enacted that removed the Northern Rocky Mountain Distinct Population Segment of gray wolf from the list of threatened and endangered species. Following the delisting of a species under the ESA, the species is placed on the Regional Forester's Sensitive Species List in the Northern Region of the Forest Service.

Affected Environment

Since the original animals were released in Yellowstone National Park in 1995, wolves have spread throughout the ecosystem, and now occupy habitat on Forest Service lands in the Gallatin and Madison mountain ranges. Gray wolves are habitat generalists, and make use of a wide variety of habitat types throughout their lives. The primary prey species for gray wolves is elk, but other large ungulates, including deer and moose, would also fall prey to gray wolves. Wolves typically avoid areas of high human use such as busy road corridors (Whittington et al. 2005), yet wolves are known to occur within one mile of the Proposed Project Area. However, there are no known wolf den or rendezvous sites (i.e., reproductive areas) in close proximity to the Proposed Project Area.

Methodology for Analysis

Project activities were assessed for potential impacts to wolves such as habitat alteration, effects to important prey species (big game), helicopter and construction disturbance, and increased collision risk associated with construction equipment and traffic.

Spatial Boundary

Potential direct and indirect effects (mechanized and human disturbance) related to Proposed Project activities would be confined to areas along the ROW and adjacent bottomlands. To capture potential cumulative impacts, the analysis area was derived from a two-mile buffer around the Proposed Project corridor, resulting in a cumulative effects analysis area of approximately 23,000 acres. This area was selected to capture collective effects along the entire project corridor (16 miles), as well as to consider cumulative impacts from noise and other disturbance factors within a known distance of wolf occurrence in the project vicinity. Since wolves are habitat generalists, management is focused on maintaining sustainable populations of prey species, primarily ungulates. The spatial boundaries used to evaluate impacts to wolves coincide with the analysis areas defined for elk.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to wolves as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts considered were habitat loss, and potential disturbance/displacement effects to wolves and prey species, created by the project in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary was extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1 the existing 69 kV transmission line would continue to function in its current state. Line inspection patrols and other periodic maintenance activities would continue under the existing regime. There would be no effects to existing habitat and no additional habitat fragmentation or displacement of prey species. There would be no construction activities, so there would be no associated disturbance, and collision risk would not change. Although continued activities associated with ongoing maintenance of the existing transmission could have impacts on wolves, a decision to select the No Action Alternative would have no direct or indirect effects to wolves or prey species beyond those occurring under the existing condition.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under the Proposed Action-Alternative 2, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. All portions of the existing line (as well as proposed modifications under the Proposed Action-Alternative 2) are confined to within 0.25 mile of US Hwy 191. The Proposed Action-Alternative 2 is within 0.25 mile of the US Hwy 191 travel corridor and traverses an adjacent network of roads, trails, recreation areas and cabins.

Under the Proposed Action-Alternative 2, there would be tree clearing of 14.8 acres of forested habitat (predominantly Douglas-fir with some lodgepole) and removal of excessive vegetation in 3.9 acres of unforested habitat (predominantly dry sagebrush shrubland). These habitat impacts would slightly alter the cover and forage availability for big game species in the immediate project vicinity, but at such a minor amount, it is doubtful that related impacts to wolves would be notable.

During construction, the gray wolf could be negatively affected by noise from construction activity. There are no known den or rendezvous sites in the project vicinity at which wolf behavior might be affected by project-related noise disturbance. However, the noise from equipment and related human presence could alter wolf behavior and subsequently increase the search time for hunting and/or resting areas. The use of helicopters would occur over US Hwy 191 and the existing transmission line corridor, which could displace prey species, and/or dissuade wolf use of the affected area for hunting, resting or travel. Increased construction traffic in the Proposed Project Area would increase the risk of wolf mortality or injury due to collision with vehicles. However, given the high volume of high speed traffic already occurring on US Hwy 191, this added risk would be negligible. The Gallatin River corridor is an important area for wildlife, and many species cross the river and highway. Alternative 2 would not alter the

existing transmission corridor in a way significant for wolves or prey species (slight widening of ROW, and taller poles).

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)
Alternative 3 would be similar to the other action alternatives, except that it would require permanent clearing on a total of 22.4 acres of forested lands. The additional tree clearing (beyond that proposed in Alternative 2) would involve predominantly drier Douglas-fir, mostly on open forested talus slopes, which do not currently provide good cover or forage values for wolf prey species. This alternative would include 4.3 acres of clearing on un-forested land (talus, grassland, and dry sagebrush shrubland), which would reduce forage (grass), and cover (shrubs) on small amounts of winter range and calving grounds. Existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently altered because these portions of ROW would still be used and maintained for distribution to residences. Over time, vegetation re-growth in cleared areas (both forested and un-forested could again provide grass and shrub forage and cover for elk and other big game. Noise disturbance impacts and risk of vehicle collisions would be similar to those described above for Alternative 2.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)
Alternative 4 would be similar to the other action alternatives, except that it would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO. This alternative would require permanent clearing of a total of 22.5 acres of forested habitat, with about one-third of this in denser, moister forest types that generally produce better hiding cover and forage potential for wolf prey species. In addition, Alternative 4 would require 4.2 acres of permanent clearing of non-forest types, primarily in dry sagebrush shrubland, which would reduce forage and cover on a small amount of big game winter range and calving area. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently disturbed because these portions of ROW would be still used and maintained for distribution to residences. Over time, vegetation re-growth in cleared areas (both forested and un-forested could again provide grass and shrub forage and cover for wolf prey species. Noise disturbance impacts and risk of vehicle collisions would be similar to those described above for Alternative 2.

Cumulative Effects of Alternative 1 (No Action)
Under Alternative 1, the Proposed Project would not be constructed and would not add to any cumulative impacts. Therefore, the No Action alternative would have no impact on gray wolves.

Cumulative Effects of the Action Alternatives
Past human activities and practices are reflected in the Affected Environment section and establish fragmentation and ongoing human disturbance conditions in the area. Other current and future projects in the Proposed Project Area would have the potential to affect gray wolves and their prey species cumulatively with this project. The proposed US Hwy 191 Gallatin Canyon Safety Improvements would involve widening and improving US Hwy 191, which could impact habitat by removing riparian trees. The GNF timber sale in the Jack Creek area, and GNF fuel reductions projects between the river and wilderness area would result in the removal of trees, which could alter forage and cover habitat for prey species, and produce added disturbance effects in the project analysis area. Moose Creek Flat Campground fishing platform rebuild and recreation residence project requests would also contribute some disturbance impacts to wolves and their prey species in the project corridor, while the GNF annual noxious weed management program would likely benefit wolf prey species. Considering the very small amounts of habitat affected by the Proposed Action Alternatives, relatively short duration project-related activities, and the project location in an area of already concentrated human development and use, cumulative effects would be minor. Therefore, all action alternatives may impact individuals or habitat, but would not lead to a trend toward re-listing of the gray wolf.

Comparison of Alternatives

All action alternatives would consist of rebuilding an existing transmission line. Under the Proposed Action-Alternative 2, a small amount of forested habitat, which provides cover for prey species, would be lost as the result of ROW widening and hazard tree removal (14.8 acres). This would not be significant, given the wide availability of forested habitat within and adjacent to the project area. Impacts from Alternatives 3 and 4 would be similar, 22.4 and 22.5 acres, respectively; although forested habitat loss would be slightly greater because of LROs. Where forested cover is removed, vegetative re-growth could improve foraging habitat for wolf prey species. Disturbance effects that could might influence wolf and prey distribution, and potential for vehicle collisions associated with project-related traffic, would not differ appreciably between the action alternatives.

Bighorn Sheep

Affected Environment

Bighorn sheep (*Ovis canadensis*) generally inhabit steep, open slopes, or cliffs. They may also be found on rolling foothills or intermountain valleys while grazing, but they are typically found near steep, rocky habitat for refuge from predators (Pallister 1974). High quality green forage is an important habitat component in the spring and summer, and low snow accumulation is an important habitat component in winter (Shackleton et al. 1999). Bighorn sheep preferred winter habitat is typically south-facing aspects or wind-exposed faces which limit snow accumulation. Bighorn sheep are generally non-migratory, but move up and down in elevation depending on the time of year and suitable forage available (MFG 2011).

Bighorn sheep live in herds arranged by age and sex. Herds may be as large as 80 individuals for groups containing ewes, lambs, and yearling males. Adult males typically band together in herds outside of the breeding season in age classes spanning two to three years. Adult male herds are typically much smaller (Shackleton et al. 1999; Krausman et al. 1999; MTNHP 2010). During the mating season, herds of adult males break up as males attempt to defend and breed smaller groups of females. Breeding season generally takes place in November. Ewes usually produce a single lamb in May (Shackleton et al. 1999). Lambing typically takes place on open slopes with little to no snow cover located close to water, from April to June, but predominantly throughout the month of May (Krausman et al. 1999; Shackleton et al. 1999).

Non-forested portions of the existing ROW which would support bighorn sheep wintering and spring lambing areas extend through shrublands dominated by mountain big sagebrush and grasslands. Surrounding the ROW within Gallatin Canyon are many areas of steep, rocky terrain providing escape habitat for bighorn sheep. Bighorn sheep may be found in suitable habitat in the Proposed Project's analysis area, as well as moving between these areas. Suitable winter range is present on a south-facing slope located directly north of MT Hwy 64, near the intersection with US Hwy 191, and sheep are frequently seen in this area. MFWP personnel (MTNHP 2010) have identified winter and spring bighorn sheep range on the south-facing slopes from the Moose Creek drainage to the slope above MT Hwy 64 described above.

Methodology for Analysis

Project activities were assessed for potential disturbance impacts to lambing bighorn sheep and increased perches for predatory raptors which may take young lambs.

Spatial Boundary

Analysis of impacts to bighorn sheep were analyzed within the areas directly affected by the Proposed Project and to the potential bighorn sheep lambing areas located on the western slope above the Gallatin River between Moose Creek and the town of Big Sky. For cumulative effects, the entire Gallatin River Canyon through the Proposed Project Area was considered.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to bighorn sheep as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts considered were habitat alteration, and potential disturbance/displacement effects to sheep in the project vicinity. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary was extended 50 years into the past to consider the cumulative disturbance effects associated with concentrated development in the Gallatin Canyon, beginning with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Impacts to winter and spring bighorn sheep habitat would be negligible under Alternative 1. Bighorn sheep prefer to winter on open slopes with little to no tree cover, removal of hazard trees under current ROW management would not be expected to affect bighorn sheep winter range. Proposed Project related traffic would not increase from current levels under Alternative 1. Therefore, disturbance to bighorn sheep from Proposed Project related activities would not increase above current levels, and would thus have no impact to bighorn sheep.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Under Alternative 2, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. All portions of the existing line (as well as proposed modifications under Alternative 2) are confined to within 0.25 mile of US Hwy 191. The Proposed Action is within 0.25 mile of the US Hwy 191 travel corridor and traverses an adjacent network of roads trails, recreation areas and cabins.

Under Alternative 2, effects to bighorn sheep may include direct disturbance from construction related activity and habitat fragmentation. Suitable lambing habitat exists along the southern portion of the Proposed Project. Under the Proposed Action-Alternative 2, expansion of ROW would require new permanent disturbance of 1.0 acre of dry sagebrush shrubland on NFS lands. However, the expansion of ROW in these habitats would not alter the habitat's function, and it could still serve as winter and spring lambing habitat. The rest of the ROW expansion would occur in forested lands, talus slopes, and wetlands habitats not currently known to be used by sheep.

Direct disturbance from construction-related activity may occur if construction timing overlaps with bighorn sheep movement to spring habitat. No tree removal would be required on bighorn sheep lambing areas because these areas are largely unforested, open slopes. Potential disturbance in lambing areas would be due to increased human presence and the placement of new support structures, stringing conductors, and removing the existing 69 kV transmission line. Such impacts would be temporary and down slope of lambing areas, and in some cases, on the opposite side of the Gallatin River and US Hwy 191. Helicopters supporting tree removal and construction operations may disturb bighorn sheep but would not fly directly over lambing areas. Frequent flights would occur to and from the proposed Portal Creek fly yard, which is located nearby, but on the opposite side of the Gallatin River from lambing areas. Further, much of the helicopter use could occur outside the lambing period (e.g., later in the summer/fall). Noise disturbances would be temporary in nature, and bighorn sheep would be able to return to normal activities after helicopter construction activities are completed.

Construction-related disturbance to bighorn sheep in wintering areas would not occur, as no construction activities would take place during winter. Additionally, PDF 5.3d minimizes impacts to bighorn sheep by restricting over flights and construction disturbance from November 15 – May 31 on the portions of the transmission line within wintering bighorn sheep habitat (areas by Deer Creek and along MT Hwy 64) (MT Fish, Wildlife and Parks correspondence December 10, 2012).

Since the Proposed Action-Alternative 2 would follow the route of the existing transmission line, increases in habitat fragmentation would be negligible. The Gallatin River, MT Hwy 64 and US Hwy 191, and the existing transmission line currently fragment potential bighorn sheep habitat within the Proposed Project Area.

MFWP personnel raised the issue that new structures installed under the Proposed Action-Alternative 2 may create an additional hunting perches, and thus present an advantage for predatory raptors preying upon newborn lambs. This impact would be negligible for the following reasons. No additional structures beyond the number currently in place would be created. New structures would only be approximately ten feet taller than currently existing perches, thus not creating a substantial advantage for predatory raptors beyond the current conditions. Finally, lambing areas are generally located upslope from perches created by the new structure, thus lowering the benefit of a raptor utilizing the perch.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs) and Alternative 4 (Cave Creek and Cascade West LROs)

Direct and indirect effects of Alternatives 3 and 4 would not differ appreciably from those described above for Alternative 2, since the major differences between these alternatives involves impacts to forested habitat, in areas not currently occupied by bighorn sheep.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts. Therefore, the No Action alternative would have no impact on bighorn sheep.

Cumulative Effects of the Action Alternatives

Current conditions described in the Affected Environment section above reflect past projects in the Proposed Project Area. Projects analyzed for cumulative effects to bighorn sheep included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF fuel reduction projects, recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. US Hwy 191 improvements, the Montana Opticom fiber optic cable could further disturb lambing activities if they were to take place during the spring. These disturbances would be located at the bottom of the Gallatin River Canyon, well below potential bighorn sheep habitat. In addition, ongoing and future public recreation activities could have effects on bighorn sheep that may be in the area. Public recreation would include activities such as camping, hiking, rafting, fishing, pets, and general traffic. Of these, the recreation activity that would have the highest likelihood of disturbing bighorn sheep would be hiking, in that hikers may come upon sheep in lambing areas, causing them to flee the area if they sense a threat. This would likely be a temporary disturbance that has happened in the past and would continue to happen in the future. Because the effects from the action alternatives are expected to be relatively minimal due to the fact that most lambing habitat in the project area is opposite the Gallatin River, any cumulative effects between the Proposed Project and public recreation would likely also be minimal. Disturbance from these collective activities, when combined with the proposed action, would present negligible cumulative impacts to bighorn sheep. Therefore, all action alternatives may impact individuals or habitat, but would not lead to a trend toward federal listing for bighorn sheep.

Comparison of Alternatives

Under Alternative 1, there would be no changes to the current baseline conditions, and current and future maintenance of the existing transmission line would presumably not increase any adverse effects on bighorn sheep in the Proposed Project Area or its vicinity. Direct, indirect and cumulative effects of the Action Alternatives (2, 3, and 4) would not differ appreciably among alternatives, since the major differences between the alternatives involves impacts to forested habitat (not suitable for sheep), and in areas not currently occupied by bighorn sheep (Cascade Creek and Cave Creek).

Peregrine Falcon

Affected Environment

The peregrine falcon (*Falco peregrinus*) commonly occupies habitat with open cliffs and generally open areas for foraging. In addition to natural habitats, many artificial, human-built habitats may be used (e.g., transmission structures, buildings). Given the extreme winters in the Proposed Project Area, peregrine falcons in this area are likely migrants, spending winters in more southern climes. Migrant peregrine falcons typically arrive on nesting grounds in late April and early May (MTNHP 2012). The nesting period is estimated to be June and July (MTNHP 2012). Nests are slight scrapes and depressions on high cliffs which are extremely inaccessible to predators (Ponton 1983). Nests are typically reused by the same mated pair each year and eggs are laid shortly after returning to the nesting grounds. Incubation lasts approximately 33 to 35 days (Burnham 1983) and chicks leave the nest at approximately six weeks. Departure to wintering grounds generally occurs from late-August to early September (MTNHP 2012).

The peregrine falcon has adapted morphologically to almost exclusively take avian prey. Any bird from passerines to small geese may fall prey to peregrine falcons (Sherrod 1978), although they would still occasionally catch ground or flying mammals and rarely amphibians, fish, or insects (White et al. 2002). Most searching for prey is done from high perches near nests with expansive views that allow the bird to locate prey. However, they may also go on foraging flights of 9.3 to 26.7 miles to locate prey items (White et al. 2002).

Suitable habitat to support peregrine falcons is present within the Proposed Project Area. Open foraging habitat occurs along the length of the canyon, although the canyon bottom varies from densely forested habitat to wide open areas with few or no trees. Natural nesting habitat (i.e., cliffs) is present in the Proposed Project Area at generally higher elevations. The MTNHP maintains records of peregrine falcon occurring within one mile of the Proposed Project Area, and there are 57 records of peregrine falcons in Gallatin County ranging from 1959 to 2008. GNF biologists monitor four nest sites within close proximity to the Proposed Project Area. Peregrine falcons established eyries in the area since 1997 and have successfully fledged young since that time. These birds find suitable foraging habitat in grassy meadow and open riparian areas near cliffs.

Methodology for Analysis

Effects to peregrine falcon were evaluated by accessing occurrence data on peregrine falcons provided by the MTNHP (2011); consulting with GNF biologists on known eyrie locations; comparing occurrence data to GIS data, topographic maps, and aerial photography to determine where suitable habitat may occur within the Proposed Project Area; and conducting surveys and field-truthing the availability of suitable habitat in the Proposed Project Area. Effects to peregrine falcons were measured by proximity of Proposed Project activities to known peregrine falcon eyries, foraging areas, and by the potential alteration of suitable but unoccupied eyries and foraging areas. Because of their sensitivity, eyrie locations are not provided here.

Spatial Boundary

The spatial boundary used for the analysis of direct and indirect effects to peregrine falcons is the land directly affected by the Proposed Project. The spatial boundary used for the analysis of potential cumulative effects on peregrine falcons is a five-mile radius around eyrie areas. This is based on a recommendation from the Montana Chapter of the Wildlife Society (Hamann et al. 1999) to keep an 8.1-kilometer disturbance buffer from peregrine falcon foraging areas.

Temporal Boundary

The temporal boundary for analysis of direct and indirect impacts to peregrine falcons as a result of the Proposed Project covers the period of active construction, estimated at two years.

Cumulative impacts were considered over the life of the SUP (approximately 20 years), since the physical presence of the transmission line as well as human presence and potential noise disturbance from periodic maintenance and repair would continue for the life of the SUP. Past activities were only considered for the recent period in which falcon eyries have become established in the Gallatin River Canyon. This includes reintroduction programs in the 1980s and subsequent occupation by wild peregrines since the late 1990s.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

The existing 69 kV transmission line was in place prior to establishment of existing occupied peregrine falcon eyries within the Gallatin Canyon. Peregrine falcon nests are known to occur within the project vicinity; however, these are located well above the analysis area on high cliff ledges above the Gallatin River. These nesting areas continue to be productive despite levels of human activity within the Gallatin Canyon and the operation and maintenance of the existing transmission line. Alternative 1 includes eight transmission line crossings over the Gallatin River where the likelihood of peregrine falcon collision with the transmission line would be highest. No additional impacts to individual peregrine falcons or their habitats would be expected under this alternative.

Effects Common to All Action Alternatives

Under all Action Alternatives, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. All portions of the existing line (as well as proposed modifications under Alternative 2) are confined to within 0.25 mile of US Hwy 191.

Nesting habitat is available in areas where high cliffs are present and offer unobstructed views of the surroundings, but no nesting habitat would be affected by project implementation. The ROW of the Proposed Action-Alternative 2 would be greater than one half mile from known falcon eyries on the opposite side of both the Gallatin River and US Hwy 191. There may be some disturbance from construction noise, but based on the distance, existing noise environment and the short duration of construction-related activities in any one location, project-related disturbance to nesting areas is expected to be negligible. Helicopter use would be restricted within 0.5 mile of known occupied eyries during the nesting season (February 1 through August 31).

Foraging habitat may be affected by the replacement of existing transmission structures with new, slightly taller transmission structures. These transmission structures, and specifically their associated conductors, may present collision risks to peregrine falcons during fast dives at prey or other flying actions, which could result in injury or mortality of individual falcons. Collisions

with transmission lines would likely be a greater risk in areas of non-forested habitat, where falcons may be flying lower than in forested areas. During approximately 15 years since peregrine falcons have established breeding activity in the canyon, no impacts from current lines in project areas have been documented.

Replacement of existing transmission structures with taller transmission structures and construction of new transmission structures may have potential to increase habitat fragmentation due to the new configuration of the transmission lines; however, because the lines are primarily located on or towards the bottom of the canyon slopes, they are less of an impedance to flights than if they were located on a flat area with no slopes (Bevanger 1994). Therefore, the degree of habitat fragmentation that may affect peregrine falcons as a result of this Proposed Project would be negligible, although collision risk factors may be slightly different due to the new separation or taller barriers between nesting habitat and foraging habitat. Some vegetation would be degraded or removed by construction, but because peregrine falcons nest on open cliffs and forage in open areas, vegetation removal would be limited to minor impacts on suitable habitat for prey species.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

The Proposed Action-Alternative 2 would require eight line crossings over the Gallatin River where the likelihood of peregrine falcon collision with the transmission line would be highest, which is the same as Alternative 1. Under the Proposed Action-Alternative 2, there would be tree clearing of 14.8 acres of forested lands (predominantly Douglas-fir with some lodgepole) and removal of excessive vegetation in 3.9 acres of unforested lands (predominantly dry sagebrush shrubland). The forested lands do not provide hunting areas for peregrine falcons; however, forested vegetation does provide habitat for prey species. Unforested areas are used for hunting and prey pursuit by peregrine falcons. Habitat alterations in open areas should not affect suitability of these areas for peregrine falcon foraging activities. Riparian vegetation and wetland areas, which also provide habitat for prey species, would be avoided by project activities. Unforested areas would re-vegetate similar to surrounding areas soon after completion of construction activities. No significant loss of peregrine falcon prey habitat is expected.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Alternative 3 would be similar to other action alternatives, except that it would require six line crossings over the Gallatin River instead of the eight existing river crossings, thus reducing the likelihood of collision with the transmission line in association with river crossings. Alternative 3 would require tree clearing a total of 22.4 acres of forested lands, predominantly Douglas-fir (mostly on open forested talus slopes), which could have minor impacts on suitable habitat for prey species, but would have no effect on peregrine nesting habitat, and would slightly increase open space for hunting. This alternative would affect a total of 4.3 acres of unforested land (talus, dry sagebrush shrubland, and highway), which again may have minor temporary impacts on suitable habitat for prey species, but no negative effects on peregrine falcon nesting or hunting habitat. Existing ROW that would be abandoned for the Alternative 3 LROs would remain permanently cleared because these portions of ROW would be still used and maintained for distribution to residences.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Alternative 4 would be similar to other action alternatives. Like Alternative 3, this alternative would only require six line crossings over the Gallatin River instead of the eight existing river crossings, thus reducing the likelihood of falcon collisions with the transmission line. Alignment of Alternative 4 would pass though denser, moister lodgepole pine forest habitat in the Cascade West LRO, and would require tree clearing of 22.5 acres in forested habitat. Tree removal could have minor impacts on suitable habitat for prey species, but would have no effect on peregrine nesting habitat, and would slightly increase open space for hunting. Alternative 4 would require removal of excessive vegetation in 4.2 acres of unforested habitat in dry sagebrush shrubland,

which again may have minor impacts on suitable habitat for prey species, but no negative effects on peregrine falcon nesting or hunting habitat. Existing ROW that would be abandoned for the Alternative 4 LROs would remain permanently cleared because these portions of ROW would be still used and maintained for distribution to residences.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts. Therefore, the No Action Alternative would have no impact on peregrine falcons.

Cumulative Effects of the Action Alternatives

Current conditions described in the Affected Environment section reflect past activities, such as human development, in the analysis area. Projects analyzed for cumulative effects to peregrine falcon included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. These projects could collectively impact suitable habitat for prey species, and add to disturbance in peregrine hunting grounds. The US Hwy 191 Improvement project could add disturbance impacts near known occupied eyries, but this would be minor when compared to existing disturbance associated with high volumes of high speed traffic on the highway, and the project has mitigation measures to avoid negative impacts to peregrines.

In addition, ongoing and future public recreation activities could continue to have effects on peregrine falcon in the area. Public recreation would include activities such as camping, hunting, hiking, rafting, fishing, pets, and general traffic. Hikers that are exploring around occupied eyries may unintentionally alarm peregrine falcons, potentially disrupting nesting or foraging activity if they are deemed to be a threat by the falcons. This may increase their stress along with any activities associated with the Proposed Action where falcons may come into proximity with construction. Pets accompanying recreationists may cause added disturbance in nesting areas. Considering that all active eyries in the project area have been established and have been successful in reproduction under existing high levels of noise and human presence in the Canyon, cumulative effects to peregrine falcons from the Proposed Project alternatives and other proposed projects would be negligible. Therefore, all action alternatives may impact individuals or habitat, but would not lead to a trend toward federal listing.

Comparison of Alternatives

Under Alternative 1, there would be no changes to the current baseline conditions, and current and future maintenance of the existing transmission line would not add any adverse effects on peregrine falcons over the existing condition. All action alternatives are located at least 0.5 mile from known active peregrine eyries, and all contain mitigation measures to minimize nest disturbance associated with the use of helicopters. The action alternatives would all impact small amounts of suitable habitat for peregrine prey species, but since peregrines prey on a wide array of avian species (songbirds, waterfowl, game birds, etc.), this small amount of habitat alteration would not affect prey availability. The major difference between alternatives is that Alternatives 3 and 4 would only require six river crossings, instead of the eight river crossings for Alternatives 1 and 2, thus reducing the likelihood of collision with the transmission line.

Harlequin Duck

Affected Environment

Harlequin duck (*Histrionicus histrionicus)* preferred breeding habitat is characterized by streams with braided channels and numerous islands that provide eddies for loafing. Dense shrub cover along swift-moving stream banks provides nesting habitat, while slower portions of streams are preferred for brood rearing. Nests are typically located adjacent to water on a variety of

substrates, such as small cliff ledges, tree cavities, and stumps (Cassirer et al. 1993). Nests may also be located on mid-stream islands (Rodway et al. 1998). Harlequin ducks have been observed as transients in the Gallatin River within the project area. However, no breeding activity has been documented in the Gallatin River Canyon (MTNHP 2011). Humans approaching nests, such as on frequently rafted rivers or large highways, may detract from nesting habitat suitability. Areas that are chronically disturbed are eventually abandoned (Cassirer and Groves 1994; Hunt 1998). This may explain why no breeding efforts have been documented in the project area, which otherwise appears to provide suitable habitat.

Methodology for Analysis

Effects to harlequin ducks were evaluated by accessing occurrence data provided by the MTNHP (2011) and consulting with GNF biologists on known occurrence and breeding activity. Effects were measured in terms of impacts to breeding, feeding and stop-over habitat.

Spatial Boundary

Since harlequin ducks are strongly tied to waterways, the spatial boundary used for the analysis of direct, indirect and cumulative effects includes the waterways and areas immediately adjacent to the Gallatin River and tributaries within the project footprint.

Temporal Boundary

The temporal boundary for analysis of direct and indirect impacts to harlequin ducks as a result of the Proposed Project covers the period of active construction, estimated at two years.

Cumulative impacts were considered over the life of the SUP (approximately 20 years), since the physical presence of the transmission line, as well as human presence and potential noise disturbance from periodic maintenance and repair would continue for the life of the SUP. The cumulative temporal boundary was extended 50 years into the past to consider the cumulative disturbance effects associated with concentrated development in the Gallatin River Canyon, beginning with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1 the existing 69 kV transmission line would continue to function in its current state. Line inspection patrols and other periodic maintenance activities would continue under the existing regime. There would be no effects to existing habitat and no additional habitat fragmentation. There would be no construction activities, so there would be no associated disturbance, and collision risk transmission line would not change. Although continued activities associated with ongoing maintenance of the existing transmission could have minor disturbance impacts on harlequin ducks, a decision to select the No Action Alternative would have no direct or indirect effects to harlequin ducks beyond those occurring under the existing condition. Therefore, there would be no impact to harlequin ducks under Alternative 1.

Effects Common to All Action Alternatives

Under all Action Alternatives, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. All portions of the existing line (as well as proposed modifications under Alternative 2) are confined to within 0.25 mile of US Hwy 191.

Ground disturbance associated with ROW clearing, construction and maintenance activities would not alter harlequin duck nesting habitat because transmission structures would be set back from river/stream edges and conductors would span waterways. The Proposed Project would not

remove any riparian vegetation or involve in-water construction that would alter streambeds or banks. The only physical impact to breeding habitat would be at the river crossings, where there is potential for ducks to collide with conductor wires as they approach, or take off from the water. Ducks are not particularly fast flying birds, and could likely avoid transmission lines crossing over the river and tributaries. Further, the increased diameter of the new 161 kV conductor under the action alternatives may result in increased visibility of the line, thus potentially allowing avian species more time to maneuver and avoid collision. The Proposed Project would be developed consistent with the APLIC guidelines (2006) for avian safety, and would be operated under an Avian Protection Plan to reduce risk of collision and electrocution.

Harlequin ducks have been observed in recent years on the Gallatin River in the project area during the nesting season, but no breeding activity has been documented, which suggests that the individuals (primarily males) seen in the area have been non-breeding transients. These ducks are apparently finding adequate forage and resting areas on the Gallatin River. Aquatic invertebrates make up the bulk of the harlequin duck diet. These species are reliant on cold, high water-quality streams and rivers for successful reproduction, therefore, impacts to water quality could affect foraging habitat quality for harlequin ducks. Potential water impacts would be minimized by spanning rivers, streams, riparian areas, and other wetland areas; avoiding the removal of riparian vegetation; compliance with the State of Montana BMPs for Forestry, Forest Service Soil and Water Conservation Practices; and State of Montana Streamside Management Zone Requirements. Additionally, disturbed areas would be rehabilitated with a native seed mix to prevent erosion and sedimentation of streams. Therefore, no impacts to water quality and associated forage productivity are expected. There may be some disturbance effects to harlequin ducks resulting from noise and human presence associated with project-related activities. However, compared to existing noise levels associated with high volumes of high speed traffic on US Hwy 191 and high levels of recreation use on the Gallatin River, this disturbance influence would be minimal.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts. Therefore, the No Action Alternative would have no impact to harlequin ducks.

Cumulative Effects of the Action Alternatives

Current conditions described in the Affected Environment section reflect past activities, such as human development, in the analysis area. Projects and activities analyzed for cumulative effects to harlequin ducks included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, a fishing platform at the Moose Creek Flat Campground, and on-going recreation and traffic use in the Canyon. These projects and activities could collectively impact suitable breeding habitat for harlequin ducks, and add to disturbance in breeding, foraging and staging areas. Ongoing and future public recreation and traffic on US Hwy 191 would continue to produce disturbance effects in potentially suitable harlequin duck breeding habitat. Humans approaching nests, such as on frequently rafted rivers or large highways, may detract from nesting habitat suitability. Areas which are chronically disturbed are eventually abandoned (Cassirer and Groves 1994; Hunt 1998). This may explain why no breeding efforts have been documented in the project area, which otherwise appears to provide suitable habitat. Added disturbance impacts associated with all action alternatives would be temporary and minor, relative to existing disturbances in the project area. Therefore, all action alternatives may impact individuals or habitat, but would not lead to a trend toward federal listing.

Comparison of Alternatives

Under Alternative 1, there would be no changes to the current baseline conditions, and current and future maintenance of the existing transmission line would not add any adverse effects on

harlequin ducks over the existing condition. Impacts to breeding habitat would be similar for all action alternatives, since variation in alternative alignments would occur away from waterways and would not affect harlequin duck habitat. The only notable difference between alternatives would be the number of river crossings, and related potential for ducks to collide with conductor line. Alternatives 1 and 2 require eight river crossings, whereas Alternatives 3 and 4 require only six.

Consistency with Laws, Regulations, and Forest Plan

The Migratory Bird Treaty Act (MBTA) and Executive Order (E.O.) 13186 make it unlawful to "take" migratory bird species, except as regulated by authorized programs, and to ensure that environmental analyses evaluate the effects of federal actions on migratory bird species. The proposed transmission line ROW is an authorized use of NFS lands. The effects analysis presented here meets the requirements of the MBTA and E.O. 13186.

Forest Service Manual (FSM) states that all Forest Service planned, funded, executed or permitted programs and activities are to be reviewed for possible effects on sensitive species (FSM 2672.4). The analysis contained in this NEPA document meets the requirements for review.

The Gallatin Forest Plan contains a forest-wide standard that Habitat essential for species identified in the Sensitive Species list will be managed to maintain these species (USFS 1987:II-18). "Essential Habitat" for Sensitive Species is technically to be designated by the Regional Forester (FSM 2670.5), and none has been officially designated on the Gallatin Forest. However, habitat essential for sensitive species was considered for this project to be important breeding, feeding and sheltering habitats. These factors were considered in the effects analysis for Sensitive Species. Considering the proposed action is located in an area of already concentrated human use, would add only minor impacts (< 50 acres total habitat alteration – all alternatives), and include effective mitigation to minimize impacts to essential habitats, a conclusion of "no impact" or "may impact individuals or habitat, but would not lead to a trend toward federal listing" was reached for all identified Sensitive Species in this section.

The Gallatin Forest Plan contains a Forest-wide Standard that Habitat for waterfowl, shorebirds, and wading birds will be maintained and improved through coordination of land use activities (USFS 1987:II-18). The Proposed Project would not remove any riparian vegetation or involve in-water construction that would alter streambeds or banks. Potential water impacts would be minimized by spanning rivers, streams, riparian areas, and other wetland areas; and through compliance with the Forest Service Soil and Water Conservation Practices and State of Montana Best Management Practices for Forestry, which include Streamside Management Zone Requirements. Additionally, all disturbed areas would be rehabilitated with a native seed mix to prevent erosion and sedimentation of streams. Therefore habitat for water-associated bird species (e.g. harlequin duck) would be maintained, although high levels of disturbance associated with existing conditions may be more of an issue for harlequin duck habitat within the project area.

MA 25 includes a standard to "Design and mitigate adverse impacts on raptors and other wildlife" (USFS 1987:III-69) The Proposed Project would be developed consisted with APLIC guidelines (APLIC 2006) for avian safety and operated under and Avian Protection Plan to reduce risk of harlequin duck collision with conductors and electrocution.

Migratory Birds

Introduction

Migratory birds were identified as an issue during interdisciplinary team scoping discussions, initial public scoping, and the NOI comment period. The MTNHP lists 65 migratory bird species as SOC, 47 of which are known to occur in Gallatin County. Of the 47 migratory bird species, suitable habitat for 23 of these species occurs within the Proposed Project Area (see Project Record). Seven of these species are considered MIS or otherwise sensitive, and are discussed in detail in their own sections: 1) MIS - bald eagle, northern goshawk; and 2) Sensitive - peregrine falcon, flammulated owl, trumpeter swan, harlequin duck, and black-backed woodpecker. The remaining 16 migratory bird species with a potential to occur within the Proposed Project Area are outlined below in Table 3.4.9-4.

Migratory birds were included as an issue because the Proposed Project could affect migrating and breeding individuals, and associated habitat where these species could occur within the Proposed Project Area. Project-related activities have the potential to temporarily alter or permanently remove suitable nesting, foraging and resting habitat used by migratory birds. Rebuilding and realigning the new transmission line would result in taller structures with thicker conductors, and a potential for more increased aerial obstructions within the Gallatin River canyon. This has the potential to increase collision risk and affect breeding and stop-over habitat for avian species protected under the MBTA.

TABLE 3.4.9-4 MIGRATORY BIRD SPECIES OF CONCERN LIKELY TO OCCUR IN THE JRBS PROJECT AREA

SPECIES NAME	HABITAT	SENSITIVE PERIODS (NESTING AND BREEDING)
Black rosy-finch *Leucosticte atrata*	Nest in crevices in cliffs and talus among glaciers and snowfields above, not within the Proposed Project Area. Utilizes fields, cultivated lands, brushy areas, and around human habitation during winter and migration (Johnson 2002).	July-August
Bobolink *Dolichonyx oryzivorus*	Nests built in tall grass and mixed-grass prairies (Martin and Gavin 1995).	May-September (summer migrant)
Brewer's sparrow *Spizella breweri*	Nests in shrublands dominated by big sagebrush, but may also occur in pinyon-juniper woodlands or coniferous forests (Rotenberry et al. 1999).	May-August
Brown creeper *Certhia americana*	Nest in coniferous and mixed coniferous-deciduous forests, preferring mature and old-growth stands with high canopy cover in the western United States, and in mature western red-cedar-western hemlock, spruce-fir, and mixed-conifer forests than in pine or younger forests in western Montana and Idaho (Hejl et al. 2002b; Hutto and Young 1999).	May-July
Burrowing owl *Athene cunicularia*	Nests in open grasslands, where abandoned burrows dug by mammals such as ground squirrels, prairie dogs, and badgers are available (Klute et al. 2003).	April-May
Cassin's finch *Carpodacus cassinii*	Nest in every major forest type and timber-harvest regime in Montana, including riparian cottonwood, but are especially common in ponderosa pine and post-fire forests; they occur less often in lodgepole pine, sagebrush, and grassland (Hutto and Young 1999).	May-July
Clark's nutcracker *Nucifraga columbiana*	Typically occupy conifer forests dominated by whitebark pine at higher elevations, and ponderosa pine and limber pine along with Douglas firs at lower elevations, relying largely on seeds of these species for food (Mewaldt 1956).	March-May
Grasshopper sparrow *Ammodramus savannarum*	Primarily utilizes grasslands with moderate shrub cover; big sagebrush seems to be a preferred species (Vickery 1996).	May-August
Golden Eagle *Aquila chrysaetos*	Generally open coniferous forest. Prefers large trees or cliffs for nesting and roosting. Hunts for a variety of prey by soaring over open terrain or from a perch (USDA 1991:92).	March-July
Gray-crowned rosy-finch *Leucosticte tephrocotis*	Breeding, nesting, and winter roosting habitat in Montana is similar to other regions in the species' range (Johnson 1965; Hendricks 1981). Nest in crevices in cliffs and talus among glaciers and snowfields above timberline, and forage in barren, rocky or grassy areas adjacent to the nesting sites; in migration and winter they also occur in open situations, fields, cultivated lands, brushy areas, and around human habitation.	May-August
Great blue heron *Ardea herodias*	Occur in urban wetlands and wilderness settings. Most Montana nesting colonies are in cottonwoods along major rivers and lakes; a smaller number occur in riparian ponderosa pines and on islands in prairie wetlands. Nesting trees are the largest available. Active colonies are farther from rivers than inactive colonies. The number of nests in the colony corresponds to the distance from roads (Parker 1980).	April-August
Great gray owl *Strix nebulosa*	Rangewide it is present in deciduous or coniferous forests; and in Idaho and Wyoming it is mostly present in areas dominated by lodgepole pine, Douglas-fir, and quaking aspen (*Populus tremuloides*) (Bull and Duncan 1993).	March-July
Horned grebe *Podiceps auritus*	Found in shallow freshwater ponds and marshes with beds of emergent vegetation (Dubois 1919).	May-October

SPECIES NAME	HABITAT	SENSITIVE PERIODS (NESTING AND BREEDING)
Lewis's woodpecker *Melanerpes lewis*	Occur in river bottom woods and forest edge habitats. Breeding habitat is open forest and woodland, often logged or burned, including oak and coniferous forest; primarily ponderosa pine, riparian woodland and orchards, and less commonly in pinyon-juniper (AOU 1983).	June-August
Pacific wren *Troglodytes pacificus*	Prefer large uncut stands of old-growth and mature coniferous forests, and also occur in riparian cottonwoods and aspens. In Montana they are especially common in cedar-hemlock, cedar-grand fir, and spruce-fir forests and are strongly associated with riparian areas within these forest types (Hutto and Young 1999; Casey 2000).	April-June
Sage sparrow *Amphispiza bellii*	The sage sparrow is associated with shrublands dominated by big sagebrush with a perennial bunchgrass understory (Braun et al. 1976; Paige and Ritter 1999).	February-April

Applicable Laws, Regulation, Policy and Forest Plan Direction

Migratory birds are protected under the MBTA. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. Under the MBTA, it is illegal to "take" migratory birds, their eggs, feathers or nests, except as regulated by authorized programs. *Take* is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof. E.O. 13186, issued January 10, 2001, requires federal agencies to ensure that environmental analyses evaluate the effects of federal actions and agency plans on migratory birds, with emphasis on species of concern.

Under the BGEPA, it is unlawful to take (to include harm, harass), kill or possess any bald or golden eagle, except as regulated by authorized programs. The Forest Service has a responsibility to ensure that environmental analyses evaluate the effects of federal actions on bald and golden eagles – both of which are migratory bird SOC.

The Gallatin Forest Plan (USFS 1987:II-18) contains two Forest-wide Standards applicable to this proposal that are relevant to migratory bird species as follows:

> Emphasis will be given to the management of special and unique habitats such as wallows, licks, talus, cliffs, caves and riparian areas. Of these features, cliffs and riparian areas present important nesting and foraging habitat for a number of migratory bird species.
>
> Habitat for waterfowl, shorebirds, and wading birds will be maintained and improved through coordination of land use activities.

The area identified for the Proposed Action and Alternatives falls predominantly within Forest Plan MA 25 (electrical and transmission lines and pipelines, climatic and snow measuring sites and electronic site). In addition to the above Forest-wide standards the following standard applies in MA 25: Design facilities to mitigate adverse impacts on raptors and other wildlife (USFS 1987: III-69).

Affected Environment

The proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within the GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. The existing route roughly parallels US Hwy 191 and the Gallatin River, crossing the highway eleven times and the river eight times. During approximately 35 years of operation, the current 40-foot wide ROW supporting the 69 kV line has been maintained for safety and system reliability but has been allowed to re-vegetate with natural vegetation communities. Although the current SUP allows for the lopping of vegetation to within 18 inches of the ground, vegetation has been generally left in its natural state unless it inhibits normal maintenance activities or presents a safety or operational risk. As warranted, hazard trees that are an immediate threat to the transmission line and present a risk of fire, equipment damage or power outage are removed from the ROW as allowed by the current SUP. Line-related human disturbance in the form of patrols and routine maintenance occurs annually or more often, if needed.

Within the GNF, the existing ROW traverses both forested and non-forested habitats. Migratory bird species habitat associations for the Proposed Project Area are include in Table 3.4.9-4 and further describe below. In forested areas, the maintained ROW is predominantly vegetated by sapling tree, shrub, grass and forb species adjacent to stands of Douglas-fir (*Pseudotsuga*

menziesii), lodgepole pine (*Pinus contorta*), and/or Engelmann spruce (*Picea engelmannii*). Shrub communities within the forested sections of the ROW are dominated by huckleberry (*Vaccinium* spp.), common snowberry (*Symphoricarpos albus*), mallow ninebark (*Physocarpus malvaceus*), Woods' rose (*Rosa woodsii*), and other species that benefit from sunlight penetration created by openings in the forest canopy. These shrubs are often associated with a mixture of evergreen and deciduous tree saplings with Douglas-fir, lodgepole pine, Engelmann spruce and Rocky Mountain maple (*Acer glabrum*) being the most prevalent species. Where adjacent to high canopy cover forested stands, the ROW presents important understory vegetation, providing forage, nesting habitat, thermal protection, and security cover for a variety of wildlife species. Down woody debris ranges from 1.0 to 15.0 tons per acre (Mean=5.8 tons per acre) in the analysis area, providing structural complexity and additional thermal cover for wildlife. Non-forested portions of the existing ROW extend through shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grasslands.

Migratory birds may occupy all the habitat types within the Proposed Project Area, including streams, wetlands, riparian areas, grasslands, meadows, shrub lands, coniferous and mixed forest, talus slopes, and rocky outcrops. Forested areas, grasslands and shrubs, and rocky outcrops all provide nesting opportunities for various bird species. Trees on the edges of riparian areas may also provide nesting opportunities for particular birds. All aforementioned habitats within the Proposed Project Area provide some elements of foraging habitat. Suitable prey or other types of forage are present throughout the vicinity, including other birds, small mammals, fish, invertebrates, and vegetation. Birds protected by the MBTA may occur throughout these habitat types and may exhibit varying reactions to disturbance.

Methodology for Analysis

Potential effects to migratory birds for each alternative are the number of acres of habitat that would have ground disturbance as a result of the Proposed Project. Table 3.4.9-3 defines the terms used to describe magnitude and duration of effects to wildlife species.

Effects to migratory birds were evaluated by conducting desktop and field studies of suitable habitat within the Proposed Project Area, and consulting with GNF biologists. The 16 migratory bird species evaluated in this section were grouped into most preferred habitat categories: coniferous and deciduous woodlands - brown creeper, Cassin's finch, Clark's nutcracker, golden eagle, great gray owl, Lewis's woodpecker, and Pacific wren; shrublands - Brewer's sparrow and sage sparrow; grasslands - black rosy-finch, bobolink, burrowing owl, grasshopper sparrow, and gray-crowned rosy-finch; and open water - great blue heron and horned grebe. Projected Proposed Project effects were then analyzed for their potentials to affect suitable habitat for these migratory birds, primarily nesting habitat, to determine the degree of effects that could be expected.

Spatial Boundary

Potential direct and indirect effects (mechanized and human disturbance) related to Proposed Project activities would be confined to areas along the existing and proposed expanded ROW and adjacent bottomlands.

Migratory birds are wide-ranging creatures that use habitats at the continental and even intercontinental scale. Cumulative analysis to encompass all life history stages is beyond the scope of this analysis. Therefore, in order to capture potential cumulative impacts, the analysis area was derived from a two-mile buffer around the Proposed Project corridor, resulting in a cumulative effects analysis area of approximately 23,000 acres. This area was selected to capture collective effects along the entire project corridor (16 miles), as well as to cover a wide variety of

habitat types within an area capable of providing home ranges for a multitude of migratory bird species, including habitat for all SOC identified for the project.

Temporal Boundary

The temporal boundary for direct and indirect impact analysis to migratory birds as a result of the Proposed Project covers the period of active construction (short-term; which would be approximately two years with periods of higher intensity over non-winter months).

Cumulative impacts considered were habitat loss, and potential disturbance/displacement effects to migratory bird species, created by the project in conjunction with past, present, and reasonably foreseeable actions. The temporal boundary for cumulative effects is the life of the SUP (20 years) into the future. The cumulative temporal boundary was extended 50 years into the past to consider the concentrated development in the Gallatin Canyon associated with the creation of the modern US Hwy 191.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under the No Action Alternative the existing 69 kV transmission line would continue to function in its current state. The existing 69 kV transmission line within the Proposed Project Area would remain on the existing structures, along with the existing three-phase, 12.5 kV underbuild. ROW vegetation maintenance and operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, hazard tree removal, and transmission structure replacement when required, to minimize failure. Line inspection patrols and other periodic maintenance activities would continue. Under this alternative, impacts to migratory birds would be unchanged from existing conditions.

Effects Common to All Action Alternatives

Effects to migratory birds from the Action Alternatives may include habitat alteration and loss of nesting and foraging habitat; mortality from collision with conductors; direct disturbance from construction-related noise and human presence; habitat fragmentation; increased search time for forage, roost, and nest habitat; changes in prey availability; and changes in forage.

In addition to vegetation removal, increasing the underbuild portion of the Proposed Project Area may increase the potential risk of collision between migratory birds and conductors. Ecologically sensitive areas such as wetlands and riparian areas, in general, tend to have a high concentration of birds nesting, feeding, roosting, and migratory stop-over. Collision risk would increase if transmission lines are nearby or within these areas (Bevanger 1994). For example, transmission lines that are placed between two distinct areas of bird habitat, such as nesting in trees and foraging over water, can result in increased collisions when birds move back and forth between these areas. These inherent risks of transmission lines increase the danger where no previous lines are present. While most of the transmission line is already in place and would only be upgraded to a higher voltage, there are potential re-alignments that would impact areas where no transmission lines currently exist. These areas would pose new collision hazards where none had previously been present, particularly where the line crosses over the Gallatin River at the bottom of the canyon. Research has shown that avian collision is typically the result of birds seeing the conductor, gaining altitude, and colliding with the overhead shield wire (Brown 1987; Morkill and Anderson 1991). The increased diameter of the new 161 kV conductor under the action alternatives may result in increased visibility of the line, thus potentially allowing avian species more time to maneuver and avoid collision.

Construction noise or human presence may temporarily drive migratory birds from the area, causing them to move to areas that may be less suitable. This could occur during construction, as well as after construction during the long-term and ongoing operations and maintenance phase. Over time, these occurrences may result in migratory birds reducing use of or avoiding areas that may become "high traffic" (i.e., high levels of human disturbance).

Some habitat fragmentation would occur as a result of any Action Alternative implementation, as vegetation will be removed for ROW expansions, and transmission lines may be installed in areas where no lines are currently present. However, the canyon is already fragmented by the presence of the existing transmission line, US Hwy 191, and various buildings and recreational facilities. While areas of new construction will result in some fragmentation, most of the associated activity would be aligned with the existing transmission line and would cause no new disturbance outside of the ROW and its expanded footprint. Areas of increased habitat fragmentation may result in migratory birds increasing search time for suitable habitat. Conversely, the edge effects created by this may result in benefits to some species that prefer edge habitats.

Additionally, the project may have effects on foraging availability and food sources. Construction activity and human presence may drive prey species, particularly small mammals, into the open, making them more vulnerable to predation by species that prey upon them, such as great gray owl, or drive the prey species further from the Proposed Project Area, making foraging in these areas difficult for species that prey on these small mammals.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

Habitat alteration and loss may occur more specifically in the form of nesting and foraging habitat removal associated with tree and shrub clearing to accommodate the increased ROW width. Tree removal would not occur on pulling and tensioning sites, material storage yards, helicopter fly yards, and timber decking areas. A small amount of vegetation removal may be necessary to create permanent improvements on some existing access roads. Approximately 14.8 acres of coniferous and deciduous woodland would be permanently altered, affecting suitable habitat for Cassin's finch, Clark's nutcracker, golden eagle, great gray owl, Lewis's woodpecker, and Pacific wren. Approximately of 1.0 acre shrublands would be permanently altered, affecting suitable habitat for Brewer's sparrow and sage sparrow. Approximately 0.8 acre of grasslands will be permanently altered, affecting suitable habitat for black rosy-finch, bobolink, burrowing owl, grasshopper sparrow, and gray-crowned rosy-finch. In addition, the eight river crossings under this alternative would affect suitable habitat for great blue heron and horned grebe.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Alternative 3 would involve two short LROs at Cave Creek and Cascade Creek. The Cave Creek LRO would move the transmission line ROW behind some existing recreation residences and would require additional tree clearing due to the alignment moving upslope, approximately 200 feet in places, from the existing 69 kV transmission line. While transmission structures that are required to maintain the distribution line in the current ROW would remain, those that are not essential for the distribution would be removed after the transmission lines are re-routed. With the Cascade East LRO, the transmission line would be moved to the eastern, less forested, side of US Hwy 191, requiring tree clearing of predominantly drier, Douglas-fir on talus slopes. Those transmission structures that are not essential for the continued use of the distribution line that shares the current ROW would be removed after the transmission lines are re-routed.

Under this alternative, approximately 22.4 acres of coniferous and deciduous woodland would be permanently altered, affecting suitable habitat for Cassin's finch, Clark's nutcracker, golden eagle, great gray owl, Lewis's woodpecker, and Pacific wren. Effects to shrublands (suitable habitat for Brewer's sparrow and sage sparrow), and grasslands (suitable habitat for black rosy-

finch, bobolink, burrowing owl, grasshopper sparrow, and gray-crowned rosy-finch) would be the same as reported for Alternative 2. Alternative 3 would have only six river crossings that would impact suitable habitat for great blue heron and horned grebe, which would be a reduction from the existing condition with eight crossings.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Alternative 4 would involve a different LRO at Cascade Creek than Alternative 3. Under the Cascade West LRO, the realignment would move the transmission line west of the recreation residences at Cascade Creek. It would require tree clearing due to the alignment moving upslope, approximately 500 feet in places, in lodgepole pine habitat more densely forested and moister compared to the existing route and Cascade Creek East LRO. While transmission structures that are required to maintain the distribution line in the current ROW would remain, those that are not essential for the distribution would be removed after the transmission lines are re-routed.

Under this alternative, approximately 22.5 acres of coniferous and deciduous woodland would be permanently altered, affecting suitable habitat for Cassin's finch, Clark's nutcracker, golden eagle, great gray owl, Lewis's woodpecker, and Pacific wren. Effects to shrublands (suitable habitat for Brewer's sparrow and sage sparrow), and grasslands (suitable habitat for black rosy-finch, bobolink, burrowing owl, grasshopper sparrow, and gray-crowned rosy-finch) would be the same as reported for Alternative 2. Like Alternative 3, this alternative would have only six river crossings that would impact suitable habitat for great blue heron and horned grebe, which would be a reduction from the existing condition with eight crossings.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Project would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives

Migratory birds are wide-ranging and will seasonally make continental or even global-scale movements. Capturing cumulative effects at these scale would be beyond the scope of this analysis and speculative. Cumulative analysis is therefore focused on life history stages (e.g., breeding and daily or seasonal movements) that overlap and may extend beyond the Proposed Project Area. Current conditions described in the Affected Environment section above reflect past projects in the analysis area. Projects analyzed for cumulative effects to migratory birds included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. These projects could further reduce potential migratory bird foraging or nesting habitat. Bird nesting or foraging habitat may be lost or degraded in areas of vegetation removal; when combined with the Proposed Project, these effects would be slightly increased. Activity related to human use, such as highway and recreational improvements, could increase human traffic through the area, further increasing the amount of disturbance for birds. This could drive migratory birds farther away from the Proposed Project Area, and possibly into areas that are less suitable for use, based on various factors, such as elevation, prey availability, or habitat condition and availability. Excessive human disturbance may scare and expose prey species into the open, indirectly benefiting raptors or other birds that may be foraging nearby.

Comparison of Alternatives

Alternative 1 would result in no additional affects to migratory birds apart from current, ongoing, and other future projects and activities. Alternatives 2, 3, and 4 will result in potential minor effects to migratory birds and their habitat. Table 3.4.9-5 presents a comparison of habitat disturbance to migratory bird species for Alternatives 2, 3, and 4.

TABLE 3.4.9-5 HABITAT ASSOCIATION AND HABITAT LOSS TO MIGRATORY BIRD SPECIES LIKELY TO OCCUR IN THE JRBS PROJECT AREA

HABITAT TYPE	NEW PERMANENT DISTURBANCE (ACRES)		
	ALT. 2	ALT. 3	ALT. 4
Coniferous and Deciduous Woodland	14.8	22.4	22.5
Migratory Birds Associated with Coniferous and Deciduous Woodland Habitat: Brown creeper, Cassin's finch, Clark's nutcracker, great gray owl, Lewis's woodpecker, and Pacific wren			
Shrublands	1.0	1.0	1.0
Migratory Birds Associated with Shrub Habitat: Brewer's sparrow and sage sparrow			
Grasslands	0.8	0.8	0.8
Migratory Birds Associated with Grassland Habitat: Black rosy-finch, bobolink, burrowing owl, grasshopper sparrow, and gray-crowned rosy-finch			
Open Water - crossings	0.3	0.4	0.6
Migratory Birds Associated with Open Water Habitat: Great blue heron and horned grebe			
Total	16.9	24.6	24.9

Summary Conclusion

In summary, activities resulting from the action alternative that would be implemented during the breeding season would have some disturbance impacts, and even potential for occupied nest destruction, which could affect any migratory bird species in the Proposed Project Area. Construction, operation, and maintenance activities that would occur during late summer, fall, and/or winter would minimize disturbance effects and potential for direct bird mortality. Considering the very small amounts of habitat loss associated with the action alternatives, the short duration of disturbance impacts in any one location, and proximity of the project to an area already heavily influenced by permanent development and associated high levels of human use, any of the proposed action alternatives, even when considered collectively with other past, present and reasonably foreseeable futures actions in the project analysis area, would have negligible impacts on migratory birds species, including species of concern.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

PDFs are proposed to reduce or avoid effects to biological resources, including species protected by the MBTA. These include 1.2, 1.3, 1.9, 5.1, 5.2, 5.3, 5.7, and 8.1 which are described in Chapter 2. Implementation of BMPs and PDFs applicable to biological resources would minimize impacts and maintain habitat quality by using timing restrictions, minimizing habitat removal, and spanning sensitive habitats such as wetlands.

Consistency with Laws, Regulations, and Forest Plan

The Migratory Bird Treaty Act (MBTA) and Executive Order (E.O.) 13186 make it unlawful to "take" migratory bird species, except as regulated by authorized programs, and to ensure that environmental analyses evaluate the effects of federal actions on migratory bird species. The proposed transmission line ROW is an authorized use of NFS lands. The effects analysis presented here meets the requirements of the MBTA and E.O. 13186.

The Bald and Golden Eagle Protection Act contains language similar to the MBTA, but specific to eagles. The proposed transmission line ROW is an authorized use of NFS lands. The effects analysis shows that with prescribed mitigation measures, impacts to both bald (MIS) and golden eagles would be minimized.

The Gallatin Forest Plan (USFS 1987:II-18) contains a Forestwide Standards that Emphasis will be given to the management of special and unique habitats such as wallows, licks, talus, cliffs, caves and riparian areas. Of these features, cliffs and riparian areas present important nesting and foraging habitat for a number of migratory bird species. Cliff habitat would not be

affected by any of the action alternatives and riparian habitats would be protected by implementation of BMPs in Streamside Management Zones – see Mitigation, Chapter 2.

The Gallatin Forest Plan (USFS 1987:II-18) contains a Forestwide Standards that Habitat for waterfowl, shorebirds, and wading birds will be maintained and improved through coordination of land use activities. Water, riparian habitats, and associated bird species would be protected by implementation of BMPs in Streamside Management Zones – see Mitigation, Chapter 2.

MA 25 includes a standard to "Design and mitigate adverse impacts on raptors and other wildlife" (USFS 1987:III-69) The Proposed Project would be developed consistent with the APLIC guidelines (APLIC 2006) for avian safety and operated under and Avian Protection Plan to reduce risk of collision and electrocution.

Fisheries and other Aquatic Biological Resources

Introduction

The Gallatin National Forest, including the Gallatin River and tributaries in the Proposed Project Area, supports an important recreational wild trout fishery. Cold, clear streams and rivers supporting wild trout also provide habitat for a variety of vertebrate and invertebrate aquatic species. Fishery species are species whose habitat is most likely to be affected by management practices, thereby serving as indicators for other aquatics species (e.g., other fish species groups, aquatic insects, mollusks), as well as aquatic habitat quality. They provide a measure of assessing the success of vegetation and land management practices. The focus of the following discussion will be on wild trout fishery species and aquatic habitats that have to potential to be affected by the Proposed Action and Action Alternatives.

Wild trout are considered a management indicator for cold water fisheries.

Applicable Laws, Regulations, Policy, and Forest Plan Direction

General issues associated with fish species were not identified during interdisciplinary team scoping discussions, initial public scoping, and the NOI comment period. However, to assess the consequences of permitted actions on forest goals and standards, inclusion of analysis of fish species is required. Some of these species elicit strong public interest. The Forest Plan directs that habitat is provided for identified fish species and those native indigenous species that use special or unique habitats. Goal 6 of the Forest Plan dictates that GNF management maintain and enhance fish habitat to provide for an increased fish population. In addition, objective 1.f calls for fish habitat to be managed by application of BMPs. Forest-wide Standard 6.a.14 dictates that the GNF will be managed to maintain and potentially improve fish habitat capacity in order to achieve cooperative goals with the MFWP and to comply with State water quality standards. Specific fish species discussed in this section include wild trout.

Wild trout thrive in lower order streams within the GNF providing cold, well-oxygenated waters with low turbidity, good prey base of aquatic insects and substrate supporting cover, complex water flow patterns, and reproduction. Trout fisheries are indicators of cold water fisheries with high water quality.

Wild Trout

Affected Environment

The Proposed Project Area parallels the Gallatin River through a relatively narrow, channel in a steeply sloped mountain canyon. Much of the river banks are forested with stretches of meadows

and rocky slopes of broken cliffs and slide rock. From these steep slopes, 13 or 14 smaller tributary streams enter the Gallatin River within the Proposed Project Area. US Hwy 191 parallels the river for the length of the Proposed Project Area and has significantly altered natural flood regimes since its construction. The Gallatin River system is within the Gallatin watershed. This watershed originates on the Yellowstone Plateau in Yellowstone National Park and covers nearly 1.2 million acres. Sub watersheds of the Gallatin watershed which are crossed by the Proposed Project include: Logger Creek – Gallatin River, Storm Castle Creek (also known as Squaw Creek), Hell Roaring Creek, Cascade Creek – Gallatin River, Swan Creek, Moose Creek – Gallatin River, Deer Creek – Gallatin River, Portal Creek, and West Fork Gallatin River. These sub watersheds total 162,645 acres. Recognized impairments to streams within the Proposed Project Area are related to road development, silviculture, grazing, mining and on-site water treatment. See Section 3.4.4, Water Resources for full discussion of stream system characteristics and water quality.

Despite current conditions, overall aquatic habitats are good and the river has adequate flow volume and cold water temperatures to support wild trout populations. Thus the Gallatin River presents a world-class cold water fishery for a variety of native and stocked trout species. Table 3.4.9-6 summarizes information obtained from MFWP Fisheries Information System (MFWP 2011) regarding fish species of interest in the Proposed Project analysis area. Within the analysis area, Region 1 sensitive species Yellowstone cutthroat (*Onchorhynchus clarki bouvieri*), and native westslope cutthroat (*Onchorhynchus clarki lewisi*) do not occur. Hybridized westslope cutthroat do occur and are considered to be a MIS trout as part of the cold water fishery. Because Yellowstone cutthroat trout are outside of their native range, this sub-species is not being considered as a sensitive species in the project analysis area. The Proposed Project's ROW crossing of 13 or 14 significant streams capable of sustaining cold water fish populations is shown below in Table 3.4.9-6.

TABLE 3.4.9-6 SUMMARY OF FISHERIES DATA FOR GALLATIN RIVER AND TRIBUTARIES WITHIN THE PROPOSED PROJECT AREA

STREAM	FISHERY CHARACTERISTICS, SPECIES
Storm Castle Creek (also known as Squaw Creek)	Brook, Brown and Rainbow trout
Logger Creek	No data available
Hell Roaring Creek	Rainbow trout, Yellowstone cutthroat (not native to the area)
Cave Creek	No data available
Cascade Creek	"fishless"
Greek Creek	No surveys have been performed
Swan Creek	Brook, Rainbow, Westslope Cutthroat (Hybridized) trout
Moose Creek	Westslope Cutthroat (Hybridized) trout
Tamphery Creek	No fish captured during surveys
Portal Creek	Westslope Cutthroat (Hybridized), Golden trout
Goose Creek	Rainbow trout (redds near highway junction at Gallatin River.)
Deer Creek	No data available
Dudley Creek	No data available
Gallatin River	Brook, Brown, Rainbow trout; Longnose dace, Longnose sucker, Mottled sculpin, Mountain whitefish

Indicators specific to wild trout fisheries would be number of streams or miles of streams supporting MIS wild trout populations that would be impacted by the Proposed Project. Impacts would include degradation of riparian boundaries, loss of linkage among streams, sedimentation, alteration of substrate characteristics or stream gradients, and water quality declines.

Methodology for Analysis

Effects to wild trout were evaluated by assessing potential to impacts stream banks and beds, and water quality, as well as sedimentation associate with construction of the Proposed Project and operation.

Spatial Boundary

Because localized impacts may pervade stream systems and wild trout move both up and down stream for various life history stages and seasonal habitat requirements, the spatial boundary for impacts to fisheries typically is considered at the watershed level. The Proposed Project Area is entirely contained within a portion of the Gallatin River Canyon, crossing the main channel of the river and numerous tributary streams. Wild trout would be presumed to find habitat at power line stream crossing points and cross back and forth across the ROW seasonally in some areas. Effects on wild trout fisheries were evaluated by assessing the potential for the Proposed Project to cause adverse impacts to streams and other water courses along the Proposed Project's ROW within GNF lands in Gallatin Canyon.

Temporal Boundary

The temporal boundary for direct and indirect effects to fisheries mainly covers the period of active construction; however, it is expanded to include the life of the active ROW, as disturbance in the form of periodic maintenance and weed control would be conducted.

The temporal boundary for cumulative effects would capture the period of present and reasonably foreseeable project and the length of the SUP. Past activities affecting water quality, substrate characteristics, stream flow, large woody debris etc would date to the earliest human earth moving, impervious surface creation, waste deposition and timber removing activities.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1, the existing 69 kV transmission line would continue to function in its current state. The existing 69 kV transmission line within the Proposed Project Area would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. ROW vegetation maintenance and operations would continue under their current regime. This would include maintaining the existing 40 foot ROW width, hazard tree removal, and transmission structure replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue.

Hazard tree removal and weed management would negligibly impact vegetation roost structure and cover habitat with the existing ROW. Nevertheless, some reduction in shrub and forb cover within the ROW may occur depending upon maintenance requirements. These impacts would be minimal given that such habitat types that are currently in place are quick to recover from disturbances such as ROW maintenance. No effects on erosion or run-off are currently documented related to these activities or would be expected in the future. Similarly, no impacts to water quality related to weed abatement treatments have been documented.

No effects to aquatic habitat linkages, connectivity or stream quality would occur under Alternative 1 when compared to current conditions. No impacts to wild trout or other aquatic biological resources would be expected.

Direct and Indirect Effects of Alternative 2 (Proposed Action)

As described above, the proposed 161 kV transmission line would be constructed by rebuilding the existing 69 kV Jack Rabbit to Meadow Village transmission line originally constructed in the early 1970s utilizing portions of a 1950s-era 50 kV transmission line corridor within GNF. Most direct impacts to habitat would occur within or directly adjacent to the existing ROW. Under the

Proposed Action-Alternative 2 (and other action alternatives), an existing angle would be removed (i.e., ROW straightened) in a meadow area on the floor of the canyon south of Deer Creek. This refinement would improve the alignment by reducing structure numbers, removing an existing wildlife hazard and visual impact associated with large group of guy wires, and spanning a wetland. All portions of the existing line (as well as proposed modifications under any action alternative) are confined to within 1,115 feet of US Hwy 191.

Under all action alternatives, existing single transmission structures would be directly replaced with taller single transmission structures in most areas, with larger H-frame structures being used when necessary. ROW width would be required to be increased from approximately 40 feet wide to 50 feet for new single transmission structures and 80 feet for wide for H-frame structures. New transmission structure heights would be approximately 60 to 90 feet, an increase of approximately ten feet over current transmission structures. The existing two-phase underbuild currently in place would be replaced by a three-phase, four-wire 12.5 kV distribution circuit. No new access roads would be constructed. Existing stream crossings would be utilized during construction.

Permanent ground disturbance for the Proposed Action-Alternative 2 would include existing land used for highways, roads, and ROW corridor, and additional land that would be converted for widening roads, installing structures, and widening the ROW corridor. The land that would be used for widening roads and expanding the ROW corridor is comprised predominantly of Douglas-fir and lodgepole pine, with smaller amounts of civilized areas, dry sagebrush shrubland, scree, and other habitats. In these habitats (and given the steep topography of the Proposed Project Area), a potential exists for vegetation degradation and increased run off and soil erosion. Loss of the total sum of these habitats would vary between approximately 19.0 for Alternative 2 and 27.1 acres for both Alternatives 3 and 4.

Additionally, temporary ground disturbance for the Proposed Action-Alternative 2 include lands used for fly yards and decking areas, authorized overland travel (off-road motorized vehicle use), and structure pulling, tensioning, and splicing. The land that would be used for these temporary disturbances totals 23.5 acres and is comprised predominantly of dry sagebrush shrubland (15.1 acres), with smaller amounts of forest, civilized areas, and talus slopes.

Construction, operations and maintenance under the Proposed Action-Alternative 2 would have a low likelihood of affecting stream structure, stability of stream slopes, sedimentation, large down woody debris, streamside vegetation and general water quality. All lotic (river and stream) habitats would be spanned. BMPs and general mitigative environmental protection would assure protection for cold water trout habitats. For the reasons discussed under the water quality issue, as well as BMPs, and siting to avoid fishery resources, no impacts to MIS wild trout and other aquatic biological resources associated with the Gallatin River would occur under the Proposed Action-Alternative 2. None of the action alternatives would contribute to a trend toward long-term loss of habitat, water quality degradation, or loss of viability to populations of MIS trout species.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

Direct and indirect impacts to MIS wild trout and other aquatic biological resources associated with the Gallatin River under Alternatives 3 would be similar to the Proposed Action-Alternative 2.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

Direct and indirect impacts to MIS wild trout and other aquatic biological resources associated with the Gallatin River under Alternatives 4 would be similar to the Proposed Action-Alternative 2.

Cumulative Effects of Alternative 1 (No Action)

Under Alternative 1, the Proposed Project would not be constructed and would not add to any cumulative impacts.

Cumulative Effects of the Action Alternatives

Current conditions described in the Affected Environment section above reflect past projects in the analysis area. Projects analyzed for cumulative effects to wild trout and other aquatic biological resources included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. Cumulative effects to MIS resulting from Proposed Project and other planned projects in the Proposed Project Area could result in increased human presence and the removal of hazard trees and removal of trees for other future projects. The proposed widening and improvements on US Hwy 191 exacerbate and impair terrestrial species linkage habitat through the Gallatin River Canyon. Other projects, including GNF fuel reduction efforts, timber sales, and systematic upgrades to private homes could all result in the disturbance of terrestrial species and the potential loss of habitat. Weed maintenance would remove noxious weeds which could benefit wildlife by reducing weed competition for preferred native forage. Cumulative effects to species from Alternative 1 and other proposed projects would be less than significant when currently existing disturbance and fragmentation, such as high traffic volume on US Hwy 191, campgrounds, trailheads, fishermen, whitewater rafting trips on the Gallatin River, private residences, and the existing transmission line, are considered.

Current conditions described in the Affected Environment section above reflect past projects in the Proposed Project Area. Projects analyzed for cumulative effects to American marten included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. Habitat fragmentation from other projects would not likely increase to a substantially higher level than currently exists, given that most cumulative projects would occur within the currently fragmented Gallatin River Canyon. Impacts to stream quality would be within the limitations set forth by Forest Standards and not degrade water quality or habitat quality for fish. Cumulative effects to wild trout from action alternatives and other proposed projects would be negligible.

Comparison of Alternatives

Under Alternative 1 (No Action), there would be no changes to the current baseline conditions. Under the action alternatives, there would be 19.0 to 27.1 acres of vegetation removal in all habitats. All direct, indirect and cumulative effects to MIS wild trout would be identical.

The Proposed Project would involve rebuilding an existing overhead transmission line that roughly follows the Gallatin River and crosses numerous tributary streams within an important cold water fishery supporting an important wild trout fishery, which includes hybridized populations of Westslope cutthroat trout. At all crossings, the stream zone would be avoided. With BMPs and controls, no impacts to fish species, including MIS wild trout would occur.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

PDFs are proposed to reduce or avoid adverse environmental effects to biological resources, including wild trout. These are described in Chapter 2. Implementation of BMPs and PDFs applicable to biological resources would minimize impacts and maintain habitat quality by implementing sediment control measures (8.1), requiring the applicant or its contractor(s) to stay within construction limits (1.1), restricting equipment to pre-designated access (1.3), minimizing ground disturbance (1.2 and 1.5), controlling weed intrusion (1.9), prepare a re-vegetation plan

(1.9), close and restore access areas not needed for long-term use (1.3), and restore disturbed ground surrounding construction areas (1.9).

No impacts to wild trout and other aquatic biological resources are expected. No species specific mitigation and/or monitoring plans have been developed at this time.

Consistency with Laws, Regulations, and Forest Plan

Objective 1.f of the Forest Plan dictates that fish habitat will be managed by the applications of BMPs, and management standards have been set to mitigate impacts occurring to fisheries resources from land use activities. Special consideration will be given to waters leaving the forest to provide for the downstream high quality "blue ribbon" trout streams. Forest-wide Standard 6.a.14 dictates that the GNF will be managed to maintain and potentially improve fish habitat capacity in order to achieve cooperative goals with the MFWP and to comply with State water quality standards. Minimal impacts to trout habitat would result from all alternatives. All alternatives, including No Action, would be consistent with applicable law, regulation, policy and direction.

Amphibians and Reptiles

Introduction

The northern leopard frog and western toad are Forest sensitive species. This indicates that the population stability is a concern and the Forest Service manages to protect these species and their habitat. The northern leopard frog was not carried forward for detailed analysis because this species was not likely to occur in the project area (elevation too high). The western toad is analyzed below.

Applicable Laws, regulation, Policy and Forest Plan Direction

General issues associated with amphibian and reptile species were not identified during interdisciplinary team scoping discussions, initial public scoping, and the NOI comment period. However, to assess the consequences of permitted actions on forest goals and standards, inclusion of analysis of amphibian and reptile species is required. Some of these species elicit strong public interest. Region 1 Forest Service has designated certain species as being Sensitive. Forest Service direction is to maintain viable populations of these "Sensitive" species and to ensure that those species do not become threatened or endangered because of Forest Service actions. Specific amphibian and reptile species discussed in this section include the Region 1 Sensitive western toad.

While management guidelines directed at western toad are not directly addressed in the Forest Plan, certain Forest-wide Standards may have direct impacts on amphibian populations. These include Standard 6, Wildlife and Fish, where under 6.a.8, riparian areas are protected as a "special and unique wildlife habitat"; and Standard 10, Water and Soils, which addresses management of water quality (USFS 1987). The Forest Plan and the State of Montana dictates the use of BMPs to bodies of water throughout the forest. Furthermore, Management Area 7, which includes the riparian management areas, has a goal to "manage the riparian resource to protect the soil, water, vegetation, fish, and wildlife dependent upon it" (USFS 1987). The use of BMPs, along with the protection of riparian areas outlined under Management Area 7 of the Forest Plan, will reduce sedimentation and pollution of local waterways, thus protecting important amphibian habitat. Under E.O. 11990, all federal agencies must take action to "minimize the destruction, loss or degradation of wetlands," which would in turn protect habitat for a number of amphibians (42 CFR 26961).

Western Toad

Affect Environment

Western toad (*Bufo boreas*) was identified as an issue during interdisciplinary team scoping discussions, initial public scoping, and the NOI comment period. This Region 1 Forest Service Sensitive species was included as an issue because the Proposed Project could affect individuals and associated habitat where western toad could occur, including potential breeding, foraging, and aestivating habitat within the analysis area. Appropriate slack open water sources, wetlands, and associated uplands occur in the vicinity of the Proposed Project Area. Proposed Project-related facilities would not be sited in wet or inundated areas, and surface waters and wetlands would be avoided during construction activities. Impacts would likely be minimal and addressable with mitigation.

The western toad typically breeds between January and July in slow-moving or static water bodies, including streams, springs, ponds, lakes, reservoirs, or stock ponds, while both juveniles and adults may disperse into suitable upland habitat (e.g., diverse forest, woodland, grassland, desert, meadow) during the non-breeding portion of the year, aestivating in burrows or other areas below the surface (Olson 2005). Western toads have been documented moving as much as 2.5 miles from breeding habitat into upland areas (MFG 2011a), while in-stream movements have been documented at distances exceeding two miles during the summer period (Schmetterling and Young 2008).

The western toad is designated by the Regional Forester as a Region 1 sensitive species. This indicates that the population stability is a concern according to available data that shows significant current or predicted downward trends in their population numbers, density, or suitable habitat availability (USFS 2006a). Their protection is required by the NFMA, which states that all native and desired non-native vertebrate species shall be maintained in healthy populations (36 CFR 219.19).

The analysis area contains numerous streams and wetlands, which the alternative routes cross. These streams may provide suitable habitat for western toad breeding, foraging, and aestivating. Throughout the analysis area, water bodies that cross under the Proposed Project corridor include Logger Creek, Hell Roaring Creek, the Gallatin River and its South and West Forks, Cave Creek, Cascade Creek, Greek Creek, Swan Creek, Moose Creek, Tamphery Creek, Portal Creek, Goose Creek, Deer Creek, Dudley Creek, and several more unnamed creeks. In addition, there are several wetlands located within the analysis area and the transmission line corridor. Any of these water bodies may provide suitable breeding or, as applicable, aestivating and overwintering habitat for western toad. Foraging habitat in wetlands, grasslands, or other suitably vegetated areas can be found throughout the analysis area, as prey typically consists of invertebrates. The entire Proposed Project Area (and Action Alternative project areas) are within 2.5 miles of water bodies.

Various Proposed Project access roads cross over streams and wetlands. While most of these are existing paved or dirt roads, and many cross over bridges or culverts, at least one road is expected to be improved during construction, and at least two would be crossed overland. Study has shown that, while species-specific effects vary, amphibian populations generally decrease with influxes of sediment in streams such as from road construction (Hartwell and Ollivier 1998). This seems to be primarily from the changes in microhabitat that occur as a result of the sedimentation and the decline in habitat quality for particular species that results. In addition, the use of roads by amphibians is well-documented and is known to occasionally result in mass-amphibian deaths, especially after large rain events when amphibians are more prone to emerge from aestivation and migrate between habitat types (Andrews et al. 2008). The various access roads within the analysis

area, particularly those close to suitable western toad habitat, may potentially be used by western toad during migration or foraging efforts.

Methodology for Analysis

Potential effects to western toad for each alternative are the number of acres of habitat that would have ground disturbance as a result of the Proposed Project. Table 3.4.9-3 defines the terms used to describe magnitude and duration of effects to wildlife species and these are applied to the western toad analysis.

Effects to western toad were evaluated by conducting a desktop study of their known occurrence records (as inventoried by the MTNHP), using GIS and National Wetland Inventory (NWI) data to determine where suitable aquatic habitat to support these species may be within the analysis area, and verifying aquatic habitat in the field during surveys. Projected and potential Proposed Project effects were then analyzed for their potentials to affect suitable western toad habitat and areas of known occurrence to determine the degree of effects that could be expected on these species.

Spatial Boundary

The spatial boundary for analysis of direct and indirect effects includes the entire area likely to experience ground disturbance from the Proposed Action and Action Alternatives. This would include upland areas affected by the proposed 50-foot transmission line ROW for the 16 mile length of the project and existing access roads which may require improvement, as well as wetland breeding areas that could potentially be disturbed by construction, operation, and maintenance of the Proposed Project. The spatial boundary for cumulative effects would include all potential surface water breeding habitat buffered by 2.5 miles to account for non-breeding upland movements by toads.

Temporal Boundary

Once constructed, the Proposed Project would be a passive feature. The temporal boundary for direct and indirect effects covers the period of active construction. Occasional ROW use would occur for line inspections, weed control and maintenance, but these would have a diminishingly small potential to affect toads. The temporal boundary for cumulative effects would be the life of the SUP.

Effects Analysis

Direct and Indirect Effects of Alternative 1 (No Action)

Under Alternative 1, the existing 69 kV transmission line would continue to function in its current state. The existing 69 kV transmission line within the analysis area would remain on existing structures along with the existing three-phase, 12.5 kV underbuild. ROW vegetation operations and maintenance would continue under their current regime. This would include maintaining the existing 40-foot ROW width, hazard tree removal, and pole replacement to minimize failure. Line inspection patrols and other periodic maintenance activities would continue.

Effects to western toad under the no Action Alternative would be limited to ROW management and operations and maintenance efforts. Effects may include on-going vegetation control efforts under ROW management activities. Vegetation control efforts would not impact aquatic habitat required for breeding, or foraging, dispersal, or aestivation habitat with the existing ROW. Nevertheless, some reduction in shrub and forb cover within the ROW may occur depending upon maintenance requirements. Impacts to western toad would be unchanged from existing conditions.

Direct and Indirect Effects of Proposed Action-Alternative 2

Effects to breeding toads and their habitats would have the greatest potential to cause significant direct and indirect impacts. Aquatic and adjacent upland vegetation habitat is present throughout the analysis area along the Gallatin River and the various named and unnamed perennial and intermittent creeks that serve as tributaries to the river. Although this alternative includes eight crossings of the Gallatin River, the river does not present suitable habitat for the western toad, there are numerous smaller creeks that do contain habitat that may be suitable for this amphibian. These creeks may have reaches of sufficiently slow-moving or standing water that could support western toad breeding, as well as the hatching of egg masses and egg strands, and the development of tadpoles prior to metamorphosis. While structures will not be sited within creeks, creeks may still be crossed where existing roads are present. No new roads would be built across creeks where existing roads are not already present. Vehicles and equipment crossing through creeks are likely to result in some sedimentation within the creeks. There are also wetland and adjacent upland habitat areas that would be encroached upon by construction activities, which may provide suitable foraging and aestivation habitat for western toad. While the ROW of the Proposed Action-Alternative 2 crosses 2.7 acres of wetlands, the impacts would be minor due to the ability to span wetlands, direct embed transmission structures in or near wetlands, and use of wetland matting as needed to access transmission structure locations. The impacts would be minor and readily mitigated per the actions described, as well as with PDFs specified in Chapter 2.

There would be minimal impact to wetland habitat from access roads and overland travel to structures. A palustrine emergent identified wetland near Goose Creek; between Transmission Structures 30-08 and 30-09 would be crossed by overland travel. Overland travel to Structure 30-48 would require crossing of a palustrine emergent wetland habitat as well. Use of wetland matting to cross palustrine emergent wetlands would reduce the impact to negligible levels. Additionally, overland travel would be required to access Structure 30-50 which crosses a palustrine forested identified wetland. The overland travel would stay outside the wetland to the degree possible.

The staging area east of Portal Creek would have no anticipated impact on wetlands and adjacent upland habitat. The following factors would result in negligible impacts: the staging area would be accessed via an existing assess road; the distance of the staging area from Portal Creek is approximately 190 feet at the closest point; and the staging area is located on a terrace east of Portal Creek.

Under the Proposed Action approximately 42.5 acres of upland areas (both forested and non-forested habitats) would experience temporary or permanent ground disturbing activities with the potential to affect non-breeding toads. These acres would be distributed along the 16-mile linear ROW within the GNF. Some individual aestivating or transient toads may be affected by this ground disturbance. However, potential western toad habitat (within 2.5 miles of the Gallatin River and nearby water bodies) in the 16-mile long Proposed Project Area is in excess of 50,000 acres. Effects to individual toads would be negligible.

Species records searches within Gallatin County for the western toad indicated that the closest recorded observation of the western toad is within 700 feet from the Proposed Action-Alternative 2 (USFS 2009). Proposed Action-Alternative 2 related effects to western toad from this alternative are possible, but minor.

Direct and Indirect Effects of Alternative 3 (Cave Creek and Cascade East LROs)

This alternative includes six crossings of the Gallatin River, although the swiftly flowing river channel does not present suitable habitat for the western toad, there are numerous smaller creeks

and protected pools that do contain habitat that may be suitable for this amphibian. These creeks may have reaches of sufficiently slow-moving or standing water that could support western toad breeding, as well as the hatching of egg masses and egg strands, and the development of tadpoles prior to metamorphosis. While structures will not be sited within creeks, creeks may still be crossed where existing roads are present. No new roads would be built across creeks where existing roads are not already present for this alternative. Vehicles and equipment crossing through creeks are likely to result in some sedimentation within the creeks. There are also wetland areas and adjacent upland habitat that would be encroached upon by construction activities, which may provide suitable foraging and aestivation habitat for western toad.

While the ROW of Alternative 3 crosses 2.1 acres of wetland habitat, the impacts would be minor due to the ability to span wetlands, direct embed transmission structures in or near wetlands, and use of wetland matting as needed to access transmission structure locations. The impacts would be very small and readily mitigated per the actions described, as well as PDFs specified in Chapter 2.

The impact to wetland habitat and adjacent upland habitat from access roads and overland travel would be the same as described under direct and indirect effects of the Proposed Action-Alternative 2.

The staging area east of Portal Creek would have no anticipated impact on wetland and adjacent upland habitat as described under direct and indirect effects of the Proposed Action-Alternative 2.

Because of new ROW requirements under alternative 3, approximately 1.8 additional acres of permanent disturbance would occur in the potential upland toad habitat.

Species records searches within Gallatin County for the western toad indicated that the closest recorded observation of the western toad is within 700 feet from the Proposed Project (USFS 2009). Proposed Project related effects to western toad from this alternative are possible, but minor.

Direct and Indirect Effects of Alternative 4 (Cave Creek and Cascade West LROs)

This alternative includes six crossings of the Gallatin River, although the river does not present suitable habitat for the western toad, there are numerous smaller creeks that do contain habitat that may be suitable for this amphibian. These creeks may have reaches of sufficiently slow-moving or standing water that could support western toad breeding, as well as the hatching of egg masses and egg strands, and the development of tadpoles prior to metamorphosis. While structures will not be sited within creeks, creeks may still be crossed where existing roads are present. No new roads would be built across creeks where existing roads are not already present for this alternative. Vehicles and equipment crossing through creeks are likely to result in some sedimentation within the creeks. There are also wetland areas and adjacent upland habitat that would be encroached upon by construction activities, which may provide suitable foraging and aestivation habitat for western toad.

While the ROW of Alternative 4 crosses 2.8 acres of wetland habitat, the impacts would be minor due to the ability to span wetlands, direct embed transmission structures in or near wetlands, and the use of wetland matting as needed to access transmission structure locations. The impacts would be very small and readily mitigated per the actions described, as well as with PDFs specified in Chapter 2.

The impact to wetland and adjacent upland habitat from access roads and overland travel would be the same as described under direct and indirect effects of the Proposed Action-Alternative 2.

The staging area east of Portal Creek would have no anticipated impact on wetland and adjacent upland habitat as described under direct and indirect effects of the Proposed Action -Alternative 2. Direct and indirect effects to upland habitats would be similar to alternative 3.

Species records searches within Gallatin County for the western toad indicated that the closest recorded observation of the western toad is within 700 feet from the Proposed Project (USFS 2009). Proposed Project related effects to western toad from this alternative are possible, but minor.

Cumulative Effects of Alternative 1 (No Action)

Projects analyzed for cumulative effects to western toad included those captured by a 2.5-mile buffer around potential breeding habitats (surface water bodies) in the Proposed Project Area. This area would capture the range of habitats used by western toads for all life history stages. US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. Cumulative effects to western toad resulting from Alternative 1 and other planned projects in the Proposed Project Area could result in increased human presence and the removal of vegetation for other future projects. The proposed widening and improvements on US Hwy 191 increase dispersal hazards for western toad in the Gallatin River Canyon. Other projects, including GNF fuel reduction efforts, timber sales, and systematic upgrades to private homes could all result in the disturbance of western toad and the loss of potential habitat. However, Alternative 1 would not significantly increase the amount of habitat loss or disturbance. Weed maintenance would remove noxious weeds within the spray area could affect western toad if used adjacent to water. Cumulative effects to populations of western toad from Alternative 1 and other proposed projects would be less than significant when currently existing disturbance and fragmentation, such as high traffic volume on US Hwy 191, recreational activities and infrastructure, private residences, and the existing transmission line, are considered.

Cumulative Effects of the Action Alternatives

Current conditions described in the Affected Environment section above reflect past projects in the study area. Projects analyzed for cumulative effects to western toad included US Hwy 191 Gallatin Canyon Safety Improvements, Montana Opticom fiber optic cable, GNF recreation home project requests, Jack Creek timber sale, noxious weed spraying, and a fishing platform at the Moose Creek Flat Campground. These projects could further reduce potential western toad breeding, aestivating, and foraging habitat in addition to ROW lost as part of the Proposed Project. However, existing fragmentation and disturbances listed above would not likely reduce the overall habitat suitability within the Proposed Project Area. Habitat fragmentation from other projects would not likely increase to substantially higher level than currently exist, given that most cumulative projects will occur within the currently fragmented Gallatin River Canyon. Cumulative effects to western toad from the Proposed Project and other proposed projects would be less than significant.

Comparison of Alternatives

The Proposed Action-Alternative 2 ROW would cross 2.7 acres of wetland habitat compared to 1.9 acres for the No Action alternative. The Alternative 1-No Action ROW is 40 feet in width versus 50 feet in width for Alternatives 2, 3, and 4, which is the primary reason Alternative 1-No Action has fewer wetland habitat acres than the Proposed Action-Alternative 2, despite identical routes.

The Alternative 3 ROW would cross 2.1 acres of wetland habitat compared to 2.7 acres for the Proposed Action-Alternative 2, and 1.9 acres for Alternative 1.

The Alternative 4 ROW would cross 2.8 acres of wetland habitat compared to 2.7 acres for the Proposed Action-Alternative 2, and 1.9 acres for Alternative 1.

The ROW for all alternatives, except Alternative 1-No Action (0.2 acre), crosses the same amount of wetland habitat (0.3 acre).

The impact to wetland and adjacent upland habitat from access roads and overland travel would be the same for all alternatives. There would be no impact to wetlands for any of the alternatives from staging areas, fly yards, or deck areas.

Alternative 1 would result in no additional affects to western toad apart from current, ongoing, and other future projects and activities. Alternatives 2, 3, and 4 will result in the potential minor affect of western toad.

Effects Determination

There are several current, ongoing, and future proposed projects in the vicinity of the Proposed Project Area. The current condition described in the Affected Environment section above reflects past projects in the analysis area. Most of the current or future projects are not expected to result in adverse impacts to western toad. GNF maintenance projects may have some effects on western toad, but likely to a lesser degree than the Proposed Project and its alternatives would affect them. Planned forest maintenance activities that would potentially impact western toad include fuel reductions and noxious weed treatments. Fuel reductions near riparian areas may affect western toad in upland habitat, and noxious weed spraying may result in drift to water bodies, potentially affecting western toad that are in the area or in the water depending on the type of herbicide and the compounds within it. It is expected, however, that the GNF uses amphibian-safe herbicides. These actions may result in effects to individuals, but are unlikely to cause effects to entire populations or result in a cumulative effect that would cause a more elevated protection status of the western toad. No other current or future known projects are expected to have effects on western toad.

While some impacts to individual western toads may occur, they would be negligible and would not likely contribute to a trend toward federal listing or cause loss of viability of populations. Based on this, the effects determination of No Impact was assigned to all four alternatives in Table 3.4.9-7.

Summary Conclusion

While some effects to riparian habitat and western toad are possible as a result of the Proposed Project's implementation, based on the Proposed Project design, the likelihood of causing adverse effects to either riparian habitat or western toad is relatively low degree of effect would be low. Proposed Project structures and construction activity will generally avoid riparian habitat and will use BMPs and other suitable measures to reduce impacts to areas that are encroached upon, such as wetlands. Based on known data, western toad is known to be present within the Proposed Project Area and may potentially be directly affected. Proposed Project effects to western toad are determined to be minor.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

No specific mitigation for sensitive species is identified at this time. Various PDFs are proposed to reduce or avoid effects to biological resources, including sensitive species. These include 1.1, 1.2, 1.5, 1.7, 1.9, and 5.1, 5.2, 5.3, 5.5, and 5.7 , which are described in Chapter 2. Implementation of BMPs and general PDFs applicable to biological resources would minimize impacts to species and maintain habitat quality specified above for species.

Consistency with Laws, Regulations, and Forest Plan

The western toad is considered a Region 1 Forest Service sensitive species. Under the Forest Plan (USFS 1987, page II-18), "Habitat that is essential for species identified in the Sensitive Species list developed for the Northern Region (R1) will be managed to maintain these species." All of the alternatives, to include the No Action (Alternative 1) and the action alternatives (Alternatives 2-4) would have minimal impacts to western toad and their habitat. Therefore all the alternatives would be consistent with Forest Plan direction.

Effects Determination

The effects determination for Sensitive species is based on known occurrence, likelihood of occurrence, location, available habitat, and impact type and duration. Table 3.4.9-7 presents a summary of the effects determinations for Sensitive species, by Alternative, that are known or suspected to occur on the GNF.

TABLE 3.4.9-7 EFFECTS DETERMINATIONS FOR FOREST SERVICE REGION 1 SENSITIVE WILDLIFE SPECIES KNOWN OR SUSPECTED TO OCCUR ON THE GNF

SPECIES NAME	EFFECTS DETERMINATION[1]			
	ALT. 1	ALT. 2	ALT. 3	ALT. 4
Bald eagle *Haliaeetus leucocephalus*	NI	MIIH	MIIH	MIIH
Gray wolf *Canis lupus*	NI	MIIH	MIIH	MIIH
Wolverine *Gulo gulo luscus*	NI	MIIH	MIIH	MIIH
Bighorn sheep *Ovis canadensis*	NI	MIIH	MIIH	MIIH
Townsend's big-eared bat *Corynorhinus townsendii*	NI	NI	NI	NI
Westslope cutthroat trout *Onchorhynchus clarki lewisi*	NI	NI	NI	NI
Western pearlshell mussel *Margartifera falcata*	NI	NI	NI	NI
Peregrine falcon *Falco peregrinus*	NI	MIIH	MIIH	MIIH
Trumpeter swan *Cygnus buccinator*	NI	NI	NI	NI
Harlequin duck *Histrionicus histrionicus*	NI	NI	NI	NI
Flammulated owl *Otus flammeolus*	NI	NI	NI	NI
Black-backed woodpecker *Picoides arcticus*	NI	NI	NI	NI
Western toad *Bufo boreas*	NI	MIIH	MIIH	MIIH

NI = no impact
MIIH = may impact individuals or habitat but not likely to cause a trend toward federal listing

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3.4.10 Human Health and Safety and Other Considerations

Electric and Magnetic Fields

Description of Issue

Concerns were raised during scoping that upgrades and line improvements associated with the Proposed Project would increase the voltage of the transmission line from 69 kilovolt (kV) to 161 kV and become more of a human health risk. The transmission and distribution line currents would increase due to the future load growth. This would result in increased electric and magnetic field (EMF) values in the right-of-way (ROW). There is general public interest about whether EMF exposures from transmission lines may affect public health.

Indicators

The indicator for the assessment of EMFs is whether the Montana Major Facility Siting Act (MFSA) requirement for an electric field at the edge of the ROW would exceed one kilovolt per meter (kV/m) measured one meter above the ground in residential or subdivided areas unless the affected landowner waives this condition. The 1 kV/m is used by the State of Montana under the State of Montana MFSA Environmental Quality (Chapter 20, Subchapter 16). Another indicator for the assessment of EMF is whether the electric field at road crossings under the facility would exceed 1 kV/m measured at one meter above the ground (Administrative Rules of Montana [ARM] 17.20.1607 *Linear Facilities, Minimum Impact Standard)*.

Scale of Analysis

The spatial boundary for direct and indirect effects of EMF is from the edge of the ROW along Gallatin National Forest (GNF) section of the Jack Rabbit to Big Sky Meadow Village transmission line corridor which is approximately 16 miles The spatial boundary for cumulative effects includes the entire 37-mile project from the Jack Rabbit Substation to Big Sky Meadow Village Substation. The temporal boundary for this project is the period during construction and the life of the operating transmission line.

Affected Environment

The affected environment for human health and safety is the GNF section of the Jack Rabbit to Big Sky Meadow Village transmission line corridor which is approximately 16 miles. This includes the ROW and surrounding area based on the furthest extent of the EMF during the highest load usage.

EMFs are present wherever electricity flows: around appliances and power lines such as the existing Jack Rabbit to Big Sky 69 kV transmission line, in offices, schools, and homes. Electric fields are invisible lines of force, created by voltage, and are shielded by most materials. Units of measure are kV/m. Magnetic fields are invisible lines of force, created by electric current and are not shielded by most materials, such as lead, soil and concrete. Units of measure are Gauss (G) or milliGauss (mG). EMF strengths diminish with distance. These fields are low energy, extremely low frequency fields, and should not be confused with high energy or ionizing radiation such as X-rays and gamma rays.

The National Institute of Environmental Health Sciences (NIEHS) (NIEHS 2002) summarizes their findings for human health risks as:

> For most health outcomes, there is no evidence that EMF exposures have adverse effects. There is some evidence from epidemiology studies that exposure to power-frequency EMF

(this refers to a low frequency source of electric and magnetic fields created by power system facilities such as power lines and substations) is associated with an increased risk for childhood leukemia. This association is difficult to interpret in the absence of reproducible laboratory evidence or a scientific explanation that links magnetic fields with childhood leukemia (NIEHS 2002).

Electric fields and magnetic fields are included in the analysis for human health and safety and they are described as follows and further below.

> There are two broad types of electric and magnetic (EMF) analysis and regulations that apply to transmission lines: 1) engineering or safety-based, and 2) health effects. Engineering-based electric field levels are intended to limit electric discharges that could cause a nuisance shock. There is also a safety code to limit more harmful electrical shocks from electric fields (National Electrical Safety Code [NESC]). There are no limits that have been set by a governing body based on known or established health effects. Because there is limited scientific evidence (which cannot be reasonably interpreted as noted by NIEHS in the previous paragraph) establishing health effects resulting from EMF exposure, there are no federal health-based standards for limiting exposure to those fields.

Electric Fields

Electric field considerations in the immediate vicinity of electric power lines include the potential for electric shock, the clearance of the power lines above ground, measures to prevent unauthorized climbing of the transmission structures, and the proximity of the transmission lines to other utilities such as oil wells and pipelines.

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, transmission structures, vegetation, buildings, vehicles, and persons. Potential field effects can include induced currents, steady-state current shocks, spark discharge shocks and, in some cases, field perception and neurobehavioral responses.

Features reducing the level of potential for induced current in objects near the transmission line also reduce the level of a possible induced current shock.

Magnetic Fields

Current and voltage are required to transmit electrical energy over a transmission line. A 60-Hertz (Hz; cycles per second) magnetic field is created in the space around transmission line conductors by the electric current flowing in the conductors. This is the frequency of ordinary household current, usually referred to as 60 cycles. The strength of the magnetic field produced by an electric transmission line depends on the amount of current flowing through the conductor (the higher the electrical load, the higher the current), the configuration of the conductors (spacing and orientation), the height of the conductors, the distance from the line, and the proximity of other electrical lines. As the electric load (and the resulting current) on the transmission line varies continually on a daily and seasonal basis, the magnetic fields likewise vary throughout the day and year. Magnetic fields are highest closer to the line and diminish with distance. Physical structures, such as buildings, are transparent to magnetic fields in that they do not provide any shielding.

Applicable Laws, Regulations, Forest Plan Direction

Currently there are no forest plan standards federal or state regulations or industry guidelines pertaining to appropriate levels of magnetic field present around transmission lines. The Montana MFSA requirement for the indicator for the assessment of electric and magnetic fields is the

Montana MFSA requirement for electric transmission facilities which is an electric field at the edge of the ROW not to exceed 1.0 kV/m measured one meter above the ground in residential or subdivided areas unless the affected landowner waives this condition.

The electric field at road crossings under the facility would not exceed 7 kV/m measured at one meter above the ground (ARM 17.20.1607 *Linear Facilities, Minimum Impact Standard*). For road crossings, the MFSA electric field compliance level of 7 kV/m would be mitigated by design clearance requirements of the NESC that would provide certain minimum conductor height to ground limits. There are no magnetic field guidelines required by the State of Montana.

Methodology for Analysis

EMF from the transmission lines of the Proposed Action and alternatives were calculated at the edge of the ROW. The ROW width would be primarily 50 feet which is for single transmission structure transmission line structures. H-frame transmission line structures, if used, would have a ROW width of 80 feet. The more conservative ROW width of 50 feet is used for the EMF calculations. EMF levels were calculated at a height of one meter above ground with the bottom phase conductors of the transmission and distribution lines are modeled at minimum heights above ground (according to the NESC clearance requirements).

The conductor types for the existing and proposed transmission and distribution lines are shown in Table 3.4.10-1.

TABLE 3.4.10-1 CONDUCTOR TYPES

TRANSMISSION/DISTRIBUTION LINES	CONDUCTOR TYPE
Existing 69 kV Transmission Line	#3/0 AWG 6/1 Strand ACSR (Pigeon)
Proposed 161 kV Transmission Line	556.5 MCM ACSR (Dove)
Existing 12.5 kV Distribution Line	#4 ACSR (Swan) and #2 ACSR (Sparrow)
Proposed 12.5 kV Distribution Line	636 MCM AAC (Orchid)
Proposed Transmission Line Shield Wire	3/8" H.S. Steel, 7-Strand
Proposed Distribution Grounded Neutral	636 MCM AAC (Orchid)

In the *Jack Rabbit to Big Sky Meadow Village Transmission Line – EMF Investigation* report submitted by POWER Engineers, Inc. (POWER) to NorthWestern Energy (NorthWestern) (December 23, 2008), there were seven transmission line structure types investigated (with two of the structures (numbers 5 and 6) having alternative configurations) for the existing 69 kV transmission line and the proposed 161 kV transmission line. The structures and descriptions are shown in Table 3.4.10-2.

TABLE 3.4.10-2 TRANSMISSION STRUCTURE TYPES

STRUCTURE NUMBER	STRUCTURE DESCRIPTION
1	Existing 3/0 ACSR 69 kV, Type A, Magenta Rd. (40 foot transmission structure with static mast and single-phase, 2-wire distribution, #4 ACSR phase, #4 ACSR neutral)
2	Existing 3/0 ACSR 69 kV, Type A, Foothills Rd. (40 foot transmission structure with static mast, no distribution, 3/0 ACSR shield wire)
3	Existing 3/0 ACSR 69 kV, Type SAHPC, to Spanish Ck. (55 foot transmission structure with three-phase, 4-wire distribution, #2 ACSR phases and 3/0 ACSR neutral)
4	Existing 3/0 ACSR 69 kV, Type SAHPC, south of Spanish Ck. (55 foot transmission structure with two-phase, 3-wire distribution, #2 ACSR phases and 3/0 ACSR neutral)
5	Proposed 161 kV to Gallatin Gateway, Type SAHPC with 12.5 kV underbuild, (70 foot transmission structure, 636 MCM AAC, 3/8" shield wire)
5 (Alternative)	Proposed 161 kV to Gallatin Gateway, Type SVHPC with12.5 kV underbuild, (75 foot transmission structure, 636 MCM AAC, 3/8" shield wire)

STRUCTURE NUMBER	STRUCTURE DESCRIPTION
6	Proposed 161 kV, Type SAHPC without underbuild (70 foot transmission structure, 3/8" shield wire)
6 (Alternative)	Proposed 161 kV, Type SVHPC without underbuild (75 foot transmission structure, 3/8" shield wire)
7	Proposed 161 kV within Gallatin Canyon, Type SAHPC with 12.5 kV underbuild 3/0 ACSR (70 foot transmission structure 3/8" shield wire)

Six electrical load cases were analyzed as shown in Table 3.4.10-3. Each load case indicates the transmission and distribution line loads for each structure configuration excluding Structure 2 which was not included the electrical load studies.

TABLE 3.4.10-3 TRANSMISSION/DISTRIBUTION LINE CURRENTS

LOAD CASE	TRANSMISSION	DISTRIBUTION
Case 1: Existing 69 kV Average Annual Current	69 kV: 50 Amps	12.5 kV: 10 Amps, Along Magenta Road, Structure No. 1 12.5 kV: 30 Amps, to Spanish Creek, Structure No. 3 12.5 kV: 30 Amps, South of Spanish Creek, Structure No. 4
Case 2: Existing 69 kV Winter Peak Currents	69 kV: 102 Amps	12.5 kV: 20 Amps, Along Magenta Road, Structure No. 1 12.5 kV: 60 Amps, to Spanish Creek, Structure No. 3 12.5 kV: 60 Amps, South of Spanish Creek, Structure No. 4
Case 3: 161 kV Initial Energization Average Annual Current	161 kV: 42 Amps	12.5 kV: 100 Amps, To Gallatin Gateway Area (about 2013, when second feeder south is installed) 12.5 kV: 25 Amps, Structure No. 7 within the Gallatin Canyon to Big Sky (this current would initially drop, due to the addition of the third phase c)
Case 4: 161 kV Initial Energization Winter Peak Current	161 kV: 81 Amps	12.5 kV: 150 Amps, Structure. No. 5, 5 (Alt) to Gallatin Canyon entrance only (about 2013, when second feeder south is installed) 12.5 kV: 40 Amps, Structure No. 7 within the Gallatin Canyon to Big Sky (this current would initially drop, due to the addition of the third phase c)
Case 5: 161 kV Future (15 Years) Energization Average Annual Current	161 kV: 72 Amps	12.5 kV: 150 Amps, Structure. No. 5, 5 (Alt) to Gallatin Gateway area only 12.5 kV: 40 Amps, Structure No. 7 within the Gallatin Canyon to Big Sky
Case 6: 161 kV Future (15 Years) Winter Peak Current	161 kV: 154 Amps	12.5 kV: 200 Amps, Structure. No. 5, 5 (Alt) to Gallatin Gateway area only 12.5 kV: 60 Amps, Structure No. 7 within the Gallatin Canyon to Big Sky

Effects Analysis

Table 3.4.10-4 represents a summary of the calculated electric and magnetic field results for the alternatives.

TABLE 3.4.10-4 EMF SUMMARY RESULTS

	MFSA REQUIREMENT	ALTERNATIVE 1 EXISTING 69 kV LINE	ALTERNATIVE 2 161 kV WITH DISTRIBUTION LINE UNDERBUILT	ALTERNATIVE 3 161 kV NO DISTRIBUTION UNDERBUILD	ALTERNATIVE 4 161 kV NO DISTRIBUTION UNDERBUILD
Electric Field	1 kV/m	0.25 kV/m	0.33 kV/m	0.48 kV/m	0.48 kV/m
Magnetic Field	No guidelines	11 mG	32 mG	5 mG	5 mG

Alternative 1

The maximum calculated EMF at the edge of the ROW for the existing 69 kV line is 0.25 kV/m and 11 mG respectively.

The electric field at the edge of the ROW is less than the Montana MFSA requirement of 1 kV/m. There are no magnetic field guidelines.

Alternative 2

The existing 69 kV transmission line would be re-energized at 161 kV and the transmission line structures would be replaced. The 161 kV transmission line would be located within 10 to 15 feet of the existing transmission line route. The distribution line would remain underbuilt of the 161 kV transmission line.

The maximum calculated EMF at the edge of the ROW for the new 161 kV line is 0.33 kV/m and 32 mG respectively. The maximum calculated electric field occurs for Structure No. 7, which is located in Gallatin Canyon. The maximum calculated magnetic field occurs for Load Case No. 6, Structure 5 alternative which is the highest load current scenario (winter peak condition).

The maximum calculated electric fields at the edge of the ROW are less than the Montana MFSA requirement of 1 kV/m. The calculated electric fields at the road crossings are below 1 kV/m which is less than the Montana state standard of 7 kV/m. There are no known magnetic field effects with this alternative as the State of Montana does not have magnetic field guidelines.

Alternatives 3 and 4

Alternatives 3 and 4 would utilize the same alignment as the Proposed Action with the exception of the Cave Creek, Cascade East, and Cascade West Local Routing Options (LROs). The existing distribution to the residences in these recreational areas would remain in place along the existing corridor. Structure 6 and Structure 6 alternative were evaluated as there is no distribution underbuild for these structures.

The proposed lines would be constructed in accordance with industry and NorthWestern standards to minimize hazardous shocks from direct or indirect human contact with an overhead, energized line. The proposed line is expected to pose minimal hazards to humans. The reason for this is because the power frequency electric field magnitude, which exists in transmission lines, is below the Montana state standard of 1 kV/m, which is considered not to produce any induced current shocks to humans.

The maximum calculated EMF at the edge of the ROW for the new 161 kV line is 0.48 kV/m and 5.0 mG respectively. The maximum calculated magnetic field occurs for Load Case No. 6, which is the highest load current scenario (winter peak condition).

The maximum calculated electric fields at the edge of the ROW are less than the Montana MFSA requirement of 1.0 kV/m. The calculated electric fields at the road crossings are below 1 kV/m which is less than the Montana state standard of 7 kV/m. There are no known magnetic field effects with these alternatives as the State of Montana does not have magnetic field guidelines.

Cumulative Effects for All Alternatives

The cumulative effects of the JRBS and other projects will not be further impacted by electric and magnetic fields since the other projects do not contribute to additional EMF levels from what was calculated for the JRBS.

Comparison of Alternatives

There is no other EMF from local sources that would result in additive effects from the Proposed Project and alternative route options with any of the alternatives.

Summary Conclusion

The impact analysis for recreation residences and trails sites within the project area is based on EMF calculations.

Based on the analysis presented above, there would be minimal differences in electric field levels among Alternatives 1, 2, 3, and 4 in terms of impacts on recreation residences and trails. All alternatives result in EMFs that are less than the Montana MFSA requirement of 1.0 kV/m.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

There are no mitigation or monitoring requirements as the calculated EMF values are less than the State of Montana limit.

Consistency with Laws, Regulations and Forest Plan

All alternatives would be consistent with the state MFSA electric field guideline. There are no federal or Gallatin National Forest Management Plan of 1987 (Forest Plan) directives for EMF requirements.

Noise

Description of Issue

The primary issue is noise from construction activities associated with the Proposed Project. Construction activities associated with the Proposed Project would create truck and helicopter noise. Increasing the voltage of the line has the potential to increase low levels of broad band noise (crackle and hiss) associated with line corona. Noise associated with the transmission line was raised by the public as a concern.

Indicators

The Montana MFSA noise level guideline for electrical transmission facilities is 50 A-weighted decibels (dB(A)) average day/night noise level (L_{DN}) at edge of ROW in residential and subdivided areas unless the affected landowner waives the condition.

Scale of Analysis

The spatial boundary for audible noise is the GNF section of the Jack Rabbit to Big Sky Meadow Village transmission line corridor which is approximately 16 miles (the scale of this analysis would include the extent of the area where associated noise would be heard). The temporal boundary for this project is the period during construction and the life of the operating transmission line.

Affected Environment

Noise is generally defined as unwanted sound. Noise can impact the human environment by interfering with speech, interfering with sleep, causing hearing loss, and causing physical or mental stress. Since a person's response to noise is subjective, it can vary from person to person. Noise levels are quantified using units of decibels (dB). Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies, and the A-weighting of noise levels closely correlates to the frequency response of normal human hearing. By utilizing A-weighted noise levels in a study, a person's response to noise can be assessed. Therefore, audible noise levels are expressed as dB(A). Decibels are logarithmic values, and cannot be combined using normal algebraic addition.

For environmental noise studies, ambient noise levels are typically described using A-weighted equivalent noise levels during a certain time period (this noise level is denoted as L_{eq}). The equivalent noise level is defined as the single steady state noise level that has the same acoustical energy as the actual, time-varying noise signal during the same time period. A common time period for measuring noise is on an hourly basis. The equivalent noise level during a one-hour period is represented as $L_{eq}(h)$.

Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The L_{DN} is an equivalent noise level which includes a 10 dB(A) penalty that is added to noises which occur during the nighttime hours between 10 p.m. and 7 a.m. to account for people's higher sensitivity to noise at night when the background noise level is typically low. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Table 3.4.10-5 provides the ranges of common sounds that people could experience within the study corridor.

TABLE 3.4.10-5 TYPICAL RANGES OF COMMON SOUNDS

Sources of Noise	Noise Level Ranges (dB(A))
Threshold of Pain	130 - 140
Pneumatic Chipper	120 - 130
Motorcycle	80 - 110
Emergency Diesel Power Generator	55 - 75
Power lawnmower	80 - 95
Pleasure Motorboat	75 - 115
Automobile (At 50 Feet)	60 - 90
Conversational Speech	60 - 70
Refrigerator	45 - 70
Living Room (Suburban Area)	40 - 50
Bedroom at Night	20 - 30
Threshold of Hearing	0 - 10

Source: EPA 1974.

Power lines can generate a small amount of sound energy. The audible noise from line sources is composed of two components:

1. A broadband (random) component characterized as having high frequency content (different from more common environmental noises).

2. Pure tone (hum) components, most noticeably second and fourth harmonics of the power frequency are superimposed on the broadband noise.

Audible noise decreases with distance from a power line. Each power line phase conductor may be considered as a separate line source. Beyond a distance of approximately 50 feet from the outer power line phase conductor, this phase conductor would dominate and completely obscure the contributions of the other phase conductors. Overall, the typical attenuation of noise from the transmission and distribution lines is approximately three decibels per doubling of the distance from the line. For example, for a typical maximum noise level from a 161 kV transmission line is approximately 30 dB(A) at the location of the edge of ROW which is about 25 feet from the center of the transmission line. At a distance of 50 feet from the center of the transmission line (doubling of the distance), the noise level decreases by 3 dB(A) according to this typical amount of attenuation. This results in a noise level of 27 dB(A) which would be in the range of a bedroom at night according to Table 3.4.10-5.

Sensitive Receptors

Private Residences

There are approximately 191 private residences within 600 feet of the centerline (this distance is selected based on the assessment due to construction activities close to the power lines) of the corridor for all Alternatives.

Recreation Residences

The following are recreation residences for each of the alternatives within 600 feet of the centerline of the corridor:

Alternative 1 (No Action): 69
Alternative 2 (Proposed Action): 67
Alternative 3 (Cave Creek and Cascade East LROs): 53
Alternative 4 (Cave Creek and Cascade West LROs): 62

Recreation Trails

There are various trails along the corridor particularly in the area of the Cave Creek and Cascade route alternatives (the trails do not allow motorized vehicles so that noise from recreational vehicles is not an issue).

Noise Sources

Transportation

United States Highway 191 (US Hwy 191) and Montana State Highway 64 (MT Hwy 64) run parallel to the alternative routes.

Applicable Laws, Regulations, Forest Plan Direction

Federal Government

There are no federal noise standards that directly regulate noise from operation of electrical transmission lines and substation facilities. Noise levels above 45 dB(A) at night can result in the onset of sleep interference effects (EPA 1971). With regard to noise exposure and workers, the Occupational Safety and Health Administration (OSHA) regulations safeguard the hearing of workers exposed to occupational noise. Refer to 29 Code of Federal Regulation (CFR) 1910.95 for a list of permissible noise exposures.

Forest Service

The United Stated Forest Service (Forest Service) does not provide guidance for regulation of noise. The Forest Plan does not have a quantitative standard for noise levels.

State of Montana

The Montana MFSA noise level guideline for electrical transmission facilities is 50 dB(A) L_{DN} at edge of ROW in residential and subdivided areas unless the affected landowner waives the condition. The Montana MSFA also requires an L_{DN} level of 55 dB(A) at the edge of the property boundaries of substations in residential and subdivided areas is not to be exceeded (ARM 17.20.1607 "Linear Facilities, Minimum Impact Standard").

Montana encourages each local government entity to perform noise studies and implement a noise element as part of their general plan. There are no specific noise ordinances for Gallatin and Broadwater Counties.

Department of Energy

The Department of Energy (DOE) and the Bonneville Power Administration (BPA) conducted research to determine the likelihood of receiving complaints related to transmission line audible noise. These noise values can be related to the level during rain (foul weather, typically rain and snow, represents a worse case condition which is typically has 25 dB(A) higher than a fair weather condition), that would be exceeded 50 percent of the time over one year (L_{50}). The foul weather L_{50} values were calculated at 100 feet from the centerline. The following probabilities of receiving complaints are based on their expected audible noise level:

High, Numerous Complaints: over 60 dB(A)
Moderate, Some Complaints: 52 to 60 dB(A)
Low, No Complaints: less than 52 dB(A)

Methodology for Analysis

Operation

Audible noise levels from the transmission and distribution lines were calculated at the edge of ROW. The ROW width would be primarily 50 feet which is for single pole transmission line structures. H-frame transmission line structure would have a ROW width of 80 feet. The more conservative ROW width of 50 feet is used for the noise calculations. Audible noise levels were calculated with phase conductors located at minimum conductor heights above ground (according to the NESC clearance requirements) which is the same as for the EMF calculations. This is a conservative assumption. The conductor types used in the calculations are shown in Table 3.4.10-1 of Section 3.4.10 – Human Health and Safety; Electric and Magnetic Fields. The structure types used in the calculations are shown in Table 3.4.10-2 of Section 3.4.10 – Human Health and Safety; Electric and Magnetic Fields.

The audible noise levels are typically described is in statistical terms. The L_{50} sound level is the noise level exceeded 50 percent of the time. It is also common to evaluate sound levels over time. The time variant noise levels take into account all types of noise sources including what is produced from foul weather. L_{eq} is the equivalent, average sound level of a varying sound over a period of time, typically a period of 24 hours. L_{50} levels were calculated at a height of five feet above ground for a foul weather condition. A point of consideration is that audible noise levels would be higher in foul weather conditions due to an increase of moisture present on the line (the moisture produces water drops that increase the corona discharges around the conductors which results in higher noise levels), but ambient noise levels themselves would be increased due to audible noise generated from the foul weather itself (noise from the rain drops).

The National Oceanic and Atmospheric Administration (NOAA) (2008) reports that there is a rain rate of approximately 18 percent of the year in the Bozeman area. In order to determine the equivalent noise level for a day/night period of time (L_{DN}), an "all weather" probability

distribution was developed. This results of this assessment was that a decrease of 2 dB(A) would be applied to the calculated L_{50} levels to obtain the L_{DN} level.

Construction

Construction noise can be created from on-site and off-site sources. On-site noise sources would principally consist of the operation of heavy-duty diesel and gasoline-powered construction equipment. Off-site noise sources would include vehicles commuting to and from the job site, as well as from trucks transporting material to the staging areas or construction ROW. These sources (including helicopters) are described below.

On-site Noise Sources

Two types of noise are associated with on-site construction activities: intermittent and continuous. On-site construction noise would occur primarily from heavy-duty construction equipment (e.g., dozers, backhoes, cranes). Most construction activities would likely occur from early spring to late fall each year over a two to three year period. The following site and ground disturbing construction activities would be required to construct the new transmission line: 1) centerline surveyed and staked; 2) existing access roads improved only where necessary; 3) work areas cleared as needed; 4) materials distributed along centerline; 5) transmission structure holes and or foundations installed, and transmission structures framed and erected; 6) optical power ground wire (OPGW) ground wire, conductors installed; and 7) the site would be cleaned-up and reclaimed. Various phases of construction may occur at different locations throughout the construction process. This may require several crews operating at the same time at different locations.

Noise levels from the equipment at distances of 50 feet are shown in Table 3.4.10-6. The maximum intermittent land based construction noise levels would range from approximately 80 to 90 dB(A) at 50 feet for supporting structure assembly and tamping operations. Direct noise impacts would result from construction activities occurring adjacent to sensitive receptors, such as houses and recreation areas. However, this noise would be short-term, occurring mostly during daylight hours. It should be noted that noise levels are calculated based on the assumption that noise from a localized source is reduced by approximately 6 dB(A) with each doubling of distance from the source of noise.

Helicopter construction would definitely be considered because of the terrain through the GNF for Alternatives 2, 3, and 4. Helicopters would be used to support these construction activities: delivery of construction laborers, equipment, and materials to structure sites; structure placement; hardware installation; tree removal and wire stringing operations.

Helicopter noise is typically in the range of 90 to 100 dB(A) for takeoff or approach operations (at a distance of 50 feet) and 80 to 90 dB(A) when hovering in the air (e.g., the Bell 212 Helicopter at 150 feet has a noise level of 83 dB(A)) (FAA 2001).

Typically, ground-borne vibration generated by construction activity attenuates rapidly with distance from the source of the vibration. Therefore, vibration issues are generally confined to distances of less than 500 feet and, thus, it is anticipated that ground borne vibration would not affect potential receptors beyond the nearby work areas.

TABLE 3.4.10-6 CONSTRUCTION NOISE SOURCES

CONSTRUCTION ACTIVITY	AVERAGE CONSTRUCTION ACTIVITY SOUND LEVEL AT 50 FEET FROM SOURCE (DB(A))
Compactors (Rollers)	74
Front Loaders	78

CONSTRUCTION ACTIVITY	AVERAGE CONSTRUCTION ACTIVITY SOUND LEVEL AT 50 FEET FROM SOURCE (DB(A))
Backhoes	83
Tractors	86
Scrapers, Graders	87
Pavers	87
Trucks	88
Concrete Mixers	81
Concrete Pumps	82
Cranes (Moveable)	81
Cranes (Derrick)	87
Pumps	70
Generators	77
Compressors	81
Pneumatic Wrenches	86
Jack Hammers and Rock Drills	89
Pile Drivers (Peak)	100
Vibrators	75
Saws	77
Compactors (Rollers)	74
Front Loaders	78

Source: Bolt, Beranek & Newman (Prepared under contract for the EPA), Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, December 31, 1971. Sound level with all pertinent equipment operating.

In comparison to these construction noise levels, the following are some typical levels for noise sources (standing adjacent to these sources) in a residential environment (Noise Pollution Clearinghouse 2011):

Refrigerator 42 dB(A)
Microwave 57 dB(A)
Kitchen Exhaust Fan 70 dB(A)
Hairdryer 87 dB(A)
Clothes Washer 67 dB(A)
Lawnmower 91 dB(A)
Circular Saw 102 dB(A)

Off-site Noise Sources

Off-site noise during construction would occur primarily from commuting workers and from various truck trips to and from the construction sites. The procedures for bringing personnel, materials, and equipment to each structure site would vary along the route alignment. However, it is anticipated that most workers would be meeting at one of the staging areas and would travel to the construction site in commuter vans or buses. It is also assumed that truck trips would be required to haul structures, conductor line, and other materials to the construction sites. The peak noise levels (approximately 75 dB(A)) at 50 feet (USDOT 2006)) associated with passing trucks and commuting worker vehicles would be short-term in duration, and would generate similar noise levels for ongoing activities (e.g., transportation from highway noise).

Effects Analysis

Alternative 1

The maximum calculated operation audible noise at the edge of the ROW for the existing 69 kV line is 10 dB(A). This noise level is in the range of the threshold of hearing according to Table 3.4.10-5.

Alternative 1 does not involve any modifications to the existing 69 kV transmission line. There is no construction but maintenance of the line will occur. This would involve small trucks that would could produce peak noise levels of approximately 75 dB(A) for short-term durations (a few hours) and would generate similar noise levels for ongoing activities (e.g., transportation from highway noise).

The maximum calculated operational audible noise level at the edge of the ROW is less than the Montana MFSA L_{DN} requirement of 50 dB(A).

Alternatives 2, 3 and 4

For Alternative 2, the existing 69 kV transmission line would be re-energized at 161 kV and the transmission line structures would be replaced. The 161 kV transmission line would be located within 10 to 15 feet of the existing transmission line route. The distribution line would remain underbuilt of the 161 kV transmission line.

Alternatives 3 and 4 would utilize the same alignment as Alternative 2 (Proposed Action) with the exception of the Cave Creek and Cascade East or Cascade West LROs. The existing distribution to the residences in these recreational areas would remain in place along the existing corridor. The single transmission structures (horizontal post insulators) evaluated as there is no distribution underbuild for these structures. Alternatives 3 and 4 are further from residences and trailheads resulting in less direct impact to these receptors.

The maximum calculated operational audible noise level at the edge of the ROW for the proposed 161 kV line of relative to Alternatives 2, 3, and 4 is 38 dB(A), which is an increase of approximately 28 dB(A) compared to the 10dB(A) for the existing 69 kV line. This noise level is close to the range of noise inside a home as shown in Table 3.4.10-5.

The maximum calculated operation audible noise at the edge of the ROW is less than the Montana MFSA L_{DN} requirement of 50 dB(A).

The addition of a new circuit on existing transmission structures would require surveying of ROW, rehabilitation of disturbed areas and clearing of ROW. The construction activities would primarily include replacement and installation of new structures, foundations, and the addition of new conductor. Construction noise levels for these construction activities would range from approximately 80 to 90 dB(A) at a distance of 50 feet from the source. Helicopter noise would be in the range of 80 to 90 dB(A) for the movement of materials, placement of structures, and conductor stringing activities (helicopter hovering above ground at a height of 150 feet). The construction noise sources would occur in the day time hours approximately in the time frame from 9 a.m. to 7 p.m. (this is a typical time frame for construction activities).

For people who are hiking on trails in the vicinity of construction activities, the construction noise would be transient since there is a brief time period driving to the area where construction would take place and before leaving the area on trails away from the construction activity. For people at campgrounds and recreation residences, the construction noise would be temporary since construction activities in any one particular area would only last a few hours a day for several weeks before moving on.

Cumulative Effects for All Alternatives

Cumulative noise impacts could occur from the construction, operation and maintenance of Alternatives 2, 3, or 4 in combination with any of the projects identified in Section 3.2 were they to occur at the same time. Construction noise from these alternatives would merge with

background noise in the existing environment within a few hundred feet of construction activities. The northern portion (Phase 1) of the Jackrabbit to Big Sky project, particularly in the Four Corners community, is in an area currently consisting of residential, commercial, light industrial and agricultural land uses; however, it is located outside of the immediate construction vicinity of Alternatives 2, 3, and 4 so that cumulative noise impacts from construction are unlikely to occur. Construction impacts would be short-term and localized to the segment under construction; there is limited potential for those impacts to overlap with the impacts of other past, present, or probable future projects.

Concerning operation of power lines, corona noise from transmission lines during foul weather conditions (rain) generally fades into the ambient noise of the precipitation and is not noticeable. When viewed within the context of cumulative projects in the project area, cumulative impacts related to operation of the lines are not significant.

Comparison of Alternatives

Construction noise would be temporary and transient, and operational noise from the power lines would be less than the highway or river noise for all action alternatives (Alternatives 2, 3, and 4) and Alternative 1 (No Action). Typical noise sources in a residential environment are comparable to construction noise levels and exceed noise levels from the transmission and distribution lines. For example, hair dryers and lawnmowers have comparable noise levels to cranes and backhoes.

Typical highway noise for medium and heavy vehicles is 87 dB(A) at a distance of 50 feet from the highway (USDOT 2006). In comparison, the maximum noise level from the 161 kV transmission line is predicted to be 30 dB(A) at a distance of 25 feet from the center of the line.

Summary Conclusion

Based on the analysis presented above, there would be minimal differences in operational noise levels among Alternatives 1, 2, 3, and 4 in terms of impacts on recreation residences and trails. All alternatives result in noise levels that are less than the Montana MFSA noise level guideline for electrical transmission facilities (50 A-weighted decibels (dB(A)) average day/night noise level (L_{DN}) at edge of ROW in residential and subdivided areas).

Construction noise will be limited to day time periods and to staging areas that are not close to sensitive receptors.

Mitigation and Monitoring

There should be no mitigation or monitoring requirements for operational noise from the transmission and distribution lines.

The state of Montana does not require monitoring of construction noise for power line construction.

Consistency with Laws, Regulations, and Forest Plan

All alternatives would be consistent with the state noise MFSA guideline. There are no federal or Forest Plan directives for noise requirements.

Property Values

Description of Issue

The existing ROW across recreation residence lots on National Forest System (NFS) land would be used and slightly expanded for the Proposed Project. The change in condition to lands within the ROW from the existing condition to the proposed new condition and ROW widening, as well

as alternatives development is not expected to change property values of the recreation residences significantly. In addition, property values of privately-owned residences scattered along US Hwy 191 and outside of, but adjacent to, the GNF are not expected to change significantly as a result of the Proposed Project or alternatives.

Indicators

In the Forest Service Handbook (FSH) for appraising real property [FSH 5409.12], the Forest Service recognizes that the value of specific real property is determined by human desires or demand as modified by economic, physical, and governmental factors. As such, it is difficult to assign indicators to determine significant effects related to the issue. A qualitative assessment is described below.

Scale of Analysis

The spatial boundary for analysis includes the recreation residence areas located approximately 500 feet from the existing 69 kV transmission line ROW and alternatives, as well as privately-owned residences scattered along US Hwy 191 and outside of, but adjacent to, the GNF with views of the existing 69 kV transmission line and alternatives. This distance was presumed to be reasonable as a setback for this property value discussion, as it would include the recreational or privately-owned residence as well as neighborhood characteristics and features.

The temporal boundary for analysis is 15 years into the future. This is when the Special Use Permits (SUPs) for all recreation residence lots in the Bozeman Ranger District would be considered for renewal by the Forest Service.

Affected Environment

The Forest Service manages a recreation residence program that provides permits for use and occupancy of residences for recreational purposes. Recreation residences are cabins or houses and their associated facilities on NFS land that are privately owned and maintained by permit holders of these SUP. The residences may not be used as a principal residence.

In the analysis area, there are eleven recreation residence areas in proximity to the Proposed Project and alternatives being considered.

Along US Hwy 191 are some privately-owned residences outside of the GNF that have views of the existing 69 kV transmission line ROW or of the alternatives under consideration.

Applicable Laws, Regulations, Forest Plan Direction

The (Service-wide) Forest Service Manual (FSM) 2347.1 states:

> *"Recreation residences are a valid use of National Forest System lands. They provide a unique recreation experience to a large number of owners of recreation residences, their families and guests. To the maximum extent practicable, the recreation residence program shall be managed to preserve the opportunity provided for individual and family-oriented recreation. It is Forest Service direction to continue recreation residence use and to work in partnership with holders of these permits to maximize the recreation benefits of recreation residences."*

In 2008, the Forest Service approved the renewal of SUPs for all 86 recreation residence lots in the Bozeman Ranger District, including 69 within the Project Area, for a period of 20 years. No other actions such as proposing new lots, tracts, facilities or alterations of existing facilities were a part of the Forest Service decision to renew the permits.

Methodology for Analysis

The value of property is determined by a number of factors and buyer preferences. For the analysis of this issue, there is no specific methodology. The analysis is based on qualitative professional judgment and previous studies conducted in the U.S. evaluating the effects of transmission lines on property values.

Effects Analysis

Alternative 1

The No Action Alternative (not rebuilding the existing 69 kV transmission line) would not affect the property values of recreation residences in the analysis area. As the ROW for the existing transmission line would remain unchanged, there would be no change to the area of recreation residence lots that are crossed by the line and no change in the lot fees assessed by the Forest Service as a result of this Alternative.

Alternatives 2, 3, and 4

Studies have been conducted on the impacts of high-voltage transmissions lines to residential property. In the article "Power Lines and Property Values Revisited" (Pitts and Jackson 2007), impacts of high voltage transmission lines on the value of residential property has been studied extensively and the impacts are not easily measurable. Research shows that the effects of high voltage transmission lines on residential properties are varied and are determined by five interplaying factors: proximity to transmission structures and lines; the view of transmission structures and lines; the type and size of structures; the appearance of easement landscaping; and surrounding topography. Many studies indicate that the transmission lines have no significant effect on residential property values. Other studies, however, have shown a small diminution in value attributable to the close proximity of these transmission lines. Studies report an average discount of between one and ten percent of property value. The diminution in value is attributable to the visual unattractiveness of the lines, potential health hazards, disturbing sounds, and safety concerns. These impacts diminish as distance from the line increases and disappear at a distance of 200 feet from the lines.

For the article, Pitts and Jackson also interviewed realtors and appraisers in several central California communities. Approximately half of the realtors and appraisers interviewed said they had not observed negative impacts on either residential sale prices or days on market due to the presence of the powers lines. The remaining realtors and appraisers had observed negative impacts on homes adjacent to a power line ROW, with price discounts ranging on average between two and seven percent. Many realtors and appraisers interviewed indicated that price and marketability effects of high voltage transmission lines depend on the market conditions at the time of sale. Also, several realtors and appraisers indicated that some buyers may consider power lines an eyesore and a nuisance, but that other buyers did not. One realtor stated that "external factors such as power lines have less of an effect on lower-end homes than on luxury properties." The article concluded that the impacts from the power lines, as well as other negative externalities, depend on many factors, including market condition, location, and personal preference.

In another article entitled, "Electric Transmission Lines: is there an Impact on Rural Land Values?" (Jackson 2010), Jackson writes about the potential impacts of transmission lines to rural land used for agricultural or recreational purposes. Jackson studied several hundred sales of rural land values in central Wisconsin that involved properties with a transmission line easement for lines ranging in voltage from 115 kV to 345 kV. The general finding of his analyses showed that there were small (1.11 to 2.44 percent) discounts that could be attributable to the presence of the

lines and the encumbrances of the properties by the easements. Neither of these small differences was considered statistically significant.

In the publication, "Environmental Impacts of Transmission Lines" (Public Service Commission of Wisconsin 2009), the Commission indicated that data from studies from the 1950s evaluating the potential change in property values due to the proximity to a new transmission line is often inclusive. The publication states that a review of the studies indicates that transmission lines have the following effects on property values:

> The estimated reduction in sale price for single-family homes has ranged from 0 to 15 percent;
>
> Adverse effect on the sale price of smaller properties could be greater than effects on larger properties;
>
> Other factors, such as schools, jobs, lot size, house size, neighborhood characteristics, and recreational facilities tend to have a greater effect on sale price than the presence of a transmission line;
>
> Sale prices can increase where the transmission ROW is attractively landscaped or developed for recreation (i.e., hiking, hunting and snowmobiling);
>
> Effects on price and value appear to be greatest immediately after a new transmission line is built or an existing ROW is expanded. These effects appear to diminish over time and over generations of property owners;
>
> Effects on sale price have most often been observed on property crossed by or adjacent to a transmission line, but effects have been observed for properties farther away from a line; and,
>
> Agricultural values are likely to decrease if the transmission line structures are in a location that inhibits farm operations.

Dennis Hoeger, MAI (Member Appraisal Institute) of Hoeger-Jackson & Associates, a real estate appraisal company based in Bozeman, Montana just north of the Proposed Project Area, was contacted for his professional opinion on the potential impacts to property values as a result of rebuilding the line to 161 kV. Hoeger-Jackson & Associates conducted the appraisal of NFS lands in Gallatin Canyon occupied by the recreation residences in 2007. Mr. Hoeger indicated that it would be difficult to prove a long term loss in property value specifically related to improvements to an overhead transmission line. The Forest Service notes that the recreation residences in GNF are in high demand and do not become available for acquisition very often. When a residence does become available to the public, its days-on-market are generally few, provided that it is in good condition. The proximity of a recreation residence to a transmission line is not a significant detractor as it is outweighed by the other benefits that its location in GNF provides. The literature (Pitts and Jackson 2007) confirms that market conditions (i.e., demand) influence whether power lines are a factor at all in sales or property value.

Comparison of Alternatives

The No Action Alternative (Alternative 1) would not require additional ROW as no improvements would be made to the existing line. Additional ROW is anticipated to be needed from some recreation residences lots for Alternatives 2, 3, and 4. Alternatives 3 and 4 are not

anticipated to require ROW from the recreation residence lots in the Cave Creek recreation residence tract, nor the Cascade Creek recreation residence tract.

Summary Conclusion

As previously noted, studies in the U.S. have indicated varied effects of transmission lines on property values, ranging from discounts of various percentages in property value that may be attributable, in part, to the proximity of a transmission line. However, other characteristics such as market conditions, geography, and property amenities, typically factor in the determination of property value.

The existing 69 kV transmission line and ROW through GNF (Alternative 1) have been features in the landscape, including its proximity to recreation residences within, and private residences adjacent to, the Forest for a number of decades. Upgrading the existing line as proposed under Alternatives 2, 3, or 4 would not represent a substantive change to the forest setting compared to building an entirely new transmission line. As such, Alternative 2 (Proposed Action) is identified as the least impactive alternative regarding property values.

Studies of impacts of new transmission line construction or structural rebuilds generally have revealed short-term impacts rather than long term effects. However, most studies have concluded that other factors, such as general location, size of property, improvements, condition, amenities, and supply and demand factors in a specific market area are far more important criteria than the presence or absence of transmission lines in determining the value of real estate.

Some impacts on property values (and salability) might occur on an individual basis as a result of the upgrade of the transmission line. However, these impacts would be highly variable, individualized, and unpredictable. Constructing and operating the transmission line is not expected to cause long-term negative impacts to property values along the proposed routes or in the general vicinity. Non-project impacts, along with other general market factors, are already reflected in the market value of properties in the area. These conditions are not expected to change appreciably. Additionally, any effect of the transmission line on property values would be realized only when the property was sold.

Project Design Features, Best Management Practices, Mitigation, and Monitoring

No mitigation is warranted or necessary because significant long-term impacts are not expected to occur to property values in the Project Area as a direct result of the proposed transmission line upgrade.

Consistency with Laws, Regulations, and Forest Plan

All of the alternatives would be consistent with the (Service-wide) FSM 2347.1 on recreation residence use. The demand for recreation residences is anticipated to remain strong on GNF and as such, property values of these residences are not anticipated to decline as a result of the Proposed Project.

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3.4.11 Environmental Justice

Description of Issue

Environmental justice (EJ) refers to the equal distribution of environmental hazards and amenities. EJ efforts help to ensure that minority and low-income populations have equal opportunities and are not disproportionately affected by federal actions.

Whether to approve a Special Use Permit (SUP) for the upgrades and line improvements associated with the Proposed Project is an activity that should be reviewed for consistency with Executive Order (E.O.) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" and United States Department of Agriculture (USDA) Departmental Regulation 5600-002, which implements the USDA's EJ implementation strategy.

Indicator and Methods

An EJ issue arises where conduct or action may involve disproportionately high and adverse environmental or human health effect on an identifiable low-income or minority population. The proposed project was evaluated to determine if minority and/or low income communities are present in the project area and cumulative effects analysis area. If an EJ population is present, then additional analysis would be completed to determine if these populations could be disproportionately affected by the project.

Scale of Analysis

The spatial boundary for identifying potential direct and indirect impacts to minority populations and low-income populations is the project area, the section of the Jack Rabbit to Big Sky Meadow Village transmission line corridor crossing approximately 16 miles of national forest. The entire 37-mile corridor including the communities of Four Corners and Gallatin Gateway, and other portions of Gallatin County were considered for assessment of cumulative effects. The temporal boundary includes the Proposed Project's construction, operation, and maintenance periods.

Affected Environment

As identified by the US Census Bureau, Table 3.4.11-1 summarizes minority population data for the Four Corners and Gallatin Gateway portions of Gallatin County. The transmission line passes through these communities across private lands within the cumulative effects analysis area. The United States Census Bureau does not report low-income population data for these communities. Therefore, census data for Gallatin County is used, and compared to the state of Montana to determine if low income populations may be present.

Table 3.4.11-1 identifies threshold percentages that could serve as reasonable predictors of minority and low-income population status. The data below are not intended to represent a quantitative or qualitative assessment of all circumstances and conditions that may affect environmental justice. However, the data below can reveal useful information.

TABLE 3.4.11-1 MINORITY AND LOW-INCOME POPULATIONS IN THE PROPOSED PROJECT'S VICINITY

DEMOGRAPHIC CHARACTERISTIC	VARIABLE	FOUR CORNERS	GALLATIN GATEWAY	GALLATIN COUNTY	MT	THRESHOLD PERCENT
Minority Population	Percent of non-white residents	3.0	4.2	4.6	10.1	>50
Low-Income Population	Percent of families with an annual income of less than $10,000	Data not reported	Data not reported	2.8	4.3	>20
	Percent of families living below the federal poverty level	Data not reported	Data not reported	7.3	9.7	>10
	Percent of individuals under 18 living below the federal poverty level	Data not reported	Data not reported	12.2	19.4	>20
	Percent of households requiring public assistance for income	Data not reported	Data not reported	1.1	2.2	>20

Source: Census Bureau, 2010a.

Based on the data presented above, the populations in Four Corners, Gallatin Gateway, and Gallatin County do not cross the threshold percentage that would categorize these places as minority-dominated communities. Similarly, Gallatin County's data does not cross the threshold percentage that would categorize it as a low-income community. Based on census data, the project area and cumulative effects area does not have low income or minority populations.

Applicable Laws, Regulations, and Forest Plan Direction

On February 11, 1994, President Clinton signed E.O. 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." E.O. 12898 directs federal agencies to focus attention on the human health and environmental conditions in minority populations and low-income populations. The purpose of the E.O. is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

The Gallatin Forest Plan predates President Clinton's E.O. and as such there are no forest plan policies or directions governing environmental justice. The USDA, which the United States Forest Service (Forest Service) is an agency of, in response to E.O. 12898, published Departmental Regulation 5600-002, "Environmental Justice" a key element of implementing the USDA's EJ implementation strategy

Effects Analysis and Consistency with Laws, Regulations and Forest Plan Direction

According to census data, neither the project area nor the cumulative effects are has an identifiable low-income or minority population. As an EJ population is not present, no additional analysis is necessary.

The Proposed Project was assessed to determine whether EJ populations are present that could be impacted by the proposed project, and determined they are not. Therefore, the project is consistent with E.O. 12898 and Departmental Regulation 5600-002 for considering disproportionately high and adverse effects to identifiable minority populations and low-income populations.

3.4.12 Air Quality

Description of Issue

There was a concern raised during the comment period on the Draft Environmental Impact Statement (DEIS) that transmission line construction would include activities that could affect air quality during construction (short term) and during operation and maintenance of the line (longer term). The concern noted that there may be potential for some air quality impacts from use of equipment and vehicles during construction, operation and maintenance (i.e., pollutant emissions of carbon monoxide, carbon dioxide, sulfur oxides, PM-2.5, nitrogen oxides, volatile organic hydrocarbons, aldehydes, and polycyclic aromatic hydrocarbons), and creation of fugitive dust and particulates during construction.

The public comment also asked that the Final Environmental Impact Statement (FEIS) disclose that there are no air quality non-attainment areas located near the proposed transmission line, identify any federal/state air quality Class 1 areas within 100 miles of the project area, and discuss meteorological conditions in the project areas that may result in dispersion of construction related air pollutants.

Indicators

The Gallatin National Forest Management Plan of 1987 (Forest Plan) standard for air quality (Chapter II.E.9) states that the United States Forest Service (Forest Service or USFS) will cooperate with the Montana Air Quality Bureau in the State Implementation Plan (SIP). The requirements of the SIP and Montana Smoke Management Plan (SMP) will be met.

Project related emissions are anticipated to be negligible and difficult to discern from the vehicular emissions of nearby public roads. Therefore, a qualitative assessment was conducted concerning the temporary and minor emissions related to air quality.

Scale of Analysis

The spatial boundary for evaluating direct and indirect effects is the project area, which is located in a narrow linear north-south direction through Gallatin Canyon, and crosses approximately 16 miles of NFS lands. The spatial boundary for evaluating cumulative effects is the Montana Airshed 8A, which includes all of Gallatin County. NorthWestern Energy's transmission line upgrade crosses NFS and private lands in Gallatin County, spanning 37 miles from the Four Corners area of Bozeman to Big Sky. The temporal boundary includes the construction, operation, and maintenance phase of the project.

Applicable Laws, Regulations and Forest Plan Direction

Federal Clean Air Act

The framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act (CAA) (www.epa.gov/air/oaq_caa.html), as amended in 1977 and 1990 (*42 U.S.C. §7401 et seq.)*. The CAA was designed to "protect and enhance" the quality of the nation's air resources. The CAA and Wilderness Act established stringent requirements for areas designated as "Class I" and "Class II" Wilderness. The closest Class I area to the project area is Yellowstone National Park, located approximately13 miles to the southeast.

The CAA encourages reasonable federal, state, and local government actions for pollution prevention. SIPs are developed by each state to implement the provisions of the CAA. SIPs may impose rules and regulations more stringent than those withheld by the Environmental Protection Agency (EPA). The SIPs describe the State's actions to achieve and maintain the National Ambient Air Quality Standards (NAAQS).

Conformity Determinations. The general conformity provisions of the CAA (Section 176(c)) prohibit federal agencies from taking any action within a non-attainment area that causes or contributes to a new violation of the standards, increases frequency or severity of an existing violation, or delays the timely attainment of a standard as defined in the area plan. The project is located in an attainment area for all NAAQS.

National and State Ambient Air Quality Standards

Under the guidance of the CAA, the EPA established NAAQS, which must be met by state and federal agencies, and private industry. The NAAQS have been established for carbon monoxide, nitrogen oxide, and sulfur dioxide, lead, and $PM_{2.5}$.

States are given primary responsibility for air quality management. Section 110 of the CAA requires states to develop SIPs that identify how the state will attain and maintain NAAQS. The SIP is promulgated through the Montana CAA and implementing regulations. The regulations provide specific guidance on maintenance of air quality, including restrictions on open burning (Adminsitrative Rules of Montana [ARM] 16.8.1300). The act created the Montana Air Quality Bureau (now the Montana Department of Environmental Quality [DEQ]) and the regulatory authority to implement and enforce the codified regulations.

Montana/Idaho State Airshed Group

The majority of the legal entities in Montana and Idaho (including the Forest Service) that create particulates as a result of burning activities have formed the Montana/Idaho State Airshed Group. Through a Memorandum of Understanding (MOU), this group has established a Smoke Management Program that provides air quality predictions to its members, which includes the Forest Service.

As described in the ROW Clearing Plan (Appendix B), NorthWestern may pile burn slash to reduce fire hazard or to improve aesthetic appeal. No broadcast burning is proposed. Pile burning within the project area would comply with state requirements of the Montana SIP and the SMP (USFS 1987a, p. II-26). All burning would be reported to the Airshed Coordinator on a daily basis, as required. If the monitoring unit forecasts ventilation problems, prescribed burning may either restricted by elevation or curtailed until good ventilation exists.

Clean Air Act of Montana

As described in the ROW clearing plan (Appendix B), NorthWestern may pile burn slash to reduce fire hazards or improve aesthetic appeal. Pile burning associated with ROW clearing and slash disposal would be considered a minor open burning source, and would be subject to Parts 1 - 4 of the Montana Code Annotated 2011, defined as the "Clean Air Act of Montana" as well as the requirements found in Subchapter 6 of the ARM, Title 17, relative to minor open burning sources.

The Montana DEQ regulates air quality/smoke management in Montana, and has established a protocol and monitors emission standards rates for all burns in affected airsheds. Burn permits are administered through Gallatin County (http://www.gallatin.mt.gov/public_documents/BurnPermit). If NorthWestern burns any piles, they will have to call the state hotline number

every day they plan to burn. Emissions are not anticipated to exceed the NAAQS rates. See project record for air quality modeling.

Gallatin National Forest Land Management Plan (1987)

Forest-Wide Standards related to air quality in the Gallatin Forest Plan include the following (Ch 2, Section E, Subsection 9):

> *The Forest will cooperate with the Montana Air Quality Bureau in the State Implementation Plan (SIP). The requirements of the SIP and Montana Smoke Management Plan will be met.*

Affected Environment

The project area is located in the Gallatin River Canyon, located approximately 13 miles to the northwest boundary of Yellowstone National Park, a federally designated Class I area. Table 3.4.12-1 lists all federally designated Class 1 areas within 100 miles of the project area. The project area is not located in a nonattainment area.

TABLE 3.4-12-1 PROXIMITY TO FEDERAL CLASS I AREAS

Federal Class I Area	Approx. Miles to Nearest Boundary	State(s)	Direction	Federal Land Manager*
Yellowstone NP	13	ID, MT, WY	SE	USDI-NPS
Gates of the Mtn Wilderness Area	90	MT	NNW	USDA-FS
Red Rock Lakes Wilderness Area	48	MT	SSW	USDI-FWS
Grand Teton NP	83	WY	SSE	USDI-NPS
North Absaroka Wilderness	82	WY	SE	USDA-FS
Teton Wilderness	95	WY	SE	USDA-FS
Washakie Wilderness	85	WY	SE	USDA-FS

*USDI-NPS: United States Department of Interior, National Park Service
USDA-FS: United States Department of Agriculture, United States Forest Service
USDI-FWS: United States Department of Interior, Fish and Wildlife Service

Methodology/Effects Analysis

Emissions for the alternatives will be below de minimis values as required by EPA and Montana DEQ, therefore a formal, quantitative emissions inventory of construction related fugitive and mobile sources was not prepared for the alternatives. A qualitative assessment of potential air emissions from action alternatives based on experience with similar processes and devices indicates project emissions will be well below Montana DEQ permitting levels.

All pile burning associated with an action alternative would meet Best Available Control Technology (BACT) for open burning as outlined in the Montana air regulations (i.e., ARM Title 17, Chapter 8, Subchapter 6). BACT techniques and methods for open burning may include the following:

(i) Schedule burning during periods and seasons of good ventilation;
(ii) Consult with Montana DEQ regarding dispersion forecasts prior to open burns and utilizing predictive modeling results performed by and available from the DEQ to minimize smoke impacts;
(iii) Limit the amount of burning to be performed during any one time;
(iv) Use of ignition and burning techniques which minimize smoke production;
(v) Use of fuel preparation methods that will minimize dirt and moisture content;

(vi) Promote fuel configurations which create an adequate air to fuel ratio;
(vii) Prioritize burns as to air quality impact and assigning control techniques accordingly;
(viii) Promote alternative treatments and uses of materials to be burned; and
(ix) Select sites that will minimize smoke impacts.

Additionally, while there will be minimal air emissions associated with construction activities and future maintenance activities (i.e., motor vehicles), the amount of such emissions will be negligible and difficult to discern from the vehicular emissions of nearby public roads (i.e., United States Highway 191 [US Hwy 191]). NorthWestern may minimize air emissions during construction and maintenance of the transmission line by employing dust control at their work sites and by ensuring all construction and maintenance vehicles are properly tuned and maintained.

Summary Conclusion

Air emissions generated from construction for the transmission line will be temporary in nature, insignificant, and generally restricted to the existing corridor bordered by US Hwy 191. All pile burning will be reported to the Montana Idaho Airshed Coordinator, and NorthWestern will obtain a burn permit from Gallatin County if necessary. By following best management practices in construction activities (minimize fugitive emissions, dust suppression by wetting or agent as needed, etc.) and devices (low sulfur fuel, minimize idling, etc.) the air emissions impact associated with construction of Alternatives 2, 3, and 4 will be negligible. All of the alternatives will create minor amounts of mobile source air quality emissions from service vehicles and equipment required for operation and maintenance activities. The requirements of the SIP and Montana SMP will be met.

3.5 Short-term Uses and Long-term Productivity

The National Environmental Policy Act (NEPA) requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 Code of Federal Regulation [CFR] 1502.16). As declared by Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare; to create and maintain conditions under which man and nature can exist in productive harmony; and to fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

For all of the action alternatives (Alternatives 2, 3, and 4), the construction staging yards, fly yards, road closures/lane restrictions, and helicopter flights for transporting construction materials would require the short-term use of man's environment. Mitigation and design features are incorporated in the action alternatives to minimize potential impacts to both the human and natural environment. These practices would help NorthWestern Energy (NorthWestern)create conditions whereby man and nature exist in harmony.

The activities above that would require short-term uses of man's environment would also create long-term benefits for present and future generations of Americans. More specifically, all of the action alternatives would improve the electric power grid in the vicinity of Four Corners and Big Sky Meadow Village. In this way, NorthWestern could improve its customers' general welfare via a safe and reliable electric power system.

3.6 Unavoidable Adverse Effects

3.6.1 Alternative 1 – No Action

Under Alternative 1, NorthWestern would continue to operate and maintain its existing electric power transmission system in the Gallatin Valley and Big Sky areas. The existing system is inadequate and unreliable. More specifically, the existing system has a limited capacity for serving the projected load growth in the fast-growing Gallatin Valley and Big Sky areas, and is approaching the end of its useful life. During heavy energy loads in the Big Sky area, an outage of either NorthWestern's 69 kilovolt (kV) transmission lines could disrupt service and, in a worst-case scenario, cause a widespread outage that could affect thousands of NorthWestern customers.

Given time, Alternative 1 would have unavoidable adverse effects. Alternative 1 would risk NorthWestern maintenance crews' safety as the aging transmission line would likely require more frequent repairs. Making more repairs to the existing line would also increase maintenance costs. Additionally, NorthWestern customers would likely experience an increase in service interruptions while maintenance is being performed, or experience outages during peak load periods since in recent years there has been an increase in outages and power surges.

3.6.2 Alternatives 2, 3, and 4

The issues presented in this chapter describe anticipated impacts and mitigation measures. NorthWestern would implement mitigation measures, where feasible, to eliminate adverse effects associated with the action alternatives. In some situations, implementing the mitigation measures can reduce adverse effects, but not eliminate them. These remaining adverse effects are considered to be unavoidable. The action alternatives (2, 3, and 4) include temporary and

permanent unavoidable adverse effects. Temporary unavoidable adverse effects would only last during the alternatives' construction periods, and would include recreation outstandingly remarkable values (ORVs). Permanent unavoidable adverse effects to scenery would include impacts to the existing visual condition (EVC) of Gallatin Canyon when viewed from observation points and corridors, and particularly to the scenery ORV near the Cascade East Local Routing Option (LRO).

3.7 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as power line right-of-ways (ROWs) or roads.

For the action alternatives, irreversible commitments of resources would include the following:

Fuel required for construction vehicles, such as:

Gasoline and/or diesel fuel for personal automobiles, which construction workers would use to travel to and from their residences and the construction sites;

Diesel fuel for bulldozers, cranes, and excavators; and

Aviation fuel for helicopters.

Particulate matter 10 microns or less in diameter emitted from project-related gas- and diesel-powered engines;

Vehicle miles traveled in hauling heavy construction equipment and materials to and from the construction sites, and in transporting construction workers to and from their residences and the construction sites;

Wear and tear on the above vehicles and equipment;

Noise generated during construction, operation, and maintenance activities;

Time that area motorists spend following detours or waiting in queue during lane closures;

Man-hours expended during project-related administrative, planning, design, engineering, construction, operation, maintenance, and management activities; and

Permanent adverse effects to the EVC and ORV.

Irretrievable commitments of resources would include the following:

Use of wood for monopole and H-frame structures;

Use of metals for guyed wires, conductors, shielding, and transformers;

Wildlife habitat fragmentation; and

ROW clearing, including tree removal and vegetation management.

After transmission line decommissioning, it is expected that the wood and metals could be recycled, and wildlife habitat and the cleared areas could be restored as close as possible to pre-development conditions.

3.8 Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders." The following is a description of the formal consultation and coordination on biological and cultural resources that has or will occur as part of the Environmental Impact Statement (EIS) process. Chapter 4, Consultation and Coordination, provides additional coordination with agencies and the public, including scoping.

3.8.1 Biological Resources

Section 7(a)(2) of the federal Endangered Species Act (ESA), 16 United States Code (U.S.C.) § 1536(a)(2), requires every federal agency, in consultation with and with the assistance of the Secretary of the Interior, to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. A federal agency will use a Biological Assessment (BA) to determine whether formal consultation is required.

The United States Forest Service (Forest Service or USFS) and the United States Fish and Wildlife Service (USFWS) have conducted meetings to discuss the requirements of the Section 7 Consultation, the BA, biological surveys, the Biological Resources Technical Report, and the schedule. The appropriate level of consultation was completed.

In November 2011, a letter was sent to the USFWS requesting lists of all species that are listed, proposed, or candidates for listing as threatened or endangered under the ESA that could occur within the Project Area. The USFWS provided a list of species fulfilling the requirements under Section 7(c) of the ESA. In compliance with 50 CFR 402 regulations, federal agencies must review their actions and determine whether the action may affect federally listed species or designated critical habitat (50 CFR 402.14; 50 CFR 402.10). On December 28, 2012, the Forest Service submitted a Biological Assessment (BA) addressing threatened species; the grizzly bear and Canada lynx, identified for consultation by the USFWS. The USFWS responded on January 15, 2013, concurring with the findings of the BA prepared by the Forest Service, thus concluding Section 7 of the ESA.

3.8.2 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) requires federal agencies to evaluate the effects of federal undertakings on historical, archaeological, and cultural resources, and to consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) concerning potential effects of federal actions on historic properties. Before federal funds are approved for a particular project or prior to the issuance of any license, the effect of the project on any district, site, building, structure, or object

that is listed in or eligible for listing in the National Register of Historical Places (National Register) must be evaluated.

In accordance with federal regulations implementing the NHPA (36 CFR 800), the USFS sent a letter to the Montana SHPO on January 4, 2012 requesting consultation for the Jack Rabbit to Big Sky Project. The letter also requested concurrence with a determination of the area of potential effects (APE) as defined at 36 CFR 800.16(d). On December 19, 2012 the Montana SHPO provided correspondence on consultation and concurrence with the APE for the Jack Rabbit project. The Jack Rabbit to Big Sky Meadow Village Transmission Line Upgrade cultural resource report by POWER Engineers Inc., was provided to the Montana State Historic Preservation Office (MT SHPO) for review on February 11, 2013 pursuant to 36 CFR 800. The MT SHPO responded on February 25, 2013 and March 18, 2013, and agreed with the Forest Service determination of project effect. They recommended that National Register of Historic Places evaluations be completed as part of this project, which the Gallatin National Forest (GNF) will pursue following release of the EIS and ROD. Therefore, state SHPO consultation requirements have been met. Please refer to SHPO-GNF correspondence in the project record.

Tribal Consultation

Various federal statutes and regulations, including NEPA and the NHPA, require that agencies consult with American Indians. Executive Order (E.O.) 13175, *Consultation and Coordination with Indian Tribal Governments*, was issued in 2000 in order to establish regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian Tribes, and to reduce the imposition of unfunded mandates upon Indian Tribes.

Regulations for Section 106 require that federal agencies identify potentially affected Indian Tribes that might have knowledge of sites of religious and cultural significance in the APE (36 CFR 800.3(f)(2)). If any such properties exist, the regulations require that federal agencies invite Indian Tribes to participate in the Section 106 process as consulting parties. For the Jack Rabbit to Big Sky Project, the USFS is responsible for Section 106 consultation with Native American Tribes.

As required by the NHPA (36 CFR 800.2(c)(2); 36 CFR 800.3(f)(2); 36 CFR 800.14(b)(2); and 36 CFR 800.14(f)), the USFS has conducted government-to-government consultations with the federally recognized Confederated Salish and Kootenai Tribal Historic Preservation Office (THPO), Eastern Shoshone Tribe THPO, Crow Tribal Council, Crow Cultural Committee, Nez Perce Tribe, Shoshone-Bannock Business Council, and Wind River Shoshone Cultural Committee and other interested parties. Consultations were initiated by the GNF to identify issues of concern to Native Americans regarding the Proposed Project (per 36 CFR 800.2(c)(5)). In November 2010, a representative of the Crow Cultural Committee made a visit to the Project Area with a GNF Archaeologist. The Forest Archaeologist met with members of the Confederated Salish and Kootenai Tribes on April 17, 2012 and members of the Crow Nation on May 1, 2012. Consultations are ongoing with all of the concerned Tribal entities.

Several Tribes responded to initial consultation letters sent by the USFS describing the Proposed Project and requesting Tribal participation. An on-site meeting was held with a representative of the Crow Tribe in November 2010. Issues of Tribal concern are being addressed through the consultation process, and are not detailed in this document.