

Environmental Assessment: Jackson Hole Mountain Resort Recreation Enhancements Project



US Department of Agriculture – Forest Service
Bridger-Teton National Forest
Jackson Ranger District
Jackson, WY



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CHAPTER 1: PURPOSE AND NEED

1.1 INTRODUCTION

The Jackson Ranger District, Bridger-Teton National Forest (BTNF), has received a proposal from Jackson Hole Mountain Resort (JHMR) to implement a number of improvements, collectively referred to as the Recreation Enhancements Project, at the ski area within the next 3 years. These improvements are included in JHMR's current master development plan (MDP; JHMR 2013), which was accepted by the agency in August 2014, replacing the previous 2004 MDP. BTNF authorization of the Recreation Enhancements Project is the Proposed Action considered in this environmental assessment (EA).

MDPs are a requirement of USDA-Forest Service (Forest Service) ski area special use permits (SUPs) and serve as a conceptual planning tool to outline the operators' vision as to how ski areas will evolve over a 10-to-15-year planning horizon. They are intended to be dynamic documents, amended or revised periodically to reflect changes in operational opportunities and constraints, skier market demands, or agency administrative requirements. Acceptance of the MDP does not authorize implementation of the plan. Authorization occurs through a NEPA process for projects that are ripe for decision and capital investment within the next 3 to 5 years, such as those proposed for this project.

JHMR, located on the eastern flank of the Teton Range about 12 road miles northwest of Jackson, WY (Figure 1-1), has operated for 50 years under a SUP issued by the Forest Service and administered by the BTNF.

This EA is tiered (40 CFR 1502.20) to the 1996 environmental impact statement (EIS) and record of decision (ROD) and the 2000 EA and decision notice/finding of no significant impact (DN/FONSI) addressing MDP revision and amendment, respectively (Forest Service 1996 and Forest Service 2000). These two documents are incorporated by reference (40 CFR 1502.21) and are available at the Jackson Ranger District, 25 Rosencrans Lane, Jackson, WY, 83001.

The BTNF has prepared this EA in compliance with the National Environmental Policy Act (NEPA) and Forest Service regulations regarding its implementation (36 CFR 220). This EA discloses the direct, indirect, and cumulative environmental impacts that would result from implementing the Proposed Action and alternatives, in support of an agency decision regarding JHMR's requested authorization.

1.2 ORGANIZATION OF DOCUMENT

The document is organized as follows:

- **Chapter 1 – Purpose and Need**: Includes background information on this EA process, summarizes the Proposed Action and the purpose and need it addresses, defines the decision to be made on the basis of this EA, identifies relevant higher level Forest Service plans, describes how the BTNF informed the public of the Proposed Action and how the public responded, then lists other permits and authorizations that may be necessary to implement the Proposed Action.
- **Chapter 2 – Proposed Action and Alternatives**: Provides a detailed description of the Proposed Action, the alternative formulation process, and the alternatives. Concludes with a comparative summary of the anticipated environmental effects of the Proposed Action and alternatives.
- **Chapter 3 – Affected Environment and Environmental Consequences**: Describes the environmental effects of implementing the Proposed Action and alternatives. Discussion is organized by resource and addresses the specific issues associated with that resource identified through public scoping and internal, interdisciplinary review.

- Chapter 4 – Consultation and Coordination: Identifies the agencies and other entities consulted during the preparation of this EA.
- Chapter 5 – List of Preparers: Identifies the BTNF and contractor personnel involved in preparation of the EA.
- Chapter 6 – References: Lists the references cited in the text of this EA.
- Appendices: More detailed information supporting the analyses presented in this EA.

Documentation of this EA process is available in the Administrative Record located at the Jackson Ranger District, 25 Rosencrans Lane, Jackson, WY, 83001.

1.3 PROPOSED ACTION

The Proposed Action includes the following elements (see section 2.4 for detailed description):

- Sweetwater gondola installation.
- Eagle’s Rest lift relocation.
- Solitude conveyor lift installation.
- Casper restaurant remodel/expansion.
- Storage facility.
- Bridger gondola Ski Patrol station.
- Ashley Ridge run upgrade and realignment.
- Wide Open run expansion.
- Solitude run development.
- Washakie run development.
- Grizzly Glade development.
- Snow-making system expansion.
- GazEx® avalanche system completion.
- Hiking and biking trail network expansion.
- Via Ferrata installation.
- Zip-line installation with modified alignment.

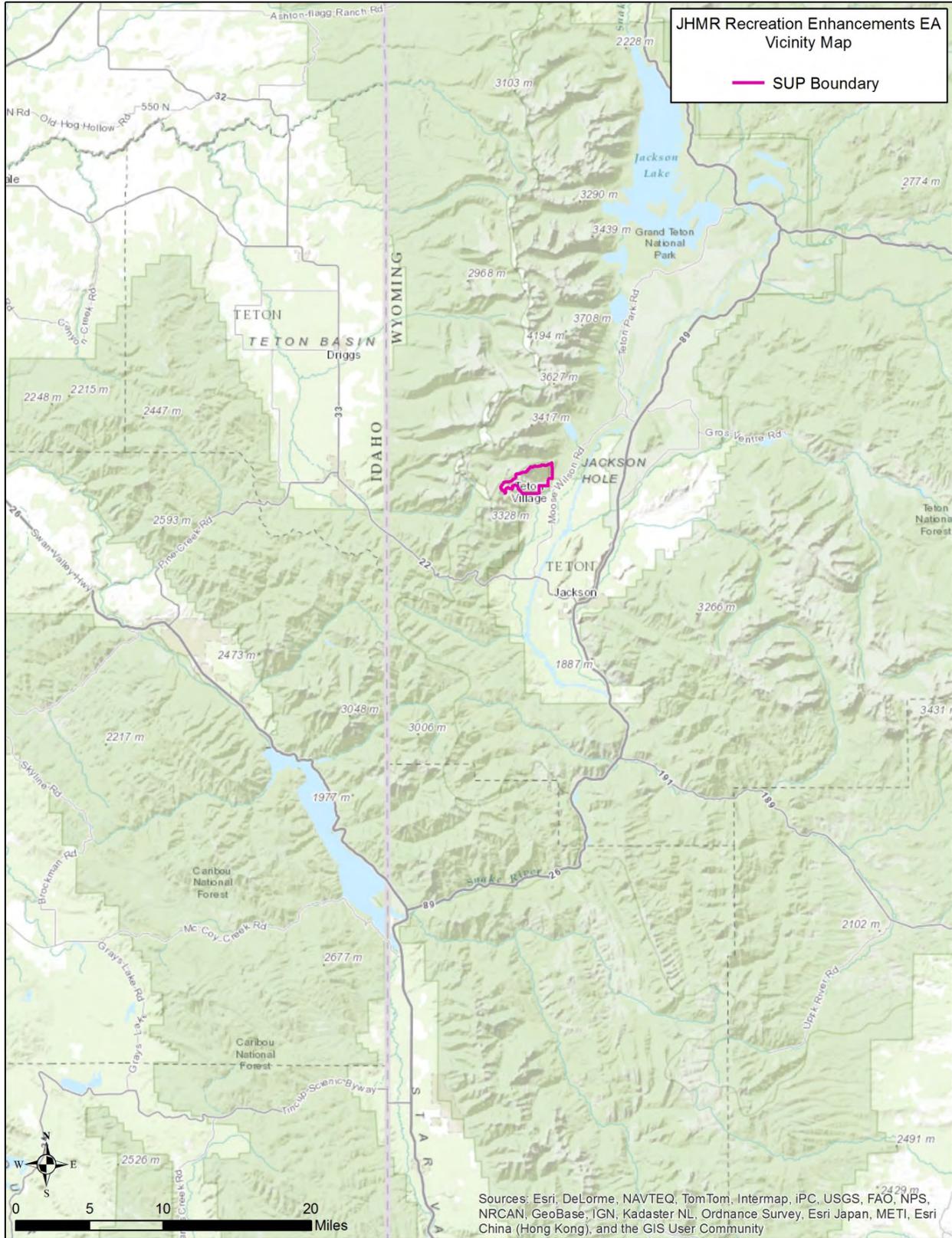


Figure 1-1. JHMR Recreation Enhancements EA vicinity map.

1.4 PURPOSE AND NEED

Two emerging developments in the mountain resort industry underlie the purpose and need for the Proposed Action. First, extensive customer surveys conducted by JHMR and other resorts indicate that visitors are increasingly seeking a more diverse range of recreational activities, particularly for families, that includes year-round opportunities and more adventurous activities. The Forest Service response to this trend includes our 2012 introduction of the *Framework for Sustainable Recreation (FFSR)*, which sets goals for providing a diverse array of recreational opportunities aimed at connecting people with the outdoors and promoting healthy lifestyles, in partnership with other public and private recreation providers.

Second, passage of the *Ski Area Recreational Opportunity Enhancement Act of 2011* provides long-awaited direction on the types of summer activities the Forest Service should consider authorizing to round out the range of opportunities provided to the public at permitted mountain resorts.

Reflecting those two developments, the purposes to be achieved through the Proposed Action are:

- To provide new and innovative forms of year-round outdoor recreation on National Forest System (NFS) lands for residents and visitors to the Jackson Hole valley.
- To utilize existing resort infrastructure as the hub for new services and recreational activities.
- To capitalize on the established relationship between the BTNF and JHMR that connects visitors with the natural environment and supports the quality of life and the economy of the local community.

The needs that must be resolved in order to achieve these purposes include:

1. Developing appropriate facilities and terrain for first-time and beginner skiers.
2. Providing more intermediate-level terrain, offsetting as feasible JHMR's skewed distribution toward advanced terrain.
3. Increasing snowmaking coverage to allow more reliable and earlier opening of the ski area and to maintain snow quality in high-use areas.
4. Making more runs groomable to improve the accessibility of terrain.
5. Increasing out-of-base lift capacity, so skiers can get on the mountain without the current, long waits in lift lines on busy days.
6. Offsetting the deficit in on-mountain food-service seating and basic skier services.
7. Meeting expressed demand for more hiking and mountain biking trails, particularly lift-served trails.
8. Providing opportunities for adventurous but less skill-demanding activities for winter and summer visitors.
9. Improving avalanche safety for visitors and ski area personnel.

The detailed descriptions in section 2.4 show how each element of the Proposed Action helps resolve these needs.

1.5 DECISIONS TO BE MADE

In consideration of the stated purpose and need and this analysis of environmental effects, the Responsible Official, the BTNF Forest Supervisor, will review the Proposed Action and alternatives in order to make the following decisions:

- Whether to authorize the Proposed Action or an alternative to it, all or in part;
- What design criteria and mitigation measures to require for the actions authorized; and
- What evaluation methods and documentation to require for monitoring project implementation and mitigation effectiveness.

Those decisions, anticipated to be documented in a decision notice and finding of no significant impact (DN/FONSI) will be subject to review and objection in accordance with the Forest Service’s project-level pre-decisional administrative review process (36 CFR 218).

1.6 PLANNING GUIDANCE

1.6.1 FOREST PLAN

As indicated in the *Bridger-Teton National Forest Land and Resource Management Plan* (Forest Plan; Forest Service 1990), JHMR falls within Forest Plan Management Area 41, Jackson Hole South, Desired Future Condition (DFC) 9B, Special Use Recreation Areas. A DFC 9B area is defined as:

An area managed for permitted, private recreation homes, permittees, and others offering services to the public, including related roads and sites. Overall, you find many signs of people. But, you see little or no evidence of resource development other than recreation. Cabins and buildings used by permittees are visible but blend into the surroundings. Roads are generally graveled, but may be paved in higher use areas. Off-highway vehicle use is limited to entry and departure routes. In some locations, you see extensive development associated with ski areas: hotels, buildings, ski lifts, gondolas, and snowcat equipment. In the winter, such areas are often quite crowded with roads clogged and many pedestrians in the area. (Forest Service 1990)

Two relevant Forest Plan goals for a DFC 9B are:

- 2.2(a) “retain, improve, and add developed sites”, and
- 2.2(b) “design facilities for all ages and abilities.”

The Proposed Action is consistent with and implements this Forest Plan direction.

1.6.2 TETON VILLAGE MASTER PLAN

Teton Village is the community at the JHMR base. The goals of the *Teton Village Master Plan* (Design Workshop 1998) include the following:

- Maximize Teton Village’s potential contribution to the quality of life and economic growth of the greater Jackson Hole community.
- Provide the best possible vacation experience to visitors to the Village both summer and winter.
- Increase the actual number of destination skiing guests and out-of-state skiers
- Create a recognizable identity and character for the Village during the summer.

Specific to the elements of the Proposed Action, the transportation guidelines in Attachment A of the Teton Village Master Plan (Section VI) specifically state that “a comprehensive system of pedestrian/bicycle trails that make necessary connections both internal to Teton Village and to regional trail systems” shall be provided.

While the Proposed Action involves only improvements on NFS land within the resort’s SUP boundary, those improvements are consistent with, and complementary to, these Village goals.

1.7 SCOPING AND IDENTIFICATION OF ISSUES

In December 2014, the BTFNF issued a public scoping notice summarizing JHMR's proposed Recreation Enhancements Project (the Proposed Action) and inviting comments regarding the scope of the associated NEPA review. A public scoping notice was mailed to 415 agencies, organizations, and individuals on the BTFNF mailing list. The notice was also posted on the BTFNF website at <http://www.fs.usda.gov/goto/btnf/projects> and made available on CD or in hard-copy form to anyone requesting it.

In addition to meeting NEPA's scoping requirements, this exercise also met the agency's obligations regarding public notice and comment on a proposed action, per the Forest Service's project-level pre-decisional administrative review process (36 CFR 218, Subpart B).

The comment period formally began on January 11, 2015, when the BTFNF's Legal Notice of Comment Period was published in the *Casper Star Tribune* (Newspaper of Record), and closed on February 10, 2015. Comment letters were received from one agency, one organization, and three individuals. Three additional comment letters were received after the close of the comment period. The scoping notice and comment letters are included in the Administrative Record, as is a *Scoping Report and Response to Comment on the Proposed Action: Jackson Hole Mountain Resort Recreation Enhancements Project*. This report identifies commenters, comments received, and the disposition of those comments.

The Proposed Action and scoping results were reviewed, in conjunction with Forest Service specialist input, to determine the environmental issues and alternatives to the Proposed Action (40 CFR 1508.25) to be addressed in this EA. Issue statements were formulated, organized by resource discipline, then reviewed and approved by the Responsible Official. They include issues to be analyzed in depth and those dropped from in-depth analysis for various reasons (e.g., because they were beyond the scope of this environmental analysis, expressed opinions rather than raising issues, involved matters covered by other laws or regulations, or were too speculative to effectively analyze). These two categories of issues as they apply to this Proposed Action are as follows.

1.7.1 ISSUES ANALYZED IN DEPTH

Scoping and internal, interdisciplinary review identified the following issues which will direct the EA's analysis of direct, indirect, and cumulative effects. The paragraph following each issue statement identifies the potentially affected resources and the impact mechanism. The next paragraph summarizes the impact indicators used in the analysis.

Soil, Water, and Watershed Resources

- *How would the proposed infrastructure affect erosion, sedimentation, and water quality?*

The project area is characterized by steep slopes, erosive soils and, in many areas, sparse ground cover. Construction-related disturbance and subsequent use could result in increased soil erosion, sediment transport, and water quality impacts.

Indicators: A risk rating for each project based on soil type, disturbance area, intensity of disturbance, slope, presence of a runoff pathway, distance to a water body, and efficacy of proposed mitigation.

- *How would the proposed infrastructure affect wetlands and riparian areas?*

While water resources in the SUP area are limited, the project area includes several types of wetlands, riparian areas, and intermittent and perennial streams. Construction and subsequent use could decrease the functioning and the extent of these valuable, aquatic habitats.

Indicators: An estimate of the acreage of these habitats lying within disturbance footprints and discussion of the resulting effects on function and extent within the permit boundary.

Vegetation

- *How would the proposed infrastructure affect special-status plant species?*

No federally listed plant species are known to occur at JHMR, but four Forest Service Region 4 sensitive species (including whitebark pine, a candidate for federal listing), eight Wyoming state species of concern or species of potential concern (two of which are also Forest Service sensitive species), and two BTNF management indicator species (MIS) may occur in potentially disturbed areas. Glading, clearing, grading, excavation, or subsequent use could adversely affect plants of these species.

Indicators: Species-specific determinations of the potential individual- and population-level impacts, based primarily on past surveys and published information on the species' distribution and population status.

- *How would the proposed infrastructure affect forest vegetation at the resort?*

Forest communities are among the most productive and structurally diverse vegetation types occurring at the resort, and trees would be cleared to accommodate most of the proposed lifts, buildings, runs, and trails. This would eliminate some forest vegetation and fragment blocks of forest habitat.

Indicators: Assessment of the amount of forest vegetation removed and qualitative description of the resulting fragmentation.

Wildlife

- *How would the proposed infrastructure affect special-status wildlife species and other species of interest or concern?*

Potential habitat for 3 federally listed species, 10 Forest Service Region 4 sensitive species, and 8 MIS species – some in more than one category – occurs in the JHMR permit area. Other species of concern to the public or agencies are also present and were analyzed, such as migratory birds. These species could be affected through habitat alteration resulting from clearing, grading, excavation, or changed patterns of human activity.

Indicators: Species-specific determinations of the potential individual- and population-level impacts, based primarily on past surveys, surveys completed for this analysis, published information on the species' habitat distribution and population status, and efficacy of proposed mitigation.

Scenic Resources

- *How would the proposed infrastructure affect the scenic quality of the SUP area?*

The SUP area viewscape has been affected by 50 years of ski-area development but generally retains its natural character. Additional clearing and infrastructural development could alter that character and detract from the area's scenic integrity.

Indicators: Analysis of effects using the methods prescribed in the Forest Service Scenery Management System (SMS), in accordance with the BTNF Forest Plan.

Recreation

- *How would the two optional locations for the upper terminal of the Sweetwater gondola affect skier circulation, lift access, and safety?*

Under Option 1, the terminal would be built just above Casper Restaurant, at a site that is limited by topography and subject to heavy skier traffic. Skiers visiting the restaurant, entering the area from either Togwotee or South Pass traverse, or dropping down Easy-Does-It run to the lower terminal of Casper lift

all pass through the area. Option 2 would place the terminal just below the intersection of the Togwotee and Solitude traverses – another high-use area. The mixing of skiers of diverse ability levels, doing different things, in relatively small spaces could impact circulation and access to the lifts and restaurant. Either option could result in more collisions and injuries.

Indicators: Assessment of projected skier volumes and routes through and around the alternative terminal locations, relative to the existing and proposed infrastructure, to identify any significant, adverse effects on these variables.

Safety

- *Would the Via Ferrata provide a safe recreational opportunity given the character of the rock at the proposed sites?*

While the cliffs in upper Casper Bowl are generally sound granite, the proposed sites below Tram towers #4 and #5 are on rock that is more fractured and, in some cases, relatively soft. This results in potential for rock fall and may make placement of secure anchors difficult.

Indicators: Qualitative assessment of the proposed routes, installed infrastructure, and management practices for the Via Ferrata as they interact with the rock type and structure occurring in the area.

- *Would the proposed hiking and mountain bike trails increase the potential for wildlife conflicts?*

The proposed trail systems traverse most habitat types in the SUP area, including thick mountain brush and forested areas where sudden encounters with bears or moose could result in attacks, with adverse consequences for both the people and the animals involved.

Indicators: Qualitative assessment of the potential for wildlife and hiker/biker conflicts, incorporating the species, habitat types, and recreational activities involved.

1.7.2 ISSUES CONSIDERED BUT NOT ANALYZED IN DEPTH

Growth-Related Effects

In terms of addressing growth-related effects of the Proposed Action and alternatives, JHMR's 2014 MDP maintains the same comfortable carrying capacity (CCC) of 7,690 visitors as all planning and NEPA documents since the 1996 EIS. As a result, the effects of this number of visitors have been well studied and disclosed previously, and the resulting focus of this EA is the resource impacts of infrastructure development under the Proposed Action and alternatives, and not the impact of more visitors to JHMR. Accordingly, impacts in the following areas have already been analyzed and disclosed and will not be addressed in this EA:

- Air Quality
- Transportation
- Utilities
- Socio-economics
- Capacity Balance (i.e., whether key capacities such as parking, food service seating, lifts, and terrain are in balance)

To validate this approach, actual skier visits since 1996 were reviewed. While peak-day visitor numbers (e.g., Christmas—New Year's Day and President's Day weekend) have occasionally exceeded 8,000, average visitation has remained well within approved CCC. As noted in the MDP, peak-day exceedances of CCC by up to 25 percent (up to 9,613 in this case) are anticipated by ski area planners. Visitor numbers are not anticipated to exceed those considered in past planning and environmental review.

Fisheries

- *How would the proposed infrastructure affect fish species and habitat?*

Discussion: Fish do not occur in the two, small, perennial streams within the SUP area. These streams are tributaries to Fish Creek, entering that fish-bearing stream immediately below the base area. This could make indirect impacts a possibility if water quality impacts – potentially associated with construction-caused sedimentation of on-mountain intermittent and perennial streams – affected Fish Creek. However, all flows off the mountain are culverted beneath the base area and pass through settling ponds before discharge to Fish Creek. This system precludes any notable off-site water quality impact.

Heritage Resources

- *How would the proposed infrastructure affect the historic integrity of the resort and any historic properties in the SUP area?*

Discussion: As a result of previous cultural resource investigations, a total of 1,027 acres have been surveyed at the Class III level at JHMR. No historic properties have been identified within the Proposed Action's area of potential effect, so no effects are anticipated. In a May 18, 2015, response (SHPO 2015), the Wyoming State Historic Preservation Office (SHPO) concurred with the BTNF's determination (Forest Service 2015a) that no historic properties would be affected by the Proposed Action.

- *How would the proposed infrastructure affect historic (prior to establishment of the ski area) and pre-historic resources?*

Discussion: Previous heritage-resource investigations, including pedestrian surveys of all high-potential areas, have located no historic or pre-historic resources at JHMR, and JHMR is required to cease construction and report any discovery of buried resources to the BTNF Forest Archaeologist. As a result, there is no need for in-depth analysis of this issue in the EA.

- *How would the proposed infrastructure affect Traditional Cultural Places (TCPs)?*

Discussion: The BTNF has consulted with representatives of area Native American Tribes, the Shoshone-Bannock, Gros Ventre, and Eastern Shoshone, in the course of previous NEPA reviews involving JHMR to ensure that no Tribal concerns were overlooked. No TCPs or other Tribal concerns have been identified. Representatives of these Tribes were notified of this Proposed Action, and only the Eastern Shoshone responded, identifying no concerns. If any cultural resources, TCPs, or sacred sites are encountered at the resort, any action that could adversely affect them must cease, and the Forest Archaeologist must report the find to appropriate Tribal representatives and fulfill consultation requirements. As a result, there is no need for in-depth analysis of this issue in the EA.

Recreation

- *How would the Sweetwater gondola and subsequent, more efficient access to the Teton lift affect winter travel out of JHMR into Granite Canyon?*

Discussion: The issue of skiers accessing Granite Canyon and other terrain in the Park is complex and has been analyzed and discussed in detail over time. The BTNF and JHMR work on an ongoing basis with Grand Teton National Park to develop and implement effective boundary management procedures. The Teton lift will likely result in more use of adjoining Park terrain, and this potential impact was analyzed in the 1996 EIS. Those analyses included the effect of the Crystal Springs lift in the same alignment as the proposed Sweetwater gondola, and the BTNF approved that lift. We do not believe that the upgrade to a gondola, with a similar capacity to the approved lift system, would appreciably alter the affects described in the previous analysis.

- *Would the proposed lift-served mountain bike trails help meet the desires of the local biking community?*

Discussion: The intent of the proposed biking trails is to provide opportunities for area visitors as well as the local biking community. Demand for lift-served trails is increasing nationwide, providing sufficient purpose and need for the proposed trail system. Jackson Ranger District’s Summer Non-Motorized Trail Assessment, identifies JHMR as an area to manage for relatively high trail densities and cites considerable desire from the cross-country and downhill mountain biking communities for additional trails in the Jackson Hole area.

1.8 REQUIRED PERMITS AND AUTHORIZATIONS

Table 1-1. Other permits, approvals, and consultations that may be required for implementation of the Proposed Action or an action alternative.		
Agency	Type of Action	Description of Permit or Action
Federal		
USDA-Forest Service	ANSI, ASHTI, and other code compliance review for lifts and structures.	Final designs for approved lifts and structures go through Regional-level engineering review to ensure compliance with applicable codes and agency standards. Lifts also require post-construction testing and approvals.
U.S. Army Corps of Engineers (COE)	Issuance of Clean Water Act, Section 404 Permit	The COE issues permits required for the discharge of dredged or fill materials into waters of the U.S., including wetlands. Nationwide or individual permits may be involved.
Environmental Protection Agency (EPA)	Review and comment regarding: Clean Air Act, as amended, 42 U.S.C.A. Section 7410-762 (PL 95-604, PL 95-95) Federal Water Pollution Control Act, as amended by the Clean Water Act, 33 U.S.C.A. Section 1251-1376 (PL 92-500, PL 95-217) Safe Drinking Water Act, 42 U.S.C.A. Section 300F-300J-10 (PL 93-523) Clean Water Act, Section 404 Permit	Under NEPA, the EPA is required to review and comment on “major federal actions that have a substantial impact on the human environment.” The EPA’s responsibility and role is to provide scoping comments, review EISs, and provide information and appropriate technical assistance during and following the environmental analysis process. Specific environmental legislation for which the EPA is responsible and which may be applicable to this Proposed Action is shown to the left. Administrative and enforcement responsibilities have been delegated to the State of Wyoming for all three acts. The EPA may be involved in 404 permitting in association with the COE.
Fish and Wildlife Service (FWS)	Endangered Species Act, Section 7 Consultation Fish and Wildlife Coordination Act consultation Section 404 Permit Consultation	If impacts on federally listed species are possible, the FWS will consult with the Forest Service, review a Biological Assessment (BA), and issue a Biological Opinion. The FWS also coordinates with the Forest Service in accordance with the Fish and Wildlife Coordination Act and reviews Section 404 permit applications to avoid adverse impacts to federally listed species.

Table 1-1 (cont'd). Other permits, approvals, and consultations that may be required for implementation of the Proposed Action or an action alternative.		
Agency	Type of Action	Description of Permit or Action
State of Wyoming		
Department of Environmental Quality (DEQ): - Water Quality Division (WQD)	Wyoming Pollutant Discharge Elimination System Permit and Stormwater Pollution Prevention Plan	The WQD review ensures that state and federal water quality standards are not exceeded. This is achieved through issuance of a 5-year WPDES permit for large construction projects which is update annually to reflect JHMR's plans for construction each year.
State History Division	Consultation on National Historic Preservation Act, Section 106 compliance process	The Division is responsible for protection of cultural resources.
Teton County		
Fire Marshal	Electrical and Life Safety Review	As a condition of Forest Service construction authorizations, the Teton County Fire Marshal inspects buildings during construction to ensure that wiring and electrical facilities are properly installed and required safety devices such as smoke alarms and sprinkler systems are in place.

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CHAPTER 2: PROPOSED ACTION

2.1 INTRODUCTION

This chapter outlines the alternative formulation process, describes the No-Action Alternative which provides the basis for assessing the effects of the Proposed Action, describes the Proposed Action, list design criteria that will be in place regardless of the alternative selected, discusses alternatives considered but not analyzed in depth, then summarizes the environmental effects of the alternatives.

2.2 ALTERNATIVE FORMULATION

Analysis of the No-Action Alternative provides a baseline for assessing the impacts of the Proposed Action and action alternatives. In this case, no action would mean that the proposed Recreation Enhancements Project was not approved. JHMR would continue current operations and previously approved projects. The previously approved projects slated for completion within the same 3-year timeframe as the Proposed Action, coupled with on-going operations, comprise the No-Action Alternative in this analysis, described below (section 2.3). Their environmental effects are summarized from the 1996 EIS and 2000 EA and updated as appropriate in Chapter 3 of this EA.

The projects included in the No-Action Alternative were previously authorized in the 1996 ROD and 2000 DN/FONSI. Given the length of time since the approvals, these projects will not be implemented until an assessment of new circumstances or information is conducted in accordance with Forest Service NEPA Handbook direction (FSH 1909.18). Inclusion of these projects in the No-Action Alternative provides the most complete, foreseeable baseline against which the impacts of the Proposed Action can be measured, as required by NEPA direction (NEPA's Forty Most Asked Questions, no. 3).

As indicated above (sections 1.1 and 1.5), JHMR's proposed Recreation Enhancements Project is the Proposed Action addressed in this EA. It is described in detail below (section 2.4).

Action alternatives are different courses of action by which the purpose and need addressed by a proposed action could reasonably be achieved. For this analysis, no issues raised during scoping or internal interdisciplinary review suggested the need to consider an action alternative. (See section 1.6 below summarizing alternatives considered but not carried into in-depth analysis.)

Section 3.2 of this EA describes the type and extent of surface disturbance associated with each project included in the No-Action Alternative and the Proposed Action.

2.3 ALTERNATIVE 1 – NO ACTION

Under the No-Action Alternative, the Proposed Action would not be authorized. Ongoing resort operations would continue, as well as six previously approved projects that JHMR plans to complete within the next 3 years (see section 2.2). Three of these projects date back to the 1996 EIS and ROD, and three are from the 2000 EA and DN/FONSI. Descriptions of the six projects from the 1996 EIS and 2000 EA are provided below. Any changes in the description or status of each project are noted following the quoted description.

2.3.1 NEW OR WIDENED SKI RUNS FROM 1996 EIS

The three projects from the 1996 EIS and ROD included in this No-Action Alternative are ski trail projects. The EIS describes the overall terrain development plan which includes these projects as follows:

With implementation of this alternative, [JHMR] would expand the existing formalized network of ski trails. Overall, the formalized network of trails would increase from 911 acres to

1,010 acres, a net increase of about 11 percent. This expansion would result from the construction of new trails and the upgrade of existing trails, ultimately involving a total of 37 trails ... New trails would be developed for circulation from new lifts. The other trails would be upgraded in response to the relocation of lifts or to improve circulation on the mountain.

The new and upgraded trails would not be evenly distributed across the mountain... Because of the location of the new lifts, most of the new trails would be constructed on the upper portions of the mountain. However, some new trails also would be developed on the lower mountain to improve skiing opportunities for beginner skiers and to increase the capacity of trails into the base area.

When the expansion of the formalized network of ski trails proposed under this alternative is completed, the distribution of terrain by skier ability would be closer to the national distribution of skier abilities... Terrain in the beginner, novice, and advanced intermediate categories would most closely match the goals. However, a surplus of expert terrain and a shortage in the low intermediate and intermediate categories would continue to exist.

The development of new trails and upgrades of existing trails could involve the removal and burial of stumps and rocks, followed by grading, fertilizing, seeding, and mulching. Where the removal of trees is required to provide a safe skiing experience, the number of trees removed would be minimized. In addition, visually-hard edges or lines would be avoided and man-made openings would be interspersed to simulate the natural surroundings and to encourage natural revegetation by forbs, grasses, and shrubs. The development of trails would incorporate the management of existing stands of trees for diversity in species and age classes as well as resistance to wind, insect infestation, disease, and fire. (Forest Service 1996, p. 2-30)

Much of the terrain development analyzed in the 1996 EIS has been completed. The three remaining projects that JHMR plans to complete in the next 3 years are:

- Upper Headwall Ridge. This project, now called Casper traverse, will improve access to Casper Bowl from Bridger gondola. About 1,100 feet of grading averaging 45 feet in width will result in a 16-foot-wide traverse surface and about 4.8 acres of advanced terrain, including some natural forest openings. Extensive blasting will be required. No aquatic features are involved. The project is currently about half complete.
- Lower Sundance Gully. This project entails placing up to 6 feet of fill material to widen the skiing surface in roughly 1,000 feet of this narrow, constricted gully section of Sundance run. This will reduce the constriction and add about 0.3 acre of advanced terrain. A seasonal drainage channel through the gully will be reconstructed.
- Eagle's Rest Cutoff. This project will add much-needed beginner terrain in an accessible, centralized location. It will entail clearing of relatively thick forest vegetation, but no whitebark pine is involved. The disturbance footprint will be roughly 1,700 feet long and 150 wide. About 5.6 acres of beginner terrain will be developed. Seasonal drainage channels at the upper and lower ends will be culverted.

These projects are shown in Figure VI-1 from the 1994 MDP, modified to show these specific locations, included in Appendix A of this EA.

2.3.2 UPPER APRES VOUS TRAVERSE FROM 2000 EA

The proposed Upper Apres Vous traverse would begin on the west side of the Apres Vous terminal and egress onto Werner run after making two switchbacks underneath the lift alignment. The trail would require approximately 0.6 acres of ground disturbance in a previously undisturbed area, 0.1 acres of ground disturbance in a previously graded area, and

0.5 acres of tree removal, particularly along the eastern edge of the Werner run. The trail would cover approximately 1.1 acre. A depiction of this element of the Proposed Action is provided as Figure 2.8. (Forest Service 2000, p. 2-12; Figure 2.8 and 2.16 included in Appendix A)

JHMR has not initiated this project, which was authorized in the 2000 DN/FONSI.

2.3.3 COMPLETION OF HALFPIPE FROM 2000 EA

Installation of a new in-ground snowboard halfpipe and terrain park would provide increased and managed opportunities for snowboarding activities on Apres Vous Mountain. Two potential locations have been identified for the permanent site for this 500 feet by 140 feet facility. Only one site would be developed. The area developed for this purpose would be served by a short tow, approximately 500 feet long. Egress and ingress trails to the site would also be required. Halfpipe construction generally requires an eight foot excavated trench bordered by an equal height of fill used to make the platform. The halfpipe would be constructed to International Ski Federation standards. Those standards require slope grades for halfpipes to be between 26 and 40 percent. The best orientation for halfpipe construction is on southeast-facing slopes in order that both walls of the pipe have approximately the same snow conditions throughout the day. The two sites being evaluated in this EA both have southeast-facing orientations.

Option 1 for the snowboard/terrain park is sited between the Werner and Hannah runs, north of the Teewinot Quad terminus. The slope gradient in this area is ideal for halfpipe construction, 32 percent. Construction of the snowboard terrain park in this location would require approximately 3.4 acres of disturbance in a previously undisturbed area and up to 3.0 acres of tree removal. Total area affected would be 3.5 acres. Approximately 0.1 acres of wetlands would be affected. A depiction of this element of the Proposed Action is provided as Figure 2.9.

Option 2 is sited between the Togwotee Pass traverse and the Solitude traverse, west of the Moran run. The slope grade in this area, 47 percent, is a little more than ideal, but is still suitable. Construction at this site would avoid the creek bed which would run on the western edge of the terrain park, and would require approximately 1.0 acres of disturbance in a previously undisturbed area and about 0.9 acres of tree removal. Total area affected would be 2.1 acres which would include 0.1 acre of wetlands. A depiction of this element of the Proposed Action is provided as Figure 2.10. A summary of ground disturbance for proposed ski trails under Alternative B is provided at the end of Section 2.2.6. (Forest Service 2000, p. 2-12; Figure 2.9 and 2.16 included in Appendix A)

In 2001, JHMR constructed this halfpipe, authorized in the 2000 DN/FONSI, at the site between the Werner and Hannah runs. All of the clearing and surface disturbance cited in the description above took place at that time. However, there was not sufficient material available at that time to complete the platforms on either side to the approved height. JHMR now plans to finish the project by adding roughly 6 feet to the height of the platforms. About 1.6 acres of temporary surface disturbance associated with heavy equipment operation and grading would occur.

2.3.4 COMPLETE REMAINDER OF AUTHORIZED HIKING AND BIKING TRAIL SYSTEMS FROM 2000 EA

An upgraded and expanded trail system is proposed to provide a user-friendly network for hiking and mountain biking. User groups would not be restricted on the trails, but appropriate signing and trail management would be employed by JHMR to avoid potential conflicts among types of trail users such as hikers, bikers, large or small groups, individuals, or horseback riders. New trail construction not occurring on already existing roads would be constructed to a width of 24 inches. Trail grades will range between 2 and 15 percent. The development of a hiking

and biking trail system at JHMR is proposed to be implemented over a period of several years in at least two distinct phases. The trail network will be for free use, except for lift fees and bike rentals. The trail network will be designed to be attractive to bicyclists and offer advantages over other trails within the National Forest.

Phase I trails would include use of 4.5 miles of an existing loop trail network near the base area. The existing trail loop would be expanded to total approximately 10 miles of trail. Approximately 7.2 miles would be new trail construction; 2.6 miles would be repair/upgrade of existing roads or trails; 0.3 miles of the Valley trail would be relocated. These trails would provide lower-ability level mountain biking opportunities. Phase I would affect a total of 3.8 acres of which 2.2 acres is on previously undisturbed soil, 0.1 acres would be within wetland, and 2.0 acres would be in a forested area (Note that categories are not exclusive). A depiction of this element of the Proposed Action is provided as Figure 2.11.

The Phase II portion of the proposal would expand the mountain bike trail network on the mid and upper mountain of JHMR. Approximately 15.4 miles would be new trail construction, with a total network of 21 trail miles. Trails would be routed on existing roads, existing single track, and previously undisturbed areas. The Bridger gondola and Apres Vous detachable quad lift would be used to facilitate the use of trails in Phase Two and would provide experiences suitable for the more advanced rider. Phase II would affect a total of 7.4 acres of which 4.1 acres is on previously undisturbed soil, 0.5 acres would be within wetland, and 3.1 acres would be in a forested area (Again note that categories are not exclusive). A depiction of this element of the Proposed Action is provided as Figure 2.12. (Forest Service 2000, p. 2-16; Figures 2.11, 2.12 and 2.16 included in Appendix A)

Since authorization in the 2000 DN/FONSI, JHMR has completed all but about 1 mile of the Phase 1 trails on the lower mountain and all but 2.7 miles of Phase II trails on the mid and upper mountain. The Phase 1 trail segment considered in this alternative branches from an existing trail in Teewinot Gully and switchbacks down Lower Teewinot run. The Phase 2 segment runs from Casper Bowl, parallels Moran Traverse, crosses Moran Face to near the upper terminal of Apres Vous, then switchbacks down Teewinot Face to tie into the existing system.

2.4 ALTERNATIVE 2 – PROPOSED ACTION

The Proposed Action comprises the following 16 projects. Project locations are shown on Figure 2-1.

2.4.1 SWEETWATER GONDOLA INSTALLATION

This 2,000-people-per-hour (pph) gondola would be about 4,500 feet long with a vertical rise of 1,300 feet. The lower terminal would be located adjacent to the Teewinot lift base terminal, and a mid-way unloading station would be built near the intersection of Jackson Face and Solitude Way runs. A gondola cabin storage facility similar to the structure at the top of Bridger gondola would be built adjacent to the mid-way station. The building footprint would be up to 6,900 square feet, dug partially into the hillside to decrease its visual impact. Water would be piped a short distance from the existing water system on site.

Two options for an upper terminal are being considered. Option 1 is adjacent to the upper terminal of the current Sweetwater triple chairlift and just uphill from Casper restaurant. Option 2 is between Ashley Ridge and Kemmerer runs at an area known as The Crossing – the intersection of Solitude and Togwotee Pass traverses. This alignment would provide more space for skier circulation and better access to the Apres Vous and Teton lift lower terminals. The mid-way station would remain in the same location for either option but would require a bend (angle) in the alignment for Option 2. Power for the top-drive lift is available at either location as well as at the mid-way station for the gondola storage facility.

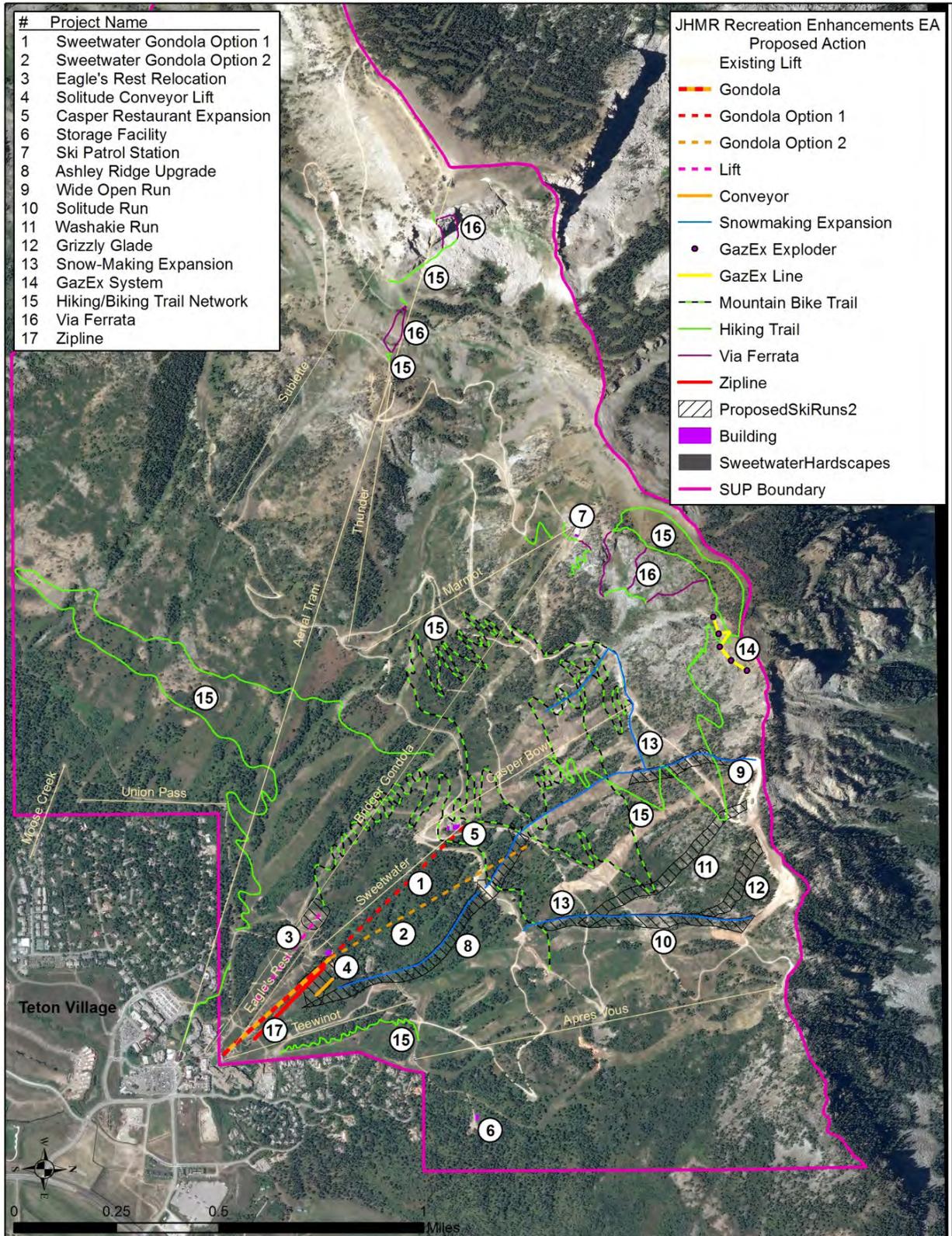


Figure 2-1. JHMR Recreation Enhancements EA Proposed Action.

Heated plaza areas (hardscapes) would be installed at the lower, mid, and upper terminal areas. Power for heating is in place at all locations. The base and mid-station hardscapes might be heated with natural gas trenched in from the maintenance building rather than more expensive electricity. Limited new access roads would be required for this project, and realignment of some existing roads may be necessary. Any disturbance for roads would be within the graded project footprint.

The new gondola would support the overall purpose and need for action (see section 1.4) in several ways. It would increase out-of-base capacity by 35 percent, significantly reducing wait times for the Tram, Bridger gondola, and Teewinot lift and getting skiers onto the mountain more quickly and efficiently in the morning and through the day (need 5 in section 1.4).

Beyond that, terrain suitable for beginning skiers is limited to the lower slopes, and JHMR's Mountain Sports School (MSS) programs for this category of visitors have historically focused operations in the base area. The mid-way unload station would provide easy access to gentle terrain, the Solitude tent, and other proposed facilities (see Eagle's Rest and Solitude conveyor lift descriptions below), providing a new venue for first-time and beginner skiers and MSS programs, away from the congested base area. This would help resolve need 1 listed above in section 1.4.

Finally, under Option 1, the gondola would allow summer operation of Casper restaurant, addressing the purposes of increasing year-round recreational opportunities and making the best use of existing infrastructure as well as the need for more food-service seating and basic services (need 6 in section 1.4).

2.4.2 EAGLE'S REST LIFT RELOCATION

The existing Eagle's Rest lift, a 50-year-old double chairlift, is a short lift accessing beginner terrain just above the base area. Its lower terminal is in the congested area shared by the Bridger gondola and the Teewinot lift. This lift would be replaced with a 1,200 pph fixed-grip triple chair, shifted uphill, and angled slightly northward along the tree line on the skier's left side of Eagle's Rest run. The new lower terminal would be about 800 feet upslope from the existing terminal. The new lift would be about 1,400 feet long, with a vertical rise of 250 feet.

The proposed alignment runs along the north edge of Eagle's Rest run, mostly in the cleared ski slope. Some trees would be removed for lift clearance. Grading for the upper terminal could affect an ephemeral drainage channel. Power would be trenched into an existing access road from the current upper terminal to the new one. A short extension of the existing road would be necessary. The upper terrain would be re-graded to provide beginner terrain with varying slope.

With the Sweetwater gondola mid-way unloading station described above, the Solitude conveyor, and modified zip-line alignment, this lift relocation is part of JHMR's effort to shift first-timer and beginner activity – and associated MMS programs – out of the congested base area. The beginner terrain served by the relocated lift would provide a logical and readily accessible next step up for beginners ready to tackle a chairlift and slightly more challenging skiing. This would help resolve need 1 listed above in section 1.4.

2.4.3 SOLITUDE CONVEYOR INSTALLATION

Conveyor lifts, or "moving carpets," are the easiest lifts for first-time and beginner skiers to use with skis on their feet, as opposed to gondolas and trams. This 300-foot conveyor would be located on gentle terrain just below and north of the Sweetwater gondola mid-way unloading station, close to the existing Solitude tent. It would be covered, most likely with an awning-type roof.

A roughly 4-acre area around the lift would be cleared and graded to provide appropriate terrain for first-timers and beginners. A new access road from the Solitude tent would be routed through the cleared and

graded area, and power would be trenched into this road. The area is partially forested and supports streams and riparian areas.

This project would be part of the proposed shift of MSS programs for beginning skiers out of the base area. It would help resolve need 1 listed above in section 1.4.

2.4.4 CASPER RESTAURANT REMODEL/EXPANSION

One of the main constraints resulting from growth in skier numbers at JHMR over the past decade is a shortage in on-mountain food service seating. Currently, the sole option in the northern portion of the ski area is Casper restaurant. Built in 1986, the facility provides 276 indoor and 120 outdoor seats. A larger, more up-to-date facility is needed to meet demand at that location, particularly when the Teton lift and Sweetwater gondola begin operation, delivering skiers to the site.

The proposed remodel and expansion would start with adding a three-story addition to the south (downhill) side of the building. Subsequently, the building footprint would be extended on the north side of the existing building, and a second floor would be added to the expansion area. The kitchen/scramble area would be completely remodeled, and a new paved and heated plaza would extend to the unloading area of the Sweetwater gondola. The resulting structure would have up to 28,000 square feet of floor space and 675 food service seats. The existing sewer and water systems would be expanded to accommodate the proposed increased capacity of the building.

The proposed Sweetwater gondola would provide summer access to the facility. With increased seating and summer access, this project addresses needs 6 and 8 listed above in section 1.4.

2.4.5 STORAGE FACILITY

JHMR has outgrown its storage facilities, and a variety of miscellaneous equipment and materials is stored outside in the existing operations storage area (bone yard). This leaves the stored material unprotected from the elements, and it creates an eyesore in in the backyards of the Granite Ridge residential development.

To improve this situation, JHMR would construct a new two-story building approximately 80 feet long and 40 feet wide – a 3,200-square-foot footprint and 6,400-square-foot gross floor area. The building would be approximately 28 feet tall with a gable roof and dark brown siding. It would be located along the north side of the existing bone yard access road. The area has been mostly cleared, and there are no streams or aquatic habitats on the site.

This project does not specifically address purpose and need as outlined in section 1.4. It is, however, a past-due operational improvement and is consistent with the second purpose, utilizing existing infrastructure for new services.

2.4.6 BRIDGER GONDOLA SKI PATROL STATION

In order to provide more on-mountain seating, JHMR has replaced its existing retail space and Ski Patrol station at the Bridger restaurant with additional food service. However, increasing demand for patrol functions at his location requires more operational space. A 675-square-foot addition is proposed to be added to the end of the existing gondola cabin storage facility. This single-story addition would match the look of the existing structure which includes painted metal siding and colored trim. This project is a necessary response to JHMR's efforts to addresses need 6 listed in section 1.4 above.

2.4.7 ASHLEY RIDGE RUN UPGRADE

The band of steep terrain between 6,700 and 7,400 feet at JHMR limits egress from the upper mountain to the lower slopes and base area. In the Casper and Apres Vous areas, Werner run is the main route off the

mountain, and it is heavily used. Development of Teton lift and the proposed Sweetwater gondola increase the need for an alternative egress route. The existing Ashley Ridge run is an alternative route but the lower portion, below South Pass Traverse, is an advanced run and is never groomed due to large rocks and difficult cross slopes.

To create a new, intermediate egress route from the upper mountain, the section of Ashley Ridge between Togwotee and South Pass traverses, which is already popular intermediate terrain, would be widened and realigned to join the lower section below South Pass Traverse. A 120-foot-wide concrete skier overpass would be built over that traverse to avoid crossing skier traffic. Below the traverse, the run would be redeveloped, following the ridge top with an average width of 150 feet, with a maximum grade of 55 percent, extending down to tie into Antelope Flats run just above the base area. Coupled with improvements to Upper Wide Open run, which links to Ashley Ridge from above, this project would result in a continuous, intermediate-level egress route from the top of Teton lift to the base area that is groomable and has snowmaking coverage.

This project would require extensive tree clearing and grading to redevelop the ski run. Buried snowmaking lines would be installed (see section 2.4.12 below). A temporary access road would need to be built near the base of the project and on a portion of Werner run to provide construction access at the middle of the project. These temporary construction roads would be reclaimed upon completion of the project. The lower portion of the run would cross a drainage channel, but no filling or grading of natural aquatic features would occur in this area. This project would help meet needs 2, 3, and 4 listed in section 1.4 above.

2.4.8 WIDE OPEN RUN EXTENSION

Installation of the new Teton lift will create the opportunity for additional intermediate runs in the Crag area. Upper Wide Open was cleared under a previous authorization, but it is a rocky, advanced run descending via a difficult entry from the ridge south of the Teton upper terminal site. The upper portion passes among numerous rock outcrops. To make it accessible from the new lift, the run would be extended about 1,200 feet toward the Teton upper terminal. To make it a groomable and achieve an intermediate difficulty level, rock outcrops would be blasted and the run surface graded down to Moran Traverse. Snowmaking would be installed, tying into the system on the adjoining Ashley Ridge run (see section 2.4.12 below). This project would help meet needs 2, 3, and 4 listed in section 1.4 above. Trees have been cleared from the run under a previous authorization.

2.4.9 SOLITUDE RUN DEVELOPMENT

The other opportunity to provide additional intermediate terrain accessed from the new Teton lift is development of a new run adjacent to the existing Moran run. This run would also be accessible from the Apres Vous lift. A moderate amount of tree removal and grading would be required to make a groomable upper intermediate run. Snowmaking would be installed (see section 2.4.12 below). There are seasonal stream channels within the disturbance area of the project but they would generally be left undisturbed. This project would help meet needs 2, 3, and 4 listed in section 1.4 above.

2.4.10 WASHAKIE RUN DEVELOPMENT

Taking further advantage of the new Teton lift, this new advanced run would follow the fall line from a point just east of the upper terminal down to Togwotee Pass Traverse. Initially this run will be extensively gladed, with only major rock outcrops removed, and utilized for several seasons to determine whether further improvements (i.e., clearing and grading) to increase skier capacity were warranted. The clearing width would be up to 160 feet and would require moderate tree removal. No aquatic features would be affected.

This project does not specifically address purpose and need as outlined in section 1.4. It is, however, a logical way to take advantage of the new lift, making it consistent with the second purpose, utilizing existing infrastructure for new services.

2.4.11 GRIZZLY GLADE DEVELOPMENT

Installation of the Teton chairlift provides the opportunity to develop more skiing terrain on Moran Face by glading this area. The concept behind this project is to connect existing treeless openings with one another while keeping the natural look of the area. This would be accomplished by selectively removing trees in dense stands and brush cutting. Some selective rock blasting/removal is also anticipated. This project would help address the purpose of using existing infrastructure for new services, listed in section 1.4 above.

2.4.12 SNOWMAKING SYSTEM EXPANSION

In the current, highly competitive skier market, it is advantageous for a ski area to open by Thanksgiving Day and essential to complete snowmaking operations prior to the Christmas holidays on all major trails. Recent warming trends make these objectives more difficult to achieve. As a result, JHMR is continually upgrading and expanding its snowmaking system. Under this proposal, they would expand snowmaking coverage to include Easy-Does-It, Wide Open, Ashley Ridge, and Solitude runs. This would expand the total coverage area from 222 acres to 248 acres, a 12 percent increase.

Expanded coverage requires the installation of underground air, water, and electrical lines and, on the actual runs, pedestals to connect snowmaking guns. Most construction activities would occur in locations that have been previously graded. The snowmaking system has already been extended halfway up Easy-Does-It. Buried lines and pedestals would be extended to the top of this run, then lines would be trenched into Amphitheater Traverse to Upper Wide Open. At that point, the line would branch to provide coverage of that run and Ashley Ridge run. The in-place snowmaking system on Werner run would be extended to provide coverage of the proposed Solitude run. About 2.3 miles of buried lines are proposed. This project would help meet needs 2 and 3 listed in section 1.4 above.

2.4.13 GAZEX® AVALANCHE SYSTEM COMPLETION

Portions of the ski terrain at JHMR are in active avalanche zones. The Craggs area has several established slide paths and are currently managed with the use of a 105 mm Howitzer. However, the Howitzer will no longer be usable in this area once the Teton lift is installed, so an alternative hazard reduction method is needed.

The resort has previously installed a GazEx avalanche hazard reduction system in the Headwall area. This system uses remotely triggered propane gas explosions to artificially release avalanches. It has proven to be very effective in reducing the occurrence of major avalanches in the Headwall area. Since the system is remotely controlled, it also reduces the risk of injury to Ski Patrol personnel. To manage avalanche hazard without the Howitzer, GazEx installations would be set up along the ridge above the Craggs area.

The proposed GazEx system expansion would consist of five “exploders,” a prefabricated propane/oxygen bottle storage shelter, buried 1-inch-diameter gas lines connecting the exploders to the shelter, and buried communication lines. No additional construction roads would be necessary, as foundation excavations would be dug by hand and concrete, the exploder units, the shelter, and the gas bottles would be flown in by helicopter. The exploders are manufactured out of metal and range in model size from the 0.8 to 1.5 cubic meters. They are approximately 12 feet tall once installed.

This project does not specifically address purpose and need as outlined in section 1.4. It is, however, an essential operational innovation that is needed to provide for skier and staff safety in the absence of the Howitzer.

2.4.14 HIKING AND BIKING TRAIL NETWORK EXPANSION

The current multipurpose trail network at JHMR consists of 14 miles of trails. The trail system dedicated specifically to downhill mountain bike riding includes an addition 5 miles of trails, for a system total of approximately 19 miles.

To meet increasing demand for hiking and mountain biking trails, JHMR would construct an additional 13.6 miles of trails within the existing trail network. About 7.9 miles would be designed to provide downhill mountain biking from the Casper and Teewinot lifts and the Sweetwater gondola. The remaining 5.7 miles would be hiking trails accessed from the Bridger and Sweetwater gondolas, with some accessing the proposed Via Ferratas located in the Casper Bowl area and the cliffs below Tram towers 4 and 5 (see section 2.4.15 below).

The trails would be constructed either by hand or with a very small “walking” backhoe or mini excavator. Using this construction method, there would be no need to remove any trees larger than 3 inches in diameter, as larger trees can readily be skirted. Brush would be cleared along the route of the trails, and the trails would be graded to a tread width of 24 inches, with disturbance up to 60 inches wide. Streams would be culverted or crossed with wooden bridges. The downhill bike trails would include banked turns and manmade features. This project would help meet needs 7 and 8 listed in section 1.4 above.

2.4.15 VIA FERRATA INSTALLATION

A Via Ferrata, Italian for “iron road,” is a protected climbing route commonly found in the mountains of Europe. The essence of a modern Via Ferrata is a steel cable which runs along a climbing route and is periodically attached to the rock for use as a safety line. Climbing aids such as iron rungs, pegs, or even ladders are commonly installed along these routes. This system allows otherwise impassable routes to be accessible to people with a wide range of climbing abilities. Walkers and climbers can follow the Via Ferrata without needing to use their own ropes and belays and without the risks associated with unprotected scrambling and climbing.

JHMR is proposing to install several Via Ferratas in the Casper Bowl area and on the cliff bands located below Tram towers 4 and 5 (Laramie and Tower 5 cliffs). The Via Ferrata system would allow JHMR visitors to experience rock climbing in a unique and safe fashion. All use of these facilities would be under the supervision of qualified JHMR guides.

The installation of the hardware (iron rungs, safety cable, etc.) would require drilling into the rock face of the chosen route. The routes would be designed and installed by companies that specialize in these types of installations. Forest Service inspection, evaluation, and certification would be required before they were opened to public use. Foot paths to the bases and tops of each Via Ferrata would be built to provide access and to interconnect the systems. This project would help meet needs 7 and 8 listed in section 1.4 above.

2.4.16 ZIP-LINE INSTALLATION WITH MODIFIED ALIGNMENT

In August 2013, the BTNF issued a Decision Memo authorizing the installation of an Aerial Adventure Course (AAC) which included a ropes course, a drop tower, and a zip-line. In order to improve operational efficiencies of the zip-line, JHMR subsequently proposed to move the starting point from a site near the top of the Teewinot lift to a point adjacent to the mid-station of the proposed Sweetwater gondola. It would be a single span, with only top and bottom towers, about 1,200 feet long.

This change would not affect the location of the ropes course or drop tower, nor would it require any more tree removal or other disturbance than required for the previously approved alignment. This realignment of the previously approved project would help meet need 8 listed in section 1.4 above in a

manner that was more consistent with the second purpose, to utilize existing resort infrastructure as the hub for new services and recreational activities.

2.5 DESIGN CRITERIA

Design criteria are measures to avoid or reduce adverse environmental effects that are identified prior to NEPA review. This analysis incorporates a number of design criteria developed on the basis of experience at JHMR and other ski areas in the region. Reducing soil erosion and adverse effects on water quality, minimizing the impacts of the hiking and biking trails systems, protecting forest and other native vegetation (particularly whitebark pine), maintaining visual quality, ensuring appropriate access to facilities, and protecting buried heritage resources are the concerns addressed by the following design criteria. They were considered to be in place in analysis of environmental consequences discussed in Chapter 3, which may identify additional project-specific mitigation measures. Implementation of design criteria and mitigation measures will be considered a condition of approval in a BTNF decision to authorize the Proposed Action.

Erosion Control

1. Disturbed site rehabilitation at JHMR is conducted in accordance with the resort's *Storm Water Pollution Prevention Plan* (SWPPP; JHMR 2011), which was prepared and is implemented as a condition of completing development projects at the resort under the Wyoming Pollutant Discharge Elimination System General Permit (see section 3.4 below). The SWPPP, updated annually to address projects slated for implementation that year, includes: appropriate best management practices (BMPs) for erosion control, sediment control, and site stabilization; operational controls; and provisions for maintenance and inspection.
2. As stated in the SWPPP, JHMR will implement any additional BMPs required by the BTNF, including ski area BMPs from *National Best Management Practices for Water-Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide* (Forest Service 2012a). Pertinent watershed BMPs are listed in Appendix B.

Hiking and Biking Trail Systems

3. All applicable Forest Service standards for trail construction will be met with respect to grade, water crossings, wetland avoidance, drainage dips and grade reversals, and turn radius.
4. All trails will be designed to avoid the cutting of trees with a diameter at breast height (dbh) greater than 3 inches to reduce impacts on upland forest. Trails will be routed around large trees and, where possible, around the roots of large trees to prevent root damage.
5. A review of proposed hazard tree or down wood removal along the trails will be conducted by JHMR and the Forest Service Permit Administrator prior to implementation. Hazard trees that must be felled will remain on site for habitat purposes, where this is consistent with safety and fuel management objectives.
6. Trail corridors will be grubbed (cleared of organic materials) so the trail surface consists solely of quality mineral soil. Grubbed organic material will be used to re-vegetate off-trail disturbed areas.
7. If any populations of special-status plant species or cultural resources are encountered during the construction process, work will be suspended in that area until the Forest Service Permit Administrator is consulted and a resolution determined.
8. Culverts a minimum of 12 inches in diameter or bridges will be used to cross channels where seasonal flow is expected. In crossing any channels where water is not expected but possible, culverts a minimum 6 inches in diameter will be used.

9. The spacing of surface water control structures along the length of the trail network will be per Forest Service Handbook guidelines at a minimum. The spacing of surface water control structures (e.g., grade reversals, drain dips, water bars) along trails within 200 feet of a channel crossing will be no less than 50 feet to minimize extension of the drainage network and to minimize sediment delivery to channels.
10. Wood features (e.g., ladder bridges, boardwalks), native soil causeways, and/or rock armoring will be incorporated into trails to avoid impacting sensitive resources such as steep slopes, tree roots, vegetation, and wet areas. Wood materials will be sourced from local suppliers and will be free of invasive species.
11. Disturbed-site rehabilitation may include topsoil replacement, planting, seeding, and fertilization where appropriate.
12. Disturbed areas will be surveyed annually to ensure success of rehabilitation efforts. If seeding or other rehabilitation efforts are not successful, the Forest Service Permit Administrator will be contacted and a site-specific, alternative, rehabilitation solution will be developed.
13. Bike trail staff will continuously monitor the trail system to ensure that rehabilitated areas are not disturbed or to remedy disturbance of rehabilitated areas.
14. Bike trail staff will continuously monitor trail system conditions to ensure that erosion or sediment mobilization away from trail corridors is not occurring and/or to implement corrective action in accordance with the project design criteria. Steep turns, with potential for damage due to hard braking, will be a particular area of focus.
15. Bike trail staff will inspect the trail system regularly to locate wet soil areas or mud puddles. If such problems persist, affected trails will be closed until conditions change, or problem areas may be crossed, if necessary, using a combination of raised mineral soil causeways, raised wooden boardwalks, and/or rock armoring. If wet conditions are widespread, the entire trail system will be closed.
16. Bike trail staff will continuously monitor the trail system to ensure that unauthorized trails or terrain features are not created by riders.
17. Downhill bike trails will be closed to hikers and other users and will be continuously monitored by bike trail staff to ensure compliance.
18. Trails will be designed to reduce potential conflicts with wildlife, (e.g., providing long sight-lines and avoiding switchbacks and other hard turns in heavy cover), and JHMR will continue to provide educational programs and materials aimed at reducing potential wildlife conflicts.

Vegetation Management

19. Soil disturbance will be minimized, and existing topsoil will be conserved for replacement.
20. Where possible, native vegetation will be retained.
21. In gladed areas, felling of trees will be accomplished with hand-held equipment. In cleared and graded areas, mechanized equipment may be used to fell and remove trees. When possible, trees will be removed over snow to designated storage areas.
22. In areas where tree selection is discretionary (e.g., hiking and biking trail construction, ski run glading, and feathering the edges of cleared runs), whitebark pine trees will not be removed.
23. Slash created by tree removal will be disposed of either through utilization, burning, chipping, mastication, lopping and scattering, or removal from the site within a specified timeframe.

24. JHMR will follow Forest Service policy (FSM 2070) and use genetically appropriate native materials for rehabilitation and restoration when possible. A qualified Forest Service botanist or ecologist will be involved in development, review, and/or approval of plant materials selected for use in site rehabilitation and restoration.
25. Any areas of native vegetation that would be disturbed and have not been previously surveyed for special-status plants will be surveyed prior to construction. Results will be reported to the Forest Service Permit Administrator, and appropriate measures to mitigate impacts will be implemented.
26. All construction equipment and vehicles used will be cleaned and certified free of noxious weeds and their seeds prior to entrance onto the BTNF. This restriction will include equipment and vehicles intended for both on- and off-road use, whether they are owned, leased, or borrowed by either contractors or subcontractors.
27. Any fill material proposed for the project, including any imported topsoil, will be first inspected by the invasive plant specialist to determine if it is weed-free, from a certified source, and thus safe to bring onto the BTNF.
28. Any straw bales, chips, or other imported mulch used in conjunction with the Proposed Action will come from a certified weed-free source.

Wildlife Protection

29. No tree cutting will occur between May 15 and July 15 to protect nesting of neo-tropical migrant and other birds.
30. All Via Ferrata hardware will extend less than 8 inches from the rock face. On slopes exceeding 60°, horizontal rungs will be installed level and have a flat surface with positive grip that could be used as a step by bighorn sheep.

Scenic Integrity

31. Permanent buildings will be designed and built in compliance with the *Built Environment Image Guide for the National Forests and Grasslands* (Forest Service 2001, FS-710). Ensuring that architectural style, building materials, size, and color are consistent with the existing visual character and meet the adopted scenery objectives. Compliance will be confirmed through Forest Service engineering review prior to construction.
32. The edges of cleared ski runs will be feathered to appear more like natural openings in forest cover, flowing with the topography and blending with the natural vegetation.

Accessibility

33. All public buildings will be designed and constructed in accordance with the *Accessibility Guidebook for Ski Areas Operating on Public Lands – 2012 Update* (Forest Service 2012b). Compliance will be confirmed through Forest Service engineering review prior to construction.

Undiscovered Heritage Resources

34. If any previously unidentified prehistoric or historic cultural resources are identified or encountered at any time during construction, efforts shall be made to protect the resource(s) until the Forest Service Permit Administrator is notified and the Forest Service fulfills its consultation requirements, including consultation with the appropriate Tribal representatives so that Tribal concerns will not be overlooked.
35. If unmarked human remains are encountered at any time during construction, all work in the vicinity of the find shall cease, with the remains covered and protected in place, and the Forest Service Permit Administrator notified immediately to begin proper notification and consultation procedures with the Wyoming State Historic Preservation Office, Native American Tribes, and

other local officials as needed (e.g., county coroner) to determine to what time period and ethnic group the skeletal material may be ascribed and the appropriate treatment.

36. If any previously unidentified Traditional Cultural Places or sacred sites are identified or encountered at any time during construction, efforts shall be made to protect the resource until the Forest Service Permit Administrator is notified and the Forest Service fulfills its consultation requirements, including consultation with the appropriate Tribal representatives so that Tribal concerns will not be overlooked.

Wetland Resources

37. Placement of lift towers in wetland areas will be avoided, and the amount of wetland area disturbed will be minimized when avoidance is not practical.
38. Trench breakers will be used when snowmaking or other utility lines cross sloped wetland areas. Trench breakers will be placed at the lower wetland boundary so that groundwater is not drained through the trench and out of the wetland.
39. Any tree removal from wetlands will be done either over the snow or after the ground has frozen to protect soil resources.

2.6 ALTERNATIVES CONSIDERED BUT NOT CARRIED INTO IN-DEPTH ANALYSIS

Public scoping identified the following alternatives that were considered but not carried into in-depth analysis for the reasons noted:

1. *Establishment of a designated game retrieval access point at the base area for hunters.*

Rationale: An agreement between JHMR and Wyoming Game and Fish Department regarding access points for hunters is outside of the scope of the Proposed Action and this analysis. Such an agreement would require a separate negotiation and can be done administratively outside of the NEPA process.

2. *Alternative Sweetwater gondola Option 2 top terminal that is either above the Solitude Traverse or north of the current diagram so that skiers can access the Solitude Traverse without hiking uphill.*

Rationale: The terminal location indicated in the scoping notice was identified by JHMR, working with their ski area planners, as the best site. It would require less extensive excavation and grading, and it would allow less restricted skier circulation, including skier flow on the Solitude and Togwotee Pass traverses, than either of the suggested locations. It would require skiers to move a short distance to get on Solitude Traverse. Based on these considerations, the EA will not analyze these alternative terminal locations in detail.

3. *Alternative plan for Ashley Ridge run that leaves tree islands and clears 75 to 150 feet width to protect snow.*

Rationale: At JHMR, tree islands impede operation of the winch cats needed to groom slopes as steep as Ashley Ridge. They are impractical as a result. As to run width, 150 feet is an industry standard, though actual widths certainly vary. The final design will be adjusted during construction to match topographic and vegetation constraints while safely accommodating desirable skier density. For analysis purposes, the nominal width of 150 feet will be used to ensure that the maximum impact on resources is analyzed.

4. *Relocate snowmaking proposed for Solitude Run to Crags or Kemmerer runs because of the unique views into Granite Canyon and more moderate grade.*

Rationale: Craggs run has more northerly exposure and higher elevation that hold natural snow better, and much of Kemmerer is also higher elevation than Solitude. Snowmaking on Upper Wide Open and Solitude, coupled with good natural snow retention on Craggs, should provide reliable skiing opportunities in the Teton lift pod under most conditions.

5. *Addition of a short run cut from where Wide Open crosses Togwotee Pass Traverse, East down to the gully and South Pass Traverse to provide a more direct route to the Teton Lift than Upper Ashley Ridge to South Pass Traverse.*

Rationale: There are two groomable routes from Upper Wide Open to the Teton lift – Solitude Traverse to Kemmerer run and Ashley Ridge to South Pass Traverse – and these provide sufficient access without developing another cut run.

6. *Ashley Ridge should be re-named to Lower Wide Open.*

Rationale: We will pass this suggestion on to JHMR. Run names are outside the scope of this analysis.

2.7 SUMMARY AND COMPARISON OF ENVIRONMENTAL EFFECTS

Table 2-1 summarizes the effects of the No-Action Alternative and the Proposed Action for each issue addressed in this analysis.

Table 2-1. Summary and comparison of environmental effects.		
Issue	No-Action Alternative	Proposed Action
Soil, Water, and Watershed Resources		
- How would the proposed infrastructure affect erosion, sedimentation, and water quality?	Would result in grading impact on 11.6 acres. Most projects have moderate to high risk of erosion and sedimentation risk prior to mitigation. Application of required design criteria and BMPs would reduce risk rating to low for all projects.	Would result in grading and excavation impacts on 58.5 acres with Option 1 for the Sweetwater gondola and 58 acres with Option 2. Most projects have moderate to high risk of erosion and sedimentation risk prior to mitigation. Application of required design criteria and BMPs would reduce risk rating to low for all projects.
- How would the proposed infrastructure affect wetlands and riparian areas?	<p>Completion of the halfpipe may temporarily impact less than 0.1 acre of scrub-shrub wetland, but this impact could readily be avoided.</p> <p>The Lower Sundance Gully and Eagle’s Rest Cutoff projects would permanently impact 1,479 feet of low-quality intermittent stream channel. Some would be culverted; most would be restored to current functioning. Section 404 permitting would require compensatory mitigation of any impact on jurisdictional wetlands or streams.</p>	<p>Projects would permanently impact 1.5 acres of forested, emergent herbaceous, and scrub-shrub wetlands and temporarily impact (i.e., restored after construction) 0.1 acre.</p> <p>Permanent impacts on 353 feet of perennial stream channels would result, with some segments culverted, others rerouted and restored to some level of functioning. Temporary stream channel impacts would include 622 feet and 138 feet of intermittent and perennial stream channel, respectively. These would be restored following construction.</p> <p>Most impacts associated with Ashley Ridge run modification and Sweetwater gondola mid-way station and associated development. Section 404 permitting would require compensatory mitigation of any impact on jurisdictional wetlands or streams.</p>
Vegetation		
- How would the proposed infrastructure affect special-status plant species?	<p>Federally listed species: None</p> <p>Forest Service sensitive species: No effect on rockcress draba or Payson’s bladderpod. May impact whitebark pine but is not likely to cause a trend toward federal listing or a loss of viability. No effect on creeping twinpod (variety <i>monticola</i>); species no longer considered a valid taxon.</p> <p>BTNF Management Indicator Species: Not likely to affect Forest-wide Shultz’s milkvetch or aspen trends.</p> <p>Wyoming Species of Concern and Species of Potential Concern: No effect on aromatic pussytoes, green spleenwort, broad-leaved twayblade, or large-flower triteleia. Potential to adversely affect milk kelloggia.</p>	<p>Federally listed species: None</p> <p>Forest Service sensitive species: May impact rockcress draba, Payson’s bladderpod, or whitebark pine but is not likely to cause a trend toward federal listing or a loss of viability. No effect on creeping twinpod (variety <i>monticola</i>); species no longer considered a valid taxon.</p> <p>BTNF Management Indicator Species: Not likely to affect Forest-wide Shultz’s milkvetch or aspen trends.</p> <p>Wyoming Species of Concern and Species of Potential Concern: No effect on large-flower triteleia. Potential to adversely affect aromatic pussytoes, green spleenwort, milk kelloggia, broad-leaved twayblade.</p>

Table 2-1 (cont'd). Summary and comparison of environmental effects.		
Issue	No-Action Alternative	Proposed Action
- How would the proposed infrastructure affect forest vegetation at the resort?	Removal of 6.5 acres of forest vegetation. Majority of impact associated with grading of Eagle's Rest Cutoff project.	Removal of 27.4 acres of forest vegetation under Option 1 of the Sweetwater gondola; 27.7 acres removed under Option 2.
Wildlife		
- How would the proposed infrastructure affect special-status wildlife species and other species of interest or concern?	Federally listed species: May affect but is not likely to adversely affect Canada lynx and grizzly bear. Forest Service sensitive species: Beneficial impact on bighorn sheep. May impact boreal owl and northern goshawk individuals but is not likely to cause a trend toward federal listing or a loss of viability. BTNF Management Indicator Species: No impact on trend Forest wide. Migratory birds: No substantial impact.	Federally listed species: May affect but is not likely to adversely affect Canada lynx and grizzly bear. Not likely to jeopardize the continued existence of the gray wolf. Forest Service sensitive species: May impact bighorn sheep, spotted bat, boreal owl, three-toed woodpecker, great gray owl, and northern goshawk individuals but is not likely to cause a trend toward federal listing or a loss of viability. BTNF Management Indicator Species: Small contribution to a slowing of the upward trend for moose on the Forest. Migratory birds: Minor detrimental impacts on Williamson's sapsucker, Lewis's woodpecker and willow flycatcher. Beneficial impact on black rosy-finch.
Scenic Resources		
- How would the proposed infrastructure affect the scenic quality of the SUP area?	Given the current visual character of the SUP area, the nature of the proposed infrastructure, and the design features in force, this alternative would retain consistency with visual quality objectives of modification and partial retention.	Same as No-Action Alternative.
Recreation		
- How would the two optional locations for the upper terminal of the Sweetwater gondola affect skier circulation, lift access, and safety?	The increased convenience of access to the top of the Casper pod via the Bridger gondola and Casper Traverse may increase use of the pod and exacerbate current crowding at the pinch point near the base of the Casper pod. Skier traffic at The Crossing would likely be reduced by completion of the Casper Traverse.	Sweetwater gondola Option 1 would increase congestion at the Casper pinch point from estimated 9 skiers per acre to 14. Skier traffic at The Crossing would be reduced by the same amount under Option 1 as under the No-Action Alternative. Option 2 would reduce congestion at the Casper pinch point since there would no longer be a lift discharging skiers there. Skier traffic at The Crossing or other locations would not be negatively impacted by Option 2.

Table 2-1 (cont'd). Summary and comparison of environmental effects.		
Issue	No-Action Alternative	Proposed Action
Safety		
- Would the Via Ferrata provide a safe recreational opportunity given the character of the rock at the proposed sites?	No Via Ferrata routes would be constructed, eliminating this issue.	Via Ferratas would be designed and constructed by experienced professionals with the expertise required to assess potential routes then design and install appropriate hardware to ensure user safety. This can be accomplished given the existing conditions and rock characteristics at JHMR, although some extra safety measures may be required in certain areas.
- Would the proposed hiking and mountain bike trails increase the potential for wildlife conflicts?	Potential for wildlife conflict would be minimal. Current practices to manage risk should be sufficient to provide for user safety.	Same as No-Action Alternative.

CHAPTER 3: ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the affected environment and the environmental effects of implementing the Proposed Action and alternatives. Discussion is organized by resource and addresses the specific issues associated with that resource identified through public scoping and internal, interdisciplinary review.

3.2 DISTURBANCE TYPES AND AREAS

Table 3-1 provides basic dimensions of disturbance associated with various types of projects. These dimensions were used in calculating project-specific disturbance areas. Tables 3-2 and 3-3 show the amount of disturbance for the No-Action Alternative and both Options 1 and 2 of the Proposed Action alternative. Details on impacts to wetland vegetation are addressed separately in section 3.4. Disturbance types, from least intensive to most intensive, are as follows:

- Glading – removal of select trees (leaving whitebark pine trees in place) to increase spacing between trees. Trees chipped or stacked and burned on site. Intent is to open up areas that are naturally too densely forested for most skiers to navigate comfortably with minimal impact on stand structure and habitat value.
- Clearing – removal of all trees and tall shrubs using tracked or wheeled equipment. Trees and slash chipped or burned on site.
- Grading – recontouring and smoothing the soil surface using caterpillars or other heavy equipment.
- Excavation – subsurface soil work using excavators or other heavy equipment, generally to construct building or tower foundations.

Table 3-1. Typical disturbance dimensions¹ by project type.		
Project Type	Disturbance Dimensions	Disturbance Type²
Buildings and Other Infrastructure	Footprint size plus 50-foot construction buffer	Excavation
Chairlifts		
Alignment Clearing	30-foot width	Clearing
Terminals	160-foot diameter circle	Excavation
Towers	28-foot diameter circle	Excavation
Conveyor Lifts	25-foot width	Grading
GazEx System		
Gas Storage/Mixing Shed	Footprint size plus 15-foot construction buffer	Excavation
Transmission Line	4-foot width	Excavation
Exploders	20-foot diameter	Excavation

Project Type	Disturbance Dimensions	Disturbance Type²
Mountain Bike Trails	6-foot width (1.5 x tread width)	Grading
Ski Trails	Actual acreage	Grading
Snowmaking Utility Lines	15-foot width	Excavation
Tree and Glade Skiing	Actual acreage	Glading
Via Ferrata	4 foot width	Grading
Zip-line		
Alignment Clearing	20-foot total width (10-feet per line)	Clearing
Towers	50-foot diameter circle	Excavation

¹These are the dimensions of construction-related disturbance, not the finished dimensions of projects.
² Indicates maximum disturbance intensity (e.g., excavation disturbance also includes clearing and grading).

Project Name	Disturbance Category and Acres Disturbed¹			
	Glading	Clearing	Grading	Excavation
Upper Headwall Ridge (Casper Traverse)	--	--	1.1	--
Lower Sundance Gully	--	--	0.3	--
Eagle's Rest Cutoff	--	--	5.9	--
Upper Apres Vous Traverse	--	--	0.7	--
Completion of Halfpipe	--	--	1.6	--
Completion of Authorized Hiking and Biking Trails	--	--	2.0	--
Totals	--	--	11.6	--

¹Acres include a disturbance buffer; the amount of actual ground disturbance may be less than the buffered distance. Areas of overlap, such as where the disturbance buffers for two different projects coincide, have only been counted one time. Disturbance acres have been rounded to the nearest tenth acre.

Table 3-3. Disturbance types and acres disturbed under the Proposed Action.					
Project Name	Disturbance Category and Acres Disturbed¹				
	Glading	Clearing	Grading	Excavation	Project Total
Sweetwater Gondola (Option 1)	--	4.7	0.5	2.1	7.3
Sweetwater Gondola (Option 2)	--	5.2	--	2.2	7.4
Eagle's Rest Lift	--	1.5	1.7	1.0	4.2
Solitude Conveyor	--	--	3.5	--	3.5
Casper Restaurant	--	--	--	0.9	0.9
Storage Facility	--	--	--	0.5	0.5
Ski Patrol Station	--	--	--	0.3	0.3
Ashley Ridge Run	--	--	11.8	--	11.8
Wide Open Run	--	--	4.2	--	4.2
Washakie Run	--	--	7.8	--	7.8
Grizzly Glade Run	4.0	--	--	--	4.0
Solitude Run	--	--	8.0	--	8.0
Snowmaking System Expansion	--	--	--	4.3	4.3
GazEx System Expansion	--	--	--	0.1	0.1
Hiking/Biking Trail Network	--	--	10.7	--	10.7
Via Ferrata	--	--	0.5	--	0.5
Zip-line Reconfiguration	--	0.3	--	0.6	0.9
Total Disturbance under Option 1					69.0
Total Disturbance under Option 2					69.1
¹ Acres include a disturbance buffer; the amount of actual ground disturbance may be less than the buffered distance. Areas of overlap, such as where the disturbance buffers for two different projects coincide, have only been counted one time. Disturbance acres have been rounded to the nearest tenth acre.					

3.3 CUMULATIVE ACTIONS

The cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impacts on the same resources affected directly or indirectly by these alternatives in the past, present, or reasonably foreseeable future. Accordingly, for all resources except wildlife, the cumulative effects area consisted of the Fish Creek subwatershed (HUC 12), and was limited to the Teton to Snake Fuels Management Project. For the wildlife analysis, the cumulative effects area was expanded to incorporate the home ranges of special-status wildlife species and added the Snow King Mountain Aerial Adventure Course, Snow King Mountain Rafferty Lift Replacement and Ski Trail Construction, and Greater Snow King Area Trails projects from the mountainside east of Jackson. These four projects are briefly described below.

- The Teton to Snake Fuels Management Project encompasses an area beginning approximately 2 miles south of the JHMR SUP boundary and extending 22 miles to the south. The purposes of the project are to (1) reduce wildland fire threat to residential areas, (2) improve firefighter and public

safety, and (3) allow BTNF managers to transition from suppressing most fires to a more natural fire regime. As scoped, the treatments would cover 0 acres (Alternative 1), 22,511 acres (Alternative 2), or 14,280 acres (Alternative 3) of the 79,056-acre project area. The project would restore and maintain fire-adapted ecosystems by reducing wildfire hazards using prescribed fire, cutting, and thinning. The Teton to Snake Fuels Management Project is still in the analysis process, though it is anticipated to be implemented in the reasonably foreseeable future.

- The Snow King Mountain Aerial Adventure Course project will be constructed at Snow King Mountain Resort, approximately 10 miles southeast of JHMR. The objective of the project is to enhance existing recreation opportunities during the summer season. The aerial adventure course will include rerouting existing trails, installing support and stabilization poles, and erecting fences or barricades; all resulting in 0.7 acres of ground disturbance. Constructing tree platforms and a zip-line will remove 30 or fewer trees with a 4-inch diameter at breast height. Project construction is scheduled for the spring and summer 2015.
- The Snow King Mountain Rafferty Lift Replacement and Ski Trail Construction project will be constructed at Snow King Mountain Resort, approximately 10 miles southeast of JHMR. It will replace the Rafferty lift and modify associated trails to improve access to beginner- and intermediate-level terrain, improve mountain circulation, and support the development of the Mountain Sports School program. The new lift will provide access for both winter and summer recreation activities. This project will create an additional 3.8 acres of cleared or gladed ski trails and clear 1.2 acres of forested habitat for the lift alignment. Construction of the replacement lift and clearing for the ski trails is anticipated to be completed during the summer 2015.
- The Greater Snow King Area Trails project is located in the area around Snow King Mountain Resort, approximately 10-15 miles southeast of the JHMR SUP boundary. The project will increase recreation opportunities near Jackson by constructing or reconstructing three trails totaling approximately 8.7 miles, decommissioning and rehabilitating existing, non-system trails totaling approximately 0.4 miles, and changing the season of use on a 1.6-mile road segment. The trails will support hiking and biking use, though on some segments use would be segregated. Approval has been granted to begin construction in spring and summer 2015.

3.4 SOIL, WATER, AND WATERSHED RESOURCES

3.4.1 SCOPE OF ANALYSIS

- *How would the proposed infrastructure affect erosion, sedimentation, and water quality?*

The project area is characterized by steep slopes, erosive soils and, in many areas, sparse ground cover. Construction-related disturbance and subsequent use could result in increased soil erosion, sediment transport, and water quality impacts.

Indicators: A risk rating for each project based on soil type, disturbance area, intensity of disturbance, slope, presence of a runoff pathway, distance to a water body, and efficacy of proposed mitigation.

- *How would the proposed infrastructure affect wetlands and riparian areas?*

While water resources in the SUP area are limited, the project area includes several types of wetlands, riparian areas, and intermittent and perennial streams. Construction and subsequent use could decrease the functioning and the extent of these valuable, aquatic habitats.

Indicators: An estimate of the acreage of these habitats lying within disturbance footprints and discussion of the resulting effects on function and extent within the permit boundary.

3.4.2 AFFECTED ENVIRONMENT

The project area described in this section is the JHMR special use permit (SUP) area, with emphasis on drainages and land areas near water bodies that are subject to disturbance under the Proposed Action and alternatives. This description focuses on watershed resources associated with the preceding issue statements, including soils, water quality, and wetland/riparian areas.

3.4.2.1 Erosion, Sedimentation, and Water Quality

The 1996 EIS (sections III.C.2 and III.C.3) and 2000 EA (sections 3.2 and 3.3) described existing soil and water resources in detail, and this section summarizes and updates this information as needed (Forest Service 1996, Forest Service 2000). A more recent watershed assessment of the SUP area and surrounding National Forest System (NFS) land in the Fish Creek watershed was completed in 2009 as part of Forest planning efforts (Forest Service 2009). That report defined Fish Creek watershed health as Class I, which includes watersheds that "...exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition" (FSM 2500-Chapter 2520). The potential for sedimentation to occur in the project area can be defined by reviewing the existing condition of soil and other watershed resources.

A soil survey of the BTNF was completed in 1984 (SCS 1985). Table 3-4 describes all soil mapping units in the SUP based on the 1984 survey and indicates where each unit is located.

Soil depths near the base of the SUP extend to 5 feet or more before reaching bedrock and consist primarily of well-drained loam to gravelly loam textures (SCS 1985, Forest Service 1996 section III.C.2.a). These soils are well drained but become more poorly drained with distance into Fish Creek valley east of the SUP area. Soil at upper elevations in the SUP area was formed primarily from glacial till and weathered bedrock, which is reflected in high amounts of gravel and boulders at the surface. Native soil depths on mid-to-upper SUP slopes are relatively shallow and range between 4 and 16 inches where they occur (SCS 1985, Forest Service 1996 section III.C.2.a). Soil texture in many areas of the SUP is skeletal, indicating a lack of well-defined soil layers and a mixture of imperfectly weathered and coarse fragments in the upper layer that generally exceeds 35 percent (Miller and Donahue, 1990). The soil profile is typically well-drained where these conditions exist.

Based on soil characteristics described in survey reports (Table 3-4), the inherent soil erosion hazard is high on lower slopes of the SUP, but actual erosion potential is minimized due to low gradient slopes. Erosion potential is moderate to high on upper slopes in the project area but slight at the highest elevations due to the prevalence of cirque formations and rubble. Evidence of unstable slopes in the form of landslides and talus deposits has been identified in the project area and surrounding areas (Case and Gilmer 1990, Love et al. 1992). Although some slow movement of soil has been noted in the form of slumping and soil creep on the steep, upper slopes of Rendezvous Mountain, loss of soil through surface erosion has not been a concern in the project area, particularly where vegetation cover is present (Forest Service 1996 section III.C.2.a).

Vegetation cover in the project area is typical of high-elevation, alpine and subalpine forests. Timber stands in the project area have been influenced by natural processes and previous management decisions. Development of lift alignments, ski runs, trails, and other infrastructure has created a series of linear forest stands throughout the project area. Natural plant communities found outside of forest cover are comprised of grass, shrubs, and forbs. Approximately 30 percent of areas covered by shrubland and montane meadows are naturally barren and influenced by small mammal activity (Forest Service 1996 section III.B.2.e). Vegetation cover on ski trails and ski lift corridors is comprised of grass and forb vegetation that includes species in elevation-specific seed mixes developed by the BTNF for use in revegetation efforts as well as species that naturally re-establish in these areas. A more detailed discussion of forest vegetation in the SUP is provided in section 3.5.

Table 3-4. Characteristic soil properties in the Jackson Hole Mountain Resort SUP.

Map Unit 372: Loamy to skeletal, mixed, and well-drained soil. Surface layers are loam to very gravelly loam 6–10 inches thick. Rock fragment content in surface soil is 5–40%. This map unit covers most of the west face of Apres Vous and most mid-elevation slopes on the east half of the resort.

Erosion Hazard: High	Revegetation Limitation: Severe	Stability Rating: Marginally Stable	Slope (%): 30–60
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Map Unit 391: Fine-loamy to loamy-skeletal, mixed, and well-drained soil. Surface layers are loam–gravelly loam about 5–10 inches thick. Rock fragments in surface soil are pebbles and cobbles and comprise 0–40%. This map unit is found along a ridge east of Rock Springs Canyon on the west portion of the SUP.

Erosion Hazard: High	Revegetation Limitation: Very Severe	Stability Rating: Marginally Unstable	Slope (%): 40-70
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Map Unit 483: Loamy-skeletal, mixed, and well-drained soil. Surface layers are very gravelly sandy loam–extremely cobbly clay loam from 4–13 inches thick. Rock fragments in surface soils include pebbles, cobbles, and angular cobbles and comprise 20–70%. Depth to bedrock is 9–16 inches. This map unit is found on mid-upper elevation slopes across the entire SUP including the ridge that runs to the west and south of Apres Vous Peak.

Erosion Hazard: High	Revegetation Limitation: Very Severe	Stability Rating: Marginally Stable	Slope (%): 50–90
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Map Unit 502: Cirque formations and rubble comprise this map unit. Majority of the unit is void of soil and vegetation. This map unit covers most high elevation slopes up to the Rendezvous Mountain ridge between the SUP and the Grand Teton National Park.

Erosion Hazard: Low	Revegetation Limitation: Slight	Stability Rating: NA	Slope (%): >100
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Map Unit 505: Fine loamy to loamy-skeletal, mixed, and well-drained soil. Surface layers are gravelly loam-very gravelly clay loam from 7-9 inches thick. Rock fragments in surface soils include pebbles and cobbles and comprise 0-70%. Depth to bedrock is 10-15 inches in some areas. This map unit is found on mid to upper slopes and spans much of the SUP below map units 502 and 506.

Erosion Hazard: High	Revegetation Limitation: Severe	Stability Rating: Marginally Stable	Slope (%): 40-90
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Map Unit 506: Surface layers are clay loam to gravelly loam-clay loam from 5-8 inches thick. Rock fragments in surface soils range from 0-20%. This map unit is found on upper slopes of Rendezvous Mountain below map unit 502.

Erosion Hazard: High	Revegetation Limitation: Severe	Stability Rating: Marginally Unstable	Slope (%): 10-50
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Map Unit 610: Fine loamy to loamy-skeletal, mixed and well-drained soil. Surface layers are loam-gravelly loam from 5-10 inches thick. Rock fragments include pebbles and cobbles and comprise 0-70%. This map unit is found on relatively low-elevation slopes in the SUP immediately above the base area.

Erosion Hazard: High	Revegetation Limitation: Moderate	Stability Rating: Marginally Unstable	Slope (%): 20-60
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Table 3-4 identifies several soil units in the project area that have a limited ability to support revegetation in the absence of BMPs and other activities that enhance regrowth. To offset these limitations, JHMR and the BTNF have developed effective site rehabilitation and revegetation practices. Most notably, they routinely purchase and haul in topsoil or mix native soil with composted wood chips to create functional topsoil. This material is then spread on disturbed sites and seeded with elevation-specific seed blends developed by the BTNF (Schreiber 2015a). With these practices in place, lower slopes of the SUP area are considered to have a high capacity for revegetation while upper slopes have a fair to good capacity (JHSC and Sno.engineering 1994). Overall, rehabilitation efforts have consistently been successful in establishing vegetation cover and stabilizing disturbed soil surfaces over the long term (Forest Service 1996 section III.C, Forest Service 2000 sections 3.2 and 3.3, JHSC 2015).

Surface hydrology in the SUP is primarily influenced by snowmelt during the spring and, to a lesser extent, by short-duration thunderstorms in summer and late fall. Shallow groundwater is recharged by surface infiltration into coarse soils and quickly moves downslope to support flows in lower elevation streams, springs, and wetlands (Forest Service 1996 section II.C.3.a.i, Eddy-Miller 2009). The USGS has mapped four intermittent stream channels in the project area that are tributaries to upper segments of Fish Creek, located east of the SUP near Teton Village (NHD 2015). Fish Creek is also classified as an intermittent stream past the village to a point approximately 4 miles downstream (Eddy-Miller 2010).

An aquatic inventory completed in 2013 identified 21 channel segments, totaling approximately 19,000 feet that support a combination of intermittent and perennial flow (Pioneer 2013). Flows are intermittent in upper channel segments, and perennial flows occur at lower elevations in segments that receive groundwater inflow during the summer and fall seasons. Figure 3-1 shows the location of all mapped channels.

The hydrologic character of these channels in regard to intermittent or perennial flow was determined from the aquatic inventory (Pioneer 2013) and long-term observations at JHMR (Schreiber 2015a). Channels in the project area are predominantly small with defined bed and bank features. Channel banks are generally rocky and covered by little or no herbaceous vegetation, and bordered by narrow bands of riparian vegetation. Channel segments at upper elevations in the project area have gradients that exceed 50 percent (Pioneer 2013).

The Wyoming Department of Environmental Quality (DEQ) has classified Fish Creek as a Class 1 stream on the basis of its water quality (DEQ 2013). Per DEQ regulations, existing water quality in any Class 1 water must not degrade, irrespective of the uses supported by the water. Water quality surveys conducted on the BTNF in the early 1970s found most water bodies on the Forest in a near-pristine condition (Forest Service 1990). Monitoring activities have continued since that time, including efforts by the Forest Service, Wyoming DEQ, and other agencies concerned with water quality. A 1980 summary of past monitoring results indicated that no widespread reduction in water quality could be traced to managed resource use on the BTNF, including energy development, recreation, vegetation management, and range improvement projects (Forest Service 1990).

More recent water quality concerns in the Fish Creek watershed have focused on flow and nutrient loads in segments of Fish Creek downstream from the project area due to excessive growth of algae and submergent macrophytes (Eddy-Miller et al. 2009, Eddy-Miller et al. 2010, Flitner Strategies 2014). No causal relationship was established in these studies between Fish Creek water quality and the SUP. Samples collected from Fish Creek showed highest median concentrations downstream of Teton Village. Isotopic analysis indicate that groundwater nutrient loads to Fish Creek are occurring, and the source of the loading is septic/sewage, animal manure, or a combination of both (Eddy-Miller et al. 2013). Based on these findings, nutrient pollution is not considered further in this analysis.

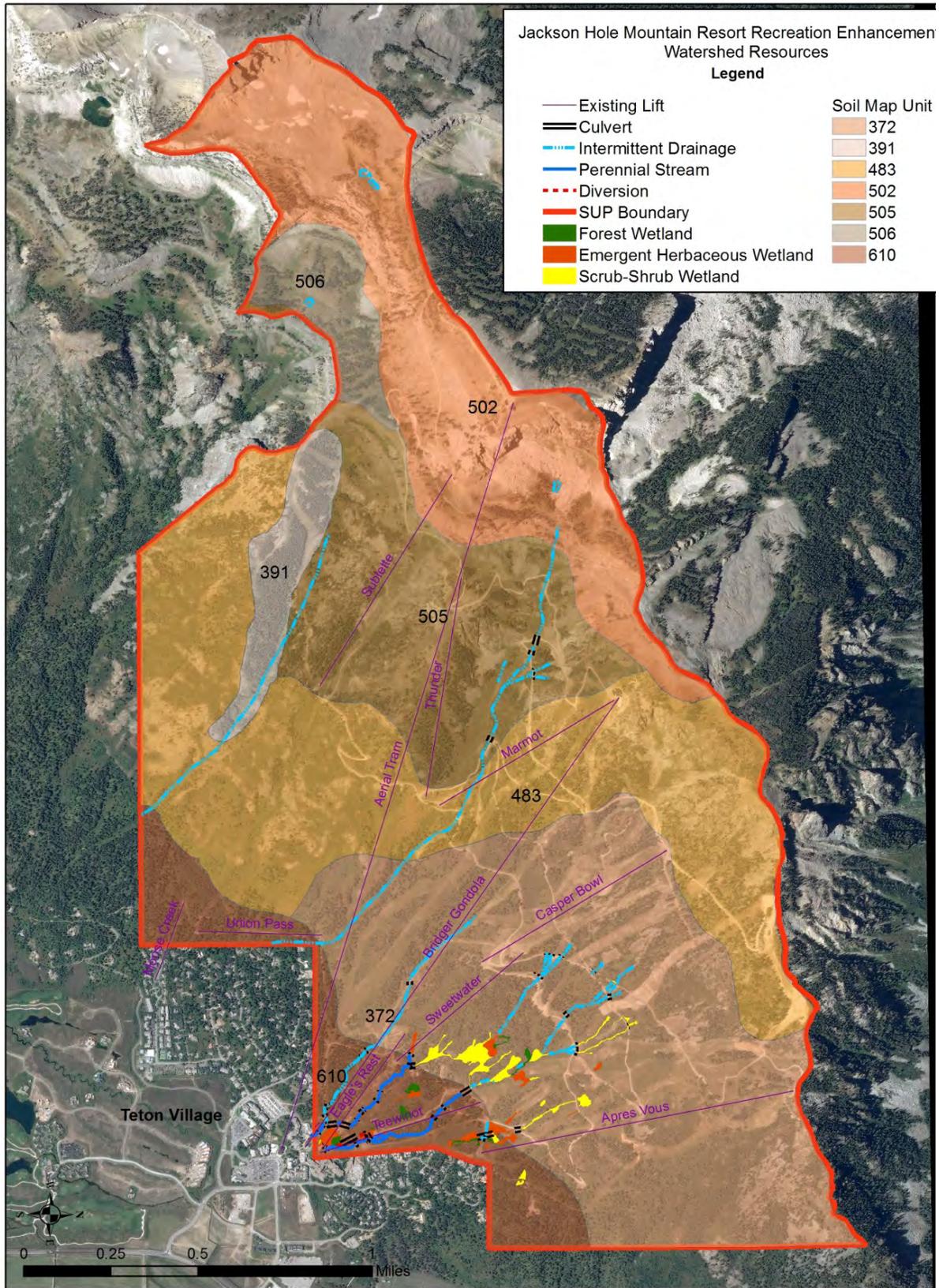


Figure 3-1. JHMR Recreation Enhancements EA watershed resources.

In regard to sediment-related water quality impacts, sedimentation due to natural processes in the BTNF is known to occur primarily in the form of landslide activity. This source produces sediment at relatively higher levels than erosion from road surfaces (Forest Service 1990). Recent observations indicate that Fish Creek carries only minimal loads of sediment as suspended material or along the channel bottom as bed load (Eddy-Miller et al. 2013). Sedimentation is the focus the water quality component of this analysis.

3.4.2.2 Wetland and Riparian Resources

Although the term “wetland” has been loosely defined by different local, state, and federal agencies, the definition used in this EA is derived from the 1982 U.S. Army Corps of Engineers (COE) and the 1980 U.S. Environmental Protection Agency (EPA) definitions. These two agencies define wetlands as, “Those areas that are inundated or saturated by surface or ground water 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” (40 CFR Part 230). These agencies further define wetlands as having three attributes: abundance of hydrophytic vegetation, hydric soils, and wetland hydrology. These factors define “jurisdictional” wetlands, those protected under the Clean Water Act.

Similarly, the term “riparian area” has various definitions. This analysis also adopts the EPA definition of riparian areas, which is, “A vegetated ecosystem along a water body through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent water body. These systems encompass wetlands, uplands, or some combination of these two landforms. They will not in all cases have all the characteristics necessary for them to be also classified as wetlands” (EPA 2005).

Previous inventories and analyses have identified the wetland and riparian areas in the project area. The most recent inventory was completed in 2013 and focused on areas where projects under the Proposed Action would be located. That inventory identified 29 wetland areas totaling approximately 18.3 acres (see Figure 3-1). The wetlands are: forested (2.7 acres), emergent herbaceous (6.7 acres), or scrub-shrub (8.9 acres) types, and the majority occur within drainage patterns associated or adjacent to stream channels (Pioneer 2013). The majority of wetlands are located on the lower mountain, between the base area and the South Pass Traverse, though a few are located further upslope in steeper terrain.

Riparian areas are limited, characterized by narrow bands of vegetation adjacent to rocky channels banks of small, first-order streams in the SUP (Pioneer 2013). As described above, soil depths are shallow, and the intermittent flows in upper channel segments provide minimal opportunity for riparian vegetation to establish near most streams.

3.4.3 DIRECT AND INDIRECT EFFECTS

This section addresses potential effects on erosion, sedimentation, and water quality and on riparian and wetland resources associated with implementing the Proposed Action or alternatives. The analysis methodology is based on the indicators listed above under each issue statement.

Effects on watershed resources can be either direct or indirect and can occur on a permanent or temporary basis. Direct permanent impacts occur when a building is constructed in a wetland, for example. Direct temporary impacts result from construction and surface disturbance prior to site restoration, such as when ski trails are graded or widened, followed by restoration efforts to restore soil surfaces to a vegetated and stable condition. Indirect impacts are generally temporary, resulting from upland disturbances that impact water quality through erosion and sediment transport.

Disturbance that occurs in protective buffer areas around streams, wetlands, and riparian habitat is considered an indirect impact, while disturbing a water feature or wetland area itself is a permanent or temporary direct impact. Protective buffers around stream corridors and wetland areas are defined by the

BTNF as follows: 300 feet either side of perennial streams, 150 feet either side of intermittent streams and wetlands less than 1 acre, and a 300-foot buffer around wetlands greater than 1 acre.

In this analysis, wetland and riparian buffers are one factor considered in assessing erosion, sedimentation, and water quality impacts, while direct impacts on channels and wetlands are addressed separately.

3.4.3.1 Erosion, Sedimentation, and Water Quality

Erosion and transport of sediment to receiving water bodies are focal points in this analysis. Natural erosion processes from the Rendezvous and Apres Vous mountains have contributed to soil resources in the project area. However, prior to stabilization, erosion from areas disturbed by construction can occur at a much higher rate than natural erosion processes. Erosion, sediment transport, and amount of fine material in streams has been noted to occur at higher levels in watersheds that include ski resorts than in reference watersheds (Wemple et al. 2007, Gabrielle et al. 2009). The method used here to assess erosion and sedimentation hazard is the connected disturbed area (CDA) approach (Forest Service 2006). It involves:

1. Measuring the size and slope of disturbances,
2. Characterizing the intensity of disturbance (glading through excavation) as well as the erosion hazard of the affected soil types,
3. Determining the distance to the closest drainage channel or other runoff pathway (road or trail) and nearest receiving water body (stream or wetland),
4. Determining the relative erosion potential of the project element,
5. Suggesting mitigation to reduce erosion and sedimentation, and
6. Assessing the post-mitigation erosion potential.

Based on these factors, projects are assigned a risk rating of High, Medium, or Low for erosion and sedimentation. Generally, project elements are assigned a High risk rating if they have two or more of the following attributes: large disturbance area (greater than 1 acre), proximity to a runoff pathway or receiving water body, and steep slopes (greater than 50 percent). Projects are assigned a Moderate risk rating if they have one of these attributes and a Low risk rating if they have none. Other factors, such as the shape and type of disturbance and the amount of disturbance inside stream and wetland buffers are also considered when assigning risk ratings.

The CDA approach prescribes “disconnecting” disturbed areas. If sediment sources are disconnected from the “easy pathways” down the mountain, the total sediment yield to major streams can be greatly reduced (Furniss et al. 2000).

Specific mitigation measures to reduce erosion, disconnect disturbed areas, and minimize the watershed and water quality impacts of each project are identified in the CDA analysis table for each alternative in the following sections. These measures are described in Appendix B. A more detailed discussion of these measures is available in *Volume 1: National Core BMP Technical Guide* (Forest Service 2012a).

In addition to these suggested mitigation measures, JHMR must comply with a Stormwater Pollution Prevention Plan (SWPPP) that has been approved by Wyoming DEQ as a condition of JHMR’s Wyoming Pollution Discharge Elimination permit. The SWPPP prescribes BMPs that minimize erosion, control sediment, and stabilize exposed soil.

Most of these SWPPP measures are also core BMPs recommended by the Forest Service for ski area development (Forest Service 2012a) and included in the CDA tables below. As a result, they are not listed or described separately in this document. Other sections of the SWPPP address operational controls (e.g. good housekeeping measures), BMP maintenance, and construction site inspection. The SWPPP is active

for a period of 5 years and amended annually to address specific activities that take place that year. The current SWPPP is set to expire in 2017 (JHMR 2014) and may be renewed at that time for an additional 5 years.

Section 2.5 also lists design criteria for developing the hiking and biking trail systems. Several of these target erosion and sedimentation, and they are also considered in this analysis though not specifically noted in the CDA tables.

3.4.3.1.1 Alternative 1 – No Action

Projects under the No-Action Alternative are described in section 2.3, and their impact on watershed resources is reviewed in more detail in the 1996 EIS and 2000 EA (see section IV.C.3 and Section 3.3, respectively). The projects include constructing the Upper Headwall Ridge run (Casper Traverse), widening Lower Sundance trail, constructing a new Lower Eagle's Rest Cut-off, widening Upper Apres Vous Traverse, modifying the half pipe, and finishing the remaining 3.7 miles of the hiking/biking trail network. The CDA analysis of these projects is summarized in Table 3-5.

All soil types that would be disturbed under the No-Action Alternative have a high erosion hazard. Most of the proposed developments are located in soil type 372, which is found on the south and east face of Apres Vous and mid-elevation elevation slopes that comprise much of the resort. The potential for erosion of this soil type decreases at lower elevations due to a corresponding reduction in slope. Soil types 610 and 483 comprise the remaining Proposed Action projects. Soil type 610 is located at the base of the SUP on low to moderate slopes, which reduce the potential for erosion to occur. Portions of soil type 483 are located at upper elevations and include areas where rock formations and rock fragments are prevalent at the surface, which also reduces soil erosion potential.

This alternative would disturb a total of 11.6 acres on slopes that range from 30 to 130 percent. All projects have an intensity of disturbance rating of 2 resulting from surface grading and contouring activities. Ski trail development on Lower Sundance and Lower Eagle's Rest Cut-off would include stream crossings, and the half-pipe modification would cross a wetland area located at the lower end of the project. Hiking and biking trails would cross roads, trails, wetlands, and channels.

Based on this analysis, projects under the No-Action Alternative have a Moderate or High erosion and sedimentation risk rating prior to mitigation. This indicates the potential for short-term nonpoint source loads of sediment to intermittent and perennial streams in the project area. These impacts could take place over longer periods if revegetation did not occur and bare soil remained exposed. However, the mitigation measures identified in Table 3-5 and the SWPPP, including proper implementation of sediment control BMPs, phasing of construction over time, and successful revegetation, would effectively mitigate these potential effects. Appendix B describes these measures.

With the suggested mitigation and SWPPP requirements in place, the erosion and sedimentation risk ratings for all project elements would fall to Low, and no substantial water quality impacts on the streams draining the project area would result from implementation of the No-Action Alternative. This conclusion is based on past experience with rehabilitation efforts in the project area (Forest Service 1996 section III.C, Forest Service 2000 sections 3.2 and 3.3, JHSC 2015).

3.4.3.1.2 Alternative B – Proposed Action

The projects included in the Proposed Action are described in detail in section 2.4. Table 3-6 summarizes results of the CDA analysis for these projects. Note that two options are considered for installing the Sweetwater gondola. The difference in disturbance acreage for these options is less than 0.1 acre.

All soil types disturbed under the Proposed Action have a high erosion hazard. They include the same soil types described above under the No-Action Alternative.

Table 3-5. CDA analysis of projects – No-Action Alternative.

Project Element	Soil Type¹/ Erosion Hazard	Project Disturbance Area (acres)	Channel/ Wetland Buffer Disturbance (acres)²	Intensity of Disturbance (1-3)	Max. Slope (%)	Proximity to Runoff Pathway	Risk Rating (prior to mitigation)	BMPs
Upper Headwall Ridge (Casper Traverse)	483 / High	1.1	- / -	2	95	Crossing trail. < 700 ft to road.	High	Rec-10, Veg-2
Lower Sundance	372 / High	0.3	4.6 / -	2	80	Crossing road, trail, stream. < 500 ft to wetland.	High	AqEco-4, Fac-2, Rec-10, Veg-2
Lower Eagle's Rest Cut-Off	610 / High	5.9	3.9 / 0.6	2	30	Crossing road, trail, stream. < 300 ft to wetland.	High	AqEco-4, Rec-10, Veg-2
Upper Apres Vous Traverse	372 / High	0.7	- / -	2	80	< 700 ft to road.	Moderate	Rec-10, Veg-2
Half-Pipe Modification	372 / High	1.6	- / 0.8	2	50	Crossing road, wetland. < 200 ft to trail, < 500 ft to stream.	High	Fac-2, Rec-10, Veg-2, Veg-1
Hiking and Biking Trails	372 / High	2.0	0.5 / 0.3	2	130	Crossing road, trail, wetland, stream.	High	Rec-4, Fac-2, Road-7
TOTAL (ac)		11.6						

¹ Dominant soil type for a project element, other types may be present.

² Values indicate disturbance inside of protective buffers enclosing stream corridors and wetlands.

Table 3-6. CDA analysis of the projects – Proposed Action.								
Project Element	Soil Type¹/ Erosion Hazard	Project Disturbance Area (acres)	Stream/ Wetland Buffer Disturbance (acres)²	Intensity of Disturbance (1-4)	Max. Slope (%)	Proximity to Runoff Pathway	Risk Rating (prior to mitigation)	BMPs
Sweetwater Gondola								
Gondola Building	610 / High	0.6	0.6 / 0.6	1	23	Crosses road, stream, wetland; <50 ft. to trail	Moderate	AqEco-2, AqEco-4, Fac-2, Rec-10, Rec-12, Road-7, Veg-1, Veg-2
Lower Terminal	610 / High	0.5	0.5 / 0.4	1	26	Crosses road, trail, wetland; adjacent to stream at upstream end.	Moderate	
Lower Terminal Hardscape	610 / High	<0.1	0.0 / 0.0	1	17	Crosses road, trail, and wetland, adjacent to stream at upstream end.	Moderate	
Mid Terminal	610 / High	0.2	0.2 / 0.2	1	13	Crosses road, trail, wetland, and stream.	High	
Mid Terminal Hardscape	610 / High	0.3	0.3 / 0.3	1	15	Crosses road, trail, wetland, and stream.	Moderate	
Option 1 - Gondola Corridor	372 / High	4.7	2.1 / 1.7	3	83	Crosses road, trail, wetland, and stream.	High	
Option 1 - Upper Terminal	372 / High	0.3	-	1	93	Crosses road and trail.	High	
Option 1 - Upper Terminal Hardscape	372 / High	0.1	-	1	88	Crosses road and trail.	High	
Option 1 - Upper Terminal Contouring	372 / High	0.5	-	2	85	Crosses road and trail.	High	
Option 2 - Gondola Corridor	372 / High	5.2	2.6 / 2.1	3	85	Crosses road, trail, stream and wetland.	High	
Option 2 - Upper Terminal	372 / High	0.5	0.0 / -	1	34	Crosses road, trail; < 500 ft. to stream.	Moderate	
Option 2 - Upper Terminal Hardscape	372 / High	0.1	0.0 / -	1	39	Crosses road and trail, < 500 ft. to stream.	Moderate	

Table 3-6 (cont'd). CDA analysis of the projects – Proposed Action.								
Project Element	Soil Type¹/ Erosion Hazard	Project Disturbance Area (acres)	Stream/ Wetland Buffer Disturbance (acres)²	Intensity of Disturbance (1-4)	Max. Slope (%)	Proximity to Runoff Pathway	Risk Rating (prior to mitigation)	BMPs
Eagle's Rest Triple Chair								
Grading around Upper Terminal	372 / High	1.7	1.1 / -	2	66	Crosses trail and stream.	High	Fac-2, Rec-10, Road-7, Veg- 1, Veg-2
Lift corridor	610 / High	1.5	0.6 / -	3	24	Crosses road and trail; < 400 ft. to stream.	High	
Lower Terminal	610 / High	0.5	0.4 / -	1	18	Crosses trail; < 200 ft. to stream.	Moderate	
Upper Terminal	372 / High	0.5	0.1 / -	1	57	Crosses trail; < 100 ft. to stream.	High	
Solitude Conveyor	610 / High	3.5	3.2 / 2.0	2	25	Crosses trail, stream, and wetland; <800 ft. to road.	High	Fac-2, Rec-10, Veg 2
Casper Restaurant	372 / High	0.9	-	1	83	Adjacent to road, < 600 ft. to stream.	High	Fac-2, Rec-12
Storage Facility	610 / High	0.5	-	1	25	Crosses road, < 200 ft. to trail.	Moderate	Rec-12, Fac-2
Ski Patrol Station	483 / High	0.3	-	1	113	<300 ft. to trail.	High	Rec-12, Fac-2
Ashley Ridge Run	372 / High	11.8	2.8 / 5.0	2	80	Crosses road, trail, stream, and wetland.	High	Fac-2, Rec-10, Veg-2
Wide Open Run	483 / High	4.2	-	2	64	Crosses road; <900 ft. to stream.	High	Fac-2, Rec-10, Veg-2
Solitude Run	372 / High	8.0	- / 1.5	2	69	Crosses road and wetland; <200 ft. to stream.	High	Fac-2, Rec-10, Veg 2
Washakie Run	372 / High	7.8	- / 0.4	2	108	Crosses road; <800 ft. to trail; <50 ft. to wetland; <700 ft. to stream.	High	Fac-2, Rec-10, Veg-2
Grizzly Glade	483 / High	4.0	-	4	82	<700 ft. to road.	Moderate	Fac-2, Rec-10, Veg-1, Veg-2
Snowmaking	372 / High	4.3	0.2 / 0.7	1	74	Crosses road, trail, and wetland; <50 ft. to stream.	High	Rec-11, Fac-9, WaterUses-1

Table 3-6 (cont'd). CDA analysis of the projects – Proposed Action.								
Project Element	Soil Type¹/ Erosion Hazard	Project Disturbance Area (acres)	Stream/ Wetland Buffer Disturbance (acres)²	Intensity of Disturbance (1-4)	Max. Slope (%)	Proximity to Runoff Pathway	Risk Rating (prior to mitigation)	BMPs
GazEx								
GazEx exploder	483 / High	<0.1	-	1	86	None.	Moderate	Rec-12, Fac-2, Fac-9
Storage shelter	483 / High	<0.1	-	1	37	None.	Low	
Trench for Gas Line	483 / High	0.1	-	1	106	None.	Moderate	
Hiking Trails	483 / High	3.8	0.4 / 0.1	2	147	Crosses road, trail, and stream; < 100 ft. to wetland.	High	Rec-4, Fac-2
Biking Trails	372 / High	6.9	1.0 / 0.2	2	83	Crosses road, trail, wetland, and stream.	High	AqEco-2, AqEco-4, Rec-4, Fac-2, Road-7, Bike Trail design criteria in section 2.5
Via Ferrata	483 / High	0.5	-	4	302	<600 ft. to road, adjacent to trail.	High	Rec-12, Fac-2
Zip-Line								
Lower Tower	610 / High	0.3	0.3 / 0.3	1	11	Crosses road; <200 ft. to trail, <100 ft. to wetland, adjacent to stream (uphill).	Moderate	Rec-10, Veg-1, Veg-2, Road-7
Upper Tower	610 / High	0.3	0.3 / 0.3	1	20	Crosses trail and stream; <300 ft. to wetland.	Moderate	
Zip-Line corridor	610 / High	0.3	0.3 / 0.0	3	25	Crosses road, trail, and stream; <100 ft. to wetland.	Moderate	
Total (including Sweetwater Gondola Option 1)		69.0	28.21					

Table 3-6 (cont'd). CDA analysis of the projects – Proposed Action.

Project Element	Soil Type¹/ Erosion Hazard	Project Disturbance Area (acres)	Stream/ Wetland Buffer Disturbance (acres)²	Intensity of Disturbance (1-4)	Max. Slope (%)	Proximity to Runoff Pathway	Risk Rating (prior to mitigation)	BMPs
Total (including Sweetwater Gondola Option 2)		69.1	29.15					

¹ Dominant soil type for a project element, other types may be present.

² Values indicate disturbance inside of protective buffers enclosing stream channels and wetlands.

Projects under the Proposed Action would disturb a total of roughly 69 acres on slopes ranging from 10 to 300 percent. Projects located on the steepest slopes include the Via Ferrata climbing routes, sited on rock outcroppings with slight erosion potential. Other developments on steep slopes include the Washaki run, ski patrol station, utility trenches for the GazEx exploder, and some hiking trail segments. Intensity of disturbance for most projects is 1 due to excavation combined with grading that would be needed to construct buildings, gondola terminals and towers, and utility trenches. Disturbance acreage for individual projects ranges from 11.8 acres for the Ashley Ridge run to less than 0.1 acre for elements of the GazEx system.

Several permanent stream crossings under the Proposed Action would be associated with hiking and biking trails. Design criteria used to minimize adverse environmental effects at these locations are described in detail in section 2.5. Any trail that crosses identified stream channels would use culverts that are a minimum of 12 inches in diameter or bridges. In crossing any channels where water is not expected but possible, culverts a minimum 6 inches in diameter would be used.

The Sweetwater gondola mid-way station, adjoining hardscape surface, and cabin storage facility would include permanent crossings of perennial stream segments that flow through the east and west edges of the proposed location. The stream channel on the east side is currently located in about 100 feet of culvert that receives flow from an upslope wetland. Under the Proposed Action, a new road would cross the wetland area that currently drains into this culvert. Approximately 25 feet of stream channel in the wetland would be contained in a new culvert where the proposed road corridor crosses the area. The new culvert would not drain the wetland. The existing 100-foot culvert would be removed. Flow from the wetland would be rerouted to a new stream channel that would pass through the hardscape area east of the mid-way station and continue downslope about 200 feet before reconnecting to an existing perennial stream.

The stream channel on the west side of the proposed development would be rerouted further to the west and around the cabin storage facility. Approximately 25 feet of the new stream channel would be located inside a culvert where a proposed road would cross the stream to access the downslope end of the cabin storage facility. The new channel would be designed to replicate natural channel form and materials and to maintain channel function.

The proposed Sweetwater gondola mid-way station, adjoining hardscape surface, and cabin storage facility would result in a net increase of stream channel habitat in the area by reducing culverts and increasing total stream length. Existing stream segments in this area were assessed in the 2013 aquatic inventory report (Pioneer 2013). The report described perennial stream segments as small, first order streams with defined bed and bank features, both heavily armored and rocky with little or no herbaceous vegetation cover and bordered by narrow bands of riparian vegetation.

A number of permanent stream crossings would also occur across an intermittent stream channel located in the Sundance Gully. Prior to this happening, as described under the No-Action Alternative, several feet of fill material would be placed above the intermittent channel in the lower gully area and reconstructed to route snowmelt runoff that flows through the area during the spring season. The gully has been extensively changed by previous development and includes no riparian habitat. Under the Proposed Action, stream crossings in Sundance Gully would be constructed to support a downhill mountain bike trail. The design of stream channel crossings are described in section 2.5 and could include culverts or wooden bridges.

Table 3-6 includes mitigation measures that address permanent stream crossings. These BMPs would minimize the risk of sedimentation and ensure stream crossings maintain channel stability and function in segments located above and below each crossing.

Most elements under the Proposed Action have a Moderate or High erosion and sedimentation risk rating prior to mitigation, indicating the potential to contribute sediment to intermittent and perennial stream

channels and wetlands in the project area. The risk rating for the several narrow, linear projects is varied due to the distance from streams or roads (e.g. trails and some segments of the snowmaking pipeline).

Table 3-6 identifies mitigation measures that would minimize or reduce the potential for erosion and sedimentation impacts. These mitigation measures are described in Appendix B. Pollution control measures that JHMR is required to comply with in the SWPPP, enforced by Wyoming DEQ, would provide additional assurance that potential sedimentation impacts were effectively mitigated.

With the suggested mitigation and SWPPP requirements in place, the erosion and sedimentation risk ratings for all project elements under the Proposed Action would fall to Low, and no substantial water quality impacts on streams draining the project area would result. This conclusion is based on past experience with rehabilitation efforts in the project area (Forest Service 1996 section III.C, Forest Service 2000 sections 3.2. and 3.3, JHSC 2015).

3.4.3.2 Wetland and Riparian Resources

In regard to wetlands and riparian areas, impact analysis centers on the acres of wetland or linear feet of stream channel that would be directly impacted by these projects. Disturbance has been categorized as glading, clearing, grading, or excavation. Glading and clearing generally would not disturb the ground surface and would not involve placement of dredge or fill material in wetland or riparian areas. However, they may alter the characteristics of such areas by changing the structure of the vegetation community. For example, clearing in forested or scrub-shrub wetlands would remove trees and large shrubs and replace them with lower-growing plant species. The area would likely continue to function as a wetland but would be converted from one wetland type to another. The conversion may also result in a rise in groundwater levels and extent of saturated soils if the new plant community consumes less water than before, and may increase the size of the area with wetland characteristics. Grading or excavation in a wetland would constitute direct adverse impacts on wetlands. Such impacts may be permanent, or wetland and stream channel functioning may be restored following construction.

Under either alternative, prior to initiating any project that would affect waters of the U.S., including wetlands and stream channels, JHMR would be required to secure any permitting required under Section 404 of the Clean Water Act. As part of that process, the COE would likely require a plan detailing how JHMR would mitigate impacts. Options include impact avoidance, impact reduction, impact mitigation (i.e., establishment, re-establishment, enhancement, rehabilitation, or preservation of Waters of the U.S.), purchase of mitigation credits from an existing mitigation bank, or participation in an in-lieu fee program (Johnson 2008). The COE would also require that wetland areas which are temporarily impacted by project construction be returned to pre-construction condition.

3.4.3.2.1 Alternative 1 – No Action

Potential impacts on wetlands and stream channels under the No-Action Alternative include disturbance of less than 0.1 acre of Palustrine Emergent wetlands, approximately 1,480 feet of intermittent drainage channel, and about 41 feet of perennial stream channel (Table 3-7).

The potential wetland impact could occur when the half-pipe was modified by grading and heavy equipment operation. Since the project would consist of raising the platforms on the sides of the halfpipe, and not modifying the bottom of the halfpipe where wetlands have been observed, the potential impact may be avoided by protecting the site during construction, which should be straightforward. If not, the impact would be minor and temporary, restored following project completion.

The intermittent stream-channel impacts would involve the Eagle's Rest Cutoff and Lower Sundance Gully projects. As described in section 2.3.1, the Eagle's Rest Cutoff would involve clearing a new ski run about 1,700 feet long and up to 150 feet wide, the upper and lower ends of which cross an intermittent drainage channel that carries flows during high-runoff years (roughly half the time). About 100 feet of the channel would be affected. About 20 feet of the affected channel is already culverted, and the remaining

portion – up to 80 feet – would also be culverted. Routing stream channels into culverts in this area is a permanent impact on stream channel habitat.

Table 3-7. Acres of wetlands and feet of stream channel directly affected by the No-Action Alternative.							
Disturbance Type	Forested Wetland (acres)	Emergent Herbaceous Wetland (acres)	Scrub-Shrub Wetland (acres)	Total (acres)	Intermittent Stream Channel (ft.)	Perennial Stream Channel (ft.)	Total (ft.)
Permanent Impacts							
Glading	--	--	--	--	--	--	--
Clearing	--	--	--	--	--	--	--
Grading	--	--	--	--	1,479	41	1,520
Excavation	--	--	--	--	--	--	--
Total	0.0	0.0	0.0	0.0	1,479	41	1,520
Temporary Impacts							
Glading	--	--	--	--	--	--	--
Clearing	--	--	--	--	--	--	--
Grading	--	--	< 0.1	--	--	--	--
Excavation	--	--	--	--	--	--	--
Total	0.0	0.0	< 0.1	0.0	0.0	0.0	0.0

The Lower Sundance Gully project would place up to 6 feet of fill material across the floor of the gully that incorporates about 1,380 feet of seasonal drainage channel including 50 feet of culvert. The impact on segments of the channel covered by fill material would be permanent, although these segments would be reconstructed, resulting in a new channel to transport runoff.

Impacts on wetlands and stream channels under the No-Action Alternative would be minimized by BMPs listed in Table 3-5, that maintain proper function of wetlands and channel stability. With the suggested mitigation, no substantial impacts on wetlands and riparian areas would result under the No-Action Alternative. This conclusion is based on past experience with rehabilitation efforts in the project area (Forest Service 1996 section III.C, Forest Service 2000 sections 3.2 and 3.3, JHSC 2015)

Wetland impacts would be avoided or minor and temporary. Any impact on jurisdictional wetlands would be subject to permitting under Section 404 of the Clean Water Act, as discussed above, which would entail offsetting mitigation. Impacts on drainage channels would be slightly more extensive, but these channels are intermittent, rocky, and support little or no riparian habitat. Following site rehabilitation efforts, no adverse impact on their functioning is expected. Neither the 1996 EIS nor the 2000 EA addressed the wetland impacts of these projects specifically, but this conclusion is consistent with their general findings (1996 EIS section IV.B.2.b and 2000 EA section 3.14.2.2)

3.4.3.2.2 Alternative 2 – Proposed Action

Potential impacts on wetlands and stream channels that could occur under the Proposed Action are shown in Table 3-8. The glading associated with the Proposed Action would not directly affect any wetlands. The clearing projects would permanently and directly impact less than 0.1 acre of forested and scrub-shrub wetlands, potentially changing their type but not affecting their function. Project clearing footprints

overlap approximately 0.4 acre of emergent herbaceous wetlands, but there would be no need to disturb those areas since they already consist of low-statured vegetation that would be compatible with the proposed infrastructure. Glading and clearing activities would not reach the edge of stream channels; therefore either of these activities would not affect wetlands or stream channels. Permanent impacts on stream channels under the Proposed Action include 207 feet of intermittent stream channel and 353 feet of perennial stream channel. Temporary stream channel impacts would include 622 feet and 138 feet of intermittent and perennial stream channel, respectively.

Table 3-8. Acres of wetlands and feet of stream channel directly affected by the Proposed Action.							
Disturbance Type	Forested Wetland (acres)	Emergent Herbaceous Wetland (acres)	Scrub-Shrub Wetland (acres)	Total (acres)	Intermittent Stream Channel (ft.)	Perennial Stream Channel (ft.)	Total (ft.)
Permanent Impacts							
Glading	--	--	--	--	--	--	--
Clearing	< 0.1	0.4 ¹	< 0.1	0.4	--	--	--
Grading	0.1	0.3	0.5	0.9	207	67	274
Excavation	< 0.1	< 0.1	0.1	0.2	--	286	286
Total	0.2	0.7	0.6	1.5	207	353	560
Temporary Impacts							
Glading	--	--	--	--	--	--	--
Clearing	--	--	--	--	--	--	--
Grading	--	< 0.1	--	< 0.1	622	59	681
Excavation	--	0.1	< 0.1	0.1	--	79	79
Total	--	0.1	< 0.1	0.1	622	138	760
¹ Existing wetland vegetation is compatible with the proposed project, no impact on wetland likely.							

Grading and excavation would remove vegetation and disturb the ground surface, and some projects could result in disturbances to subsurface hydrology and deposition of dredged or fill material in wetland and riparian areas. As a result, grading and excavation would likely convert some wetland or riparian areas into uplands. The grading projects would directly, permanently impact 0.1 acres of forested wetlands, 0.3 acres of emergent herbaceous wetland, and 0.5 acres of scrub-shrub wetland (total 0.9 acres). There would be about 0.1 acres of temporary wetland impacts, all of which would occur in emergent herbaceous wetlands that exist in buffer areas around project sites.

The excavation projects would directly, permanently impact less than 0.1 acres of forested wetland, less than 0.1 acres of emergent herbaceous wetland, and about 0.1 acres of scrub-shrub wetlands. An additional 0.1 acres of emergent herbaceous wetland and less than 0.1 acres of scrub-shrub wetland that exist in buffer areas around project sites would be temporarily impacted by excavation projects.

The Ashley Ridge project has the highest impact potential on wetlands, accounting for slightly over 0.5 acre of impact of all types. However, most of this would occur at the bottom end of the project, where JHMR proposes to fill the channel and adjacent low-lying area with snow rather than filling or grading it. The rest of the impact area is midway down the run, where grading may impact the extreme margins of adjacent wetlands.

Other wetland impacts are associated with the Sweetwater gondola, particularly the mid-way station and associated facilities (i.e., the gondola storage building and Solitude conveyor). Collectively, these projects would affect about 0.7 acres of wetlands under gondola Option 1 and 1.1 acres under Option 2. Note, however, the difference between the two options is that Option 2 would pass over a mid-mountain wetland that could likely be spanned to avoid locating towers within it. As a result, the only impact would be some tree clearing, with minor impact on its functioning.

Under either option, roughly 0.7 acres of wetlands would be directly and permanently impacted around the mid-way station and adjoining Solitude conveyor area. The mitigation measures cited above under the No-Action Alternative would be in force to reduce this impact, but it would still likely trigger Section 404 permitting, which in turn would require compensatory mitigation to offset the impact.

Permanent impacts on stream channels under the Proposed Action would include 353 feet of perennial channel including impacts produced in areas that would be graded or excavated. Impacts from grading are the result of permanent crossings (either bridges or culverts) by hiking and biking trails. Impacts from excavation are due to the Sweetwater gondola mid-way station, adjoining hardscape surface, and cabin storage facility. Impacts on stream channels at this location under gondola Option 1 and Option 2 are identical. This project would include approximately 50 feet of new culvert to facilitate road crossings of small, first order streams with banks containing little or no herbaceous vegetation cover. A portion of stream channel would pass through the hardscape area east of the mid-way station. Routing stream channels into culverts and hardscape areas would be a permanent impact on stream channel habitat. However this project would result in a net increase of stream channel habitat in the area by reducing culverts and increasing total stream length.

Temporary impacts on stream channels include stream segments that pass through disturbance buffers surrounding excavation for the upper zip-line tower and graded areas for Ashley Ridge, Eagle's Rest (upper terminal), and the Solitude conveyor. Disturbance to stream channels from excavation would be avoided, and no grading across stream channels themselves would occur.

Impacts on wetlands and stream channels under the Proposed Action would be minimized by BMPs listed in Table 3-6, that maintain proper function of wetlands and channel stability. With the suggested mitigation, no substantial impacts on wetlands and riparian areas would result under the Proposed Action. This conclusion is based on past experience with rehabilitation efforts in the project area (Forest Service 1996 section III.C, Forest Service 2000 sections 3.2 and 3.3, JHSC 2015)

3.4.4 CUMULATIVE EFFECTS

As discussed in section 3.3, the cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impact on the same resources affected directly or indirectly by these alternatives – generally those occurring within the Fish Creek subwatershed (HUC 12) – in the past, present, or reasonably foreseeable future. Only the Teton to Snake Fuels Management project meets the spatial and temporal overlap requirements.

The purposes of the Teton to Snake Fuels Management project are to (1) reduce wildland fire threat to residential areas, (2) improve firefighter and public safety, and (3) allow BTNF managers to transition from suppressing most fires to a more natural fire regime. The project would restore and maintain fire-adapted ecosystems by reducing wildfire hazards using prescribed fire, cutting, and thinning.

The project area begins approximately 2 miles south of the JHMR SUP boundary and extends 15 miles to the south. The project is still in the analysis process and the specific details of how the fuel reduction would affect watershed resources are not yet available. However, the description of alternatives in the scoping documents indicates that a total of 23 design features will be employed to decrease impacts on watershed resources, including wetland and riparian areas.

Those design features include identifying water bodies and wetlands and water bodies, excluding heavy equipment and mechanical treatments in and around them, establishing non-ignition areas adjacent to them, and rehabilitating all temporary roads, landings, and skid trails used as part of fuel reduction activities.

Reducing fuel loads in the Teton to Snake Fuels Management project area will reduce the risk of catastrophic wildland fires and the associated negative impacts on soil stability, sediment delivery to water bodies, and water quality that accompany catastrophic fires. As a result, the Teton to Snake Fuels Management project is anticipated to have a long-term beneficial cumulative effect on watershed resources including stream channels, water quality, wetlands, and riparian areas.

3.5 VEGETATION

3.5.1 SCOPE OF ANALYSIS

- *How would the proposed infrastructure affect special-status plant species?*

No federally listed plant species are known to occur at JHMR, but four Forest Service Region 4 sensitive species (including whitebark pine, a candidate for federal listing), eight Wyoming state species of concern or species of potential concern (two of which are also Forest Service sensitive species), and two BTNF management indicator species (MIS) may occur in potentially disturbed areas. Glading, clearing, grading, excavation, or subsequent use could adversely affect plants of these species.

Indicators: Species-specific determinations of the potential individual- and population-level impacts, based primarily on past surveys and published information on the species' distribution and population status.

- *How would the proposed infrastructure affect forest vegetation at the resort?*

Forest communities are among the most productive and structurally diverse vegetation types occurring at the resort, and trees would be cleared to accommodate most of the proposed lifts, buildings, runs, and trails. This would eliminate some forest vegetation and fragment blocks of forest habitat.

Indicators: Qualitative assessment of the amount of forest vegetation removed and qualitative description of the resulting fragmentation.

3.5.2 AFFECTED ENVIRONMENT

3.5.2.1 Special-Status Plant Species

The ski area and the BTNF developed a vegetation management plan in 1997 that provided specific instruction on rare plant inventories that were to be conducted within the SUP area. The inventories had actually begun the previous year and have continued since, resulting in annual inventory reports. The inventories focus on federally listed threatened and endangered species, Region 4 sensitive species, and Wyoming state plant species of special concern (JHSC and Forest Service 1997). As of 2014, a total of 472 vascular plant species had been documented (Delmatier 2014).

Inventories have been used to support past NEPA analyses. The most recent inventories have focused primarily on areas affected by projects described in the 2014 MDP, including the Proposed Action projects. All Proposed Action projects will be surveyed before ground disturbances begin (section 2.5, no. 25). Survey results will be used to minimize the potential for adverse effects on special-status plant species, especially as small adjustments are made to project alignments either because of design constraints or presence of those species.

A total of 11 plant species were selected for detailed analysis because they are known to occur within the JHMR project area (Table 3-9). Proposed activities are considered to have no impact on and special-status

plant species without potential habitat in the project area. A full list of special-status plant species considered is provided in Appendix C.

Table 3-9. List of special-status plant species with known occurrences in the JHMR project area.				
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area
Aromatic pussytoes (<i>Antennaria aromatica</i>)	Crevice on sparsely vegetated ridgelines and summits at and above the timberline on limestone-derived soils at 4,500 to 10,800 feet in elevation (Fertig 2000a).	Wyoming Species of Potential Concern	Yes	Yes
Green spleenwort (<i>Asplenium trichomanes-ramosum</i>)	Crevice on north-facing limestone outcroppings in spruce/subalpine fir forests at elevations between 5,800 and 9,900 feet (Fertig 2000b).	Wyoming Species of Concern	Yes	Yes
Shultz's milkvetch (<i>Astragalus shultziorum</i> , <i>Astragalus molybdenus</i>)	Distribution centered in Wyoming in the Teton, Salt, and Wind River ranges. Found primarily in subalpine forb communities on shallow, rocky, calcareous soils at elevations of 8,800 to 11,500 feet (Heidel and Fertig 2008a).	MIS, Wyoming Species of Potential Concern	Yes	Yes. The project area is within the elevation range, and subalpine forb communities on shallow soils are present.
Rockcress draba (<i>Draba apiculata</i> , <i>Draba globosa</i> , <i>Draba densifolia</i> var. <i>apiculata</i>)	Moist, gravelly alpine meadows and talus slopes, often on limestone-derived soils, at elevations between 8,100 and 12,400 feet (Handley and Fertig 2008).	R4 Sensitive, Wyoming Species of Concern	Yes	Yes. The project area is within the elevation range and has alpine meadows and talus slopes.
Milk kelloggia (<i>Kelloggia galioides</i>)	Woods and open slopes at elevations between 7,100 and 8,200 feet (Markow and Fertig 2008).	Wyoming Species of Concern	Yes	Yes
Payson's bladderpod (<i>Lesquerella paysonii</i>)	Endemic to the carbonate mountain ranges of west-central Wyoming, eastern Idaho, and southwestern Montana. Found on rocky, sparsely vegetated slopes, often calcareous substrates, at elevations between 5,500 and 10,600 feet (Heidel 2008a).	R4 Sensitive, Wyoming Species of Potential Concern	Yes	Yes. The project area is within the elevation range and contains rocky, sparsely vegetated slopes.

Table 3-9 (cont'd). List of special-status plant species with known occurrences in the JHMR project area.				
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area
Broad-leaved twayblade (<i>Listera convallarioides</i>)	Margins of waterbodies and other moist areas in coniferous or aspen/alder forests at elevations between 6,400 and 9,000 feet (Markow and Fertig 2000).	Wyoming Species of Concern	Yes	Yes
Creeping twinpod (<i>Physaria integrifolia</i>) ¹	Barren, rocky, calcareous hills and slopes at 6,500 to 8,600 feet elevation (Fertig, Refsdal, and Whipple 1994).	R4 Sensitive	Yes	Yes. The project area is within the elevation range, and rocky slopes are present.
Whitebark pine (<i>Pinus albicaulis</i>)	In pure stands near the treeline and in mixed stands in subalpine forests from under 8,000 to over 10,000 feet in Wyoming (Arno and Hoff 1990).	Candidate, R4 Sensitive	Yes	Yes
Quaking aspen (<i>Populus tremuloides</i>)	Found throughout the BTNF. It occurs in pure stands, or mixed with subalpine fir, lodgepole pine, Douglas-fir, whitebark pine, or Engelmann spruce. In lower elevations, it forms a mosaic with shrublands (NatureServe 2015).	MIS	Yes	Yes
Large-flower triteleia (<i>Triteleia grandiflora</i>)	Grasslands or sagebrush and pinyon-juniper woodlands to pine-forest slopes and hills (NatureServe 2015).	Wyoming Species of Concern	Yes	Yes

¹Forest Service Region 4 Sensitive Species list includes *Physaria integrifolia* var. *monticola*, which is no longer considered a valid taxon by Rocky Mountain Herbarium, WYNDD, JHMR, or the BTNF.

Aromatic Pussytoes (Antennaria aromatica)

Aromatic pussytoes is regionally endemic to southwest Montana and northwest Wyoming, and is known from the Absaroka, Beartooth, Bighorn, Gros Ventre, Wind River, Wyoming, and Salt River ranges. As of 2000, there were 27 known occurrences in Wyoming. Threats to this species are considered minimal due to the ruggedness and inaccessibility of its alpine habitat. Trend data are lacking, but there appears to be little evidence of a decline in either numbers or range (Fertig 2000a).

Aromatic pussytoes occur in crevices on sparsely vegetated ridgelines and summits at and above the timberline on limestone-derived soils at 4,500 to 10,800 feet in elevation (Fertig 2000a). This habitat

corresponds to the subalpine and alpine tundra community described in the 2000 EA, of which there were approximately 169 acres in the SUP area. Aromatic pussytoes has been observed in the project area, with three confirmed and four potential observations recorded on the ridge of Rendezvous Mountain between the west side of Cody Bowl and the Tram upper terminal (Delmatier 2014). Since the original Tram was built 50 years ago, the summit area of Rendezvous Mountain has supported dispersed hiking along the ridgeline and concentrated hiking along the service road that accesses the Tram terminal during the growing season.

Green Spleenwort (Asplenium trichomanes-ramosum)

Green spleenwort is a small-statured, perennial fern widely distributed in North America, from Alaska to Newfoundland and south to California, Colorado, Wyoming, South Dakota, Michigan and New England. There are nine extant and two historical green spleenwort occurrences in Wyoming. Those occurrences are in the Bighorn, Medicine Bow, Gros Ventre, and Teton ranges in Carbon, Sheridan, Sublette, Teton, and Washakie counties. Threats to green spleenwort include trampling, over-collection, and logging (Fertig 2001). The species is considered apparently secure globally and a species of concern in Wyoming.

Green spleenwort habitat includes crevices on north-facing limestone outcroppings in spruce/subalpine fir forests at elevations between 5,800 and 9,900 feet (Fertig 2001). Approximately 168 acres of rock outcrop habitat were previously identified in the SUP area, where green spleenwort has been observed growing in limestone rock crevices in an outcropping between Cody Bowl and Rock Springs Bowl (Delmatier 2014). These areas experience dispersed hiking during the growing season. Additional surveys are planned for areas of potential green spleenwort habitat in the Crag area during the 2015 growing season.

Shultz's Milkvetch (Astragalus shultziorum)

Shultz's milkvetch, also known as Leadville milkvetch (*A. molybdenus*), has been removed from the R4 sensitive species list but remains a MIS. A regional endemic, 26 occurrences of Shultz's milkvetch have been found in the Teton, Salt River and Wind River ranges of Wyoming, and it has recently been found in Idaho. Trend data are lacking but most populations appear to be stable (Heidel and Fertig 2008a). Sheep grazing has been identified as a potential threat at some sites, but most occurrences are at high elevation and in physically protected sites that receive little use or impacts.

Shultz's milkvetch occurs primarily in subalpine forb communities on shallow, rocky, calcareous soils at elevations of 8,800 to 11,500 feet (Heidel and Fertig 2008a). Subalpine and alpine tundra were estimated to cover approximately 169 acres of the SUP area in 2000. Shultz's milkvetch is known to occur along the east edge of Cody Bowl and on Rendezvous Mountain, west of the upper Tram terminal. Previous inventories have estimated that there are more than 1,000 individual plants growing in those areas (Delmatier 2014). These areas are used for both dispersed and concentrated hiking along existing roads and trails.

Rockcress Draba (Draba apiculata)

Rockcress draba, previously known as *Draba densifolia* var. *apiculata*, is a regional endemic of Idaho, Montana, Colorado, Utah and Wyoming. In Wyoming there are 22 extant occurrences, known from the Absaroka, Teton, Wind River, Beartooth, Medicine Bow, Gros Ventre, and Salt River ranges and the Overthrust Belt (Handley and Fertig 2008). Handley and Fertig (2008) state that rockcress draba is protected from human threats by its inaccessible habitat. However, Ladyman (2004) indicates that invasive weeds are a threat.

Rockcress draba is found in moist, gravelly alpine meadows and talus slopes, often on limestone-derived soils at elevations between 8,100 and 12,400 feet (Handley and Fertig 2008). Tall forb and talus slopes were previously estimated to cover approximately 257 acres of the SUP area. Rockcress draba is known to occur in the Cody Bowl area, on the ridge of Rendezvous Mountain east of the upper Tram terminal, in Tensleep Bowl, and in the Headwall area. These areas support dispersed and concentrated hiking during the growing season.

Milk Kelloggia (Kelloggia galioides)

Milk kelloggia is a perennial herb distributed from Washington to California and inland to Idaho, Wyoming, Utah, and Arizona. However, as of 2008, it was only known from six extant populations and two historical records in Wyoming (Markow and Fertig 2008). Milk kelloggia is considered secure globally but has a critically imperiled status in Wyoming. There are no known threats to milk kelloggia, though it is anticipated that expanding recreation at JHMR may constitute a threat.

Milk kelloggia occurs beneath dense canopies of coniferous forests and on granite outcrops in mixed conifer forests at elevations between 7,100 and 8,200 feet (Markow and Fertig 2008). There are approximately 893 acres of coniferous and mixed coniferous forests within the SUP area, and roughly one-third of that is within the elevation band occupied by milk kelloggia. At JHMR, milk kelloggia has been observed at two locations in the Craggs area, two locations near the Cheyenne Gully ski run, and one location approximately 400 feet east of the existing Sweetwater lift lower terminal (Delmatier 2014, Delmatier 2015a).

Payson's Bladderpod (Lesquerella paysonii)

Payson's bladderpod is regionally endemic to west central Wyoming, eastern Idaho, and southwestern Montana. It is found in the mountain ranges of Lincoln, Sublette, and Teton counties in Wyoming, and there were 41 extant occurrences in the Salt River and Wyoming ranges at the time of the latest surveys (Heidel 2012). The open and barren nature of this species's habitat and its possible interaction with disturbance means that invasive plants may be a threat. Payson's bladderpod has a vulnerable status both globally and in Wyoming.

Payson's bladderpod grows in open and sparsely vegetated areas and is typically associated with sagebrush grasslands at elevations between 5,500 and 10,600 feet (Heidel 2008a). While Payson's bladderpod occupies sparsely vegetated areas, it is unclear if the species is disturbance adapted. Recent surveys have shown that it occupies areas that are naturally low in vegetative cover, such as talus slopes, but also grows in pipeline corridors and on exposed ridge-tops which have been recently bladed (Heidel 2012). Though there are no sagebrush grasslands at JHMR, there are an estimated 206 acres of talus slope and subalpine and alpine plant communities in the SUP area. Payson's bladderpod is known to occur on the east side of Cody Bowl and on the ridge of Rendezvous Mountain to the south of the upper Tram terminal, with a single occurrence recorded on the ridgeline above the Bridger Restaurant (Delmatier 2014). These areas have supported dispersed and trail hiking during past growing seasons.

Broad-leaved Twayblade (Listera convallarioides)

Broad-leaved twayblade is a perennial orchid widely distributed across western North America. It is known from four extant occurrences and two historical records from the Teton, Medicine Bow, Laramie, and Bighorn ranges in Albany, Converse, Sheridan, and Teton counties in Wyoming (Markow and Fertig 2000). It is considered globally secure, but the status has been classified as critically imperiled in Wyoming by Markow and Fertig in 2000 and as imperiled by the WYNDD in 2012. The WYNDD has assigned broad-leaved twayblade a peripheral, or low conservation priority, status (Markow and Fertig 2000). Threats to broad-leaved twayblade are loss of moist forest habitat (i.e., logging), over-collection, and recreation.

Broad-leaved twayblade is found in riparian and other moist, shaded areas in coniferous, aspen, or alder forests at elevations between 6,400 and 9,000 feet. Those habitat requirements are most likely to occur in the willow/mixed brush community described in the 2000 EA, of which there was approximately 35 acres in the SUP area. It has been observed at the lower elevations at JHMR, in the small riparian area adjacent to the Beaver Tooth ski run and in a forest stand to the northwest between the South Pass and Togwotee Pass traverses (Delmatier 2014, WYNDD 2012). Additional surveys are planned for the 2015 growing season to further determine presence/absence in suitable habitat, and to estimate the number of individuals present at the known locations (Delmatier 2014).

Creeping Twinpod (Physaria integrifolia)

Only the *monticola* variety of creeping twinpod is listed as a Region 4 sensitive species. Creeping twinpod is not tracked by WYNDD because of questions of taxonomy. The *Flora of North America* treatment of *Physaria* (eFloras 2015) includes the species *integrifolia* but clarifies that the variety *monticola* is not valid taxon. The treatment states that the key characteristic of variety *monticola* is simply a result of plasticity in the growth form resulting from edaphic (soil and climate) conditions rather than evolutionary novelty. The variety is, however, listed as sensitive in Region 4 and as such still has an analysis requirement. As a result of the lack of monitoring of this species, little is known about the threats, but they are likely to be similar to those of other species that occupy rocky and barren habitats, which include competitive exclusion by invasive species.

Creeping twinpod has been observed in the project area. However, since variety *monticola* is no longer a recognized taxon, and since *Physaria integrifolia* is not a special-status species, creeping twinpod will not be discussed further in this analysis.

Whitebark Pine (Pinus albicaulis)

Whitebark pine is a subalpine species common to western mountain ranges and is considered a keystone species of high-elevation western ecosystems. It is under pressure from a number of threats, including: white pine blister rust, outbreaks of mountain pine beetle, fire suppression that has allowed for increased interspecific competition, severe wildfire, and climate change which influences mountain beetle outbreak cycles. Blister rust has been an especially severe threat, and tree mortality has approached 50 percent in some areas of the specie's range (NatureServe 2015). However, some trees appear to be naturally resistant to the blister rust and able to withstand mountain beetle attacks. These trees are referred to as "plus" trees.

Whitebark pine grows in pure and mixed stands at high elevations throughout the SUP area. A multi-agency GIS vegetation layer identified approximately 537 acres of whitebark pine forest in the SUP area, including 162 acres of whitebark pine-dominated stands and 375 acres of whitebark pine mixed with other conifers (Figure 3-2). The estimation of acres of whitebark pine stands is based on aerial image interpretation and geologic and gradient modeling, which is known to slightly overestimate whitebark pine presence in the Teton Range (Bockino 2012). A comparison of the vegetation layer to recent aerial imagery of JHMR supports Bockino's over-estimation observation and suggests that rock outcroppings at JHMR may be inaccurately included in areas identified as whitebark pine stands.

While conducting vegetation surveys near the proposed Upper Wide Open run, Delmatier (2014) observed mortality rates of 70 percent at elevations above 8,670 feet and 50 percent at lower elevations. The cause of mortality is likely to be a combination of blister rust and mountain pine beetle.

Four plus trees have been identified within the project area, and JHMR and BTNF have planted over 1,000 seedlings from those plus trees in the project area as an effort to maintain the whitebark pine population at JHMR.

Quaking Aspen (Populus tremuloides)

Quaking aspen is a widely-distributed deciduous tree species that occurs across much of North America. It can be found growing in varying conditions and on a wide range of soil types at elevations between 4,600 and 10,500 feet. Quaking aspen is often found growing on north- or east-facing mountain slopes and canyons, or near streams and other surface water (NatureServe 2015). Since it is a shade-intolerant species, aspen often decrease as evergreen trees increase in an area.

Most of the quaking aspen on the BTNF was established after the area was burned between 1840 and 1890 (Gruell and Loope 1974, Loope and Gruell 1973), the result of which is the current condition of mature stands with very little age and size class diversity. Late-seral aspen is being replaced by conifers throughout the specie's range. Because aspen is intolerant of shade, many well-stocked even-aged stands have virtually no aspen regeneration beneath them. The major cause of this decline is greatly reduced fire

frequency. Quaking aspen flourished in the West when these lands burned periodically (Bartos 2007). Aspen exists within the SUP area and is most common near the base area. There were an estimated 226 acres of mixed conifer/aspen forest within the JHMR SUP area in 2000 (Forest Service 2000).

Large-flower Triteleia (Triteleia grandiflora)

Large-flower triteleia is a widely distributed species, ranging from southern British Columbia to northern California and westward to Montana, Wyoming, Utah, and Colorado (NatureServe 2015). It can be found in sagebrush, oak-maple, aspen, and Douglas-fir communities at elevations between 4,590 and 9,350 feet (Welsh et al. 2003). In Wyoming, large-flowered triteleia is known from Fremont, Lincoln, and Teton counties. It is considered an imperiled species in Wyoming.

The majority of the project area is located within the elevation band inhabited by this species. However, Douglas-fir and aspen communities are most common at the middle- and lower-elevation portion of the SUP area. Large-flower triteleia has only been observed in the SUP area at two locations, both on steep rocky roadsides passing through open shrub communities near the convergence of the proposed Wide Open expansion and Solitude runs (Delmattier 2014). Surveys conducted in the spring of 2015 did not detect any large-flower triteleia in the convergence area (Delmattier 2015b).

3.5.2.2 Forest Vegetation

The distribution of forest stands at JHMR has been influenced by variations in growing conditions (i.e., elevation, temperature, precipitation, and soil productivity) and disturbances such as avalanches, disease, and previous development associated with operating JHMR. The creation of lift alignments, ski runs, trails, and other infrastructure has created a series of linear forest stands. While some small tree islands exist within cleared areas, they are typically removed to provide safe and efficient winch-grooming conditions on steep runs and to provide settings appropriate for beginner- and intermediate-level skiers. Operations at JHMR are also likely to have increased the extent of forest stands. For example, avalanche control results in smaller, more frequent avalanches than occurred in the past. The smaller avalanches have allowed for forest stands to regenerate in areas where they had been eliminated by large avalanches. The combination of natural processes and previous management has fragmented the forest stands.

Stands have closer canopies and greater tree cover on north-facing slopes. The forest stands within the SUP area consist of conifer/aspen at the lower- and mid-mountain elevations, and conifer stands at the higher elevations. The dominant conifer trees at the lower elevations are lodgepole pine (*Pinus contorta*) and Douglas-fir (*Pseudotsuga menziesii*), and these trees are intermixed with aspen. Lodgepole pine is most common near the Teewinot and Apres Vous lifts and, aspen tend to comprise a greater percentage of the stands near riparian areas and wetlands (Forest Service 2000). At higher elevations, stand dominance transitions to limber pine (*Pinus flexilis*), subalpine fir (*Abies lasiocarpa*), and whitebark pine. The 2000 EA identified a total of 1,007 acres of conifer and conifer/aspen forests in the SUP area (Forest Service 2000).

A remotely sensed dataset (LIDAR) from 2008 was used to estimate of the extent of forest stands in the project area (see Figure 3-2). That dataset was adjusted to account for areas that are no longer forested, including the Crags and Kemmerer ski run, and areas cleared for the Teton lift. Following those adjustments, forest stands are now estimated to occupy approximately 893 acres of the SUP area.

3.5.3 DIRECT AND INDIRECT EFFECTS

As described in section 3.2 the disturbance types associated with projects addressed in this EA have been categorized as glading, clearing, grading, or excavation. Glading includes the removal of select trees to open up areas that are naturally too densely forested for most skiers to navigate comfortably. Glading would affect the overstory layer of vegetation directly by removing select trees and changing the structure of a stand. Decreasing the overstory canopy cover also has the potential to affect the understory layer and may increase shrub and herbaceous-species cover.

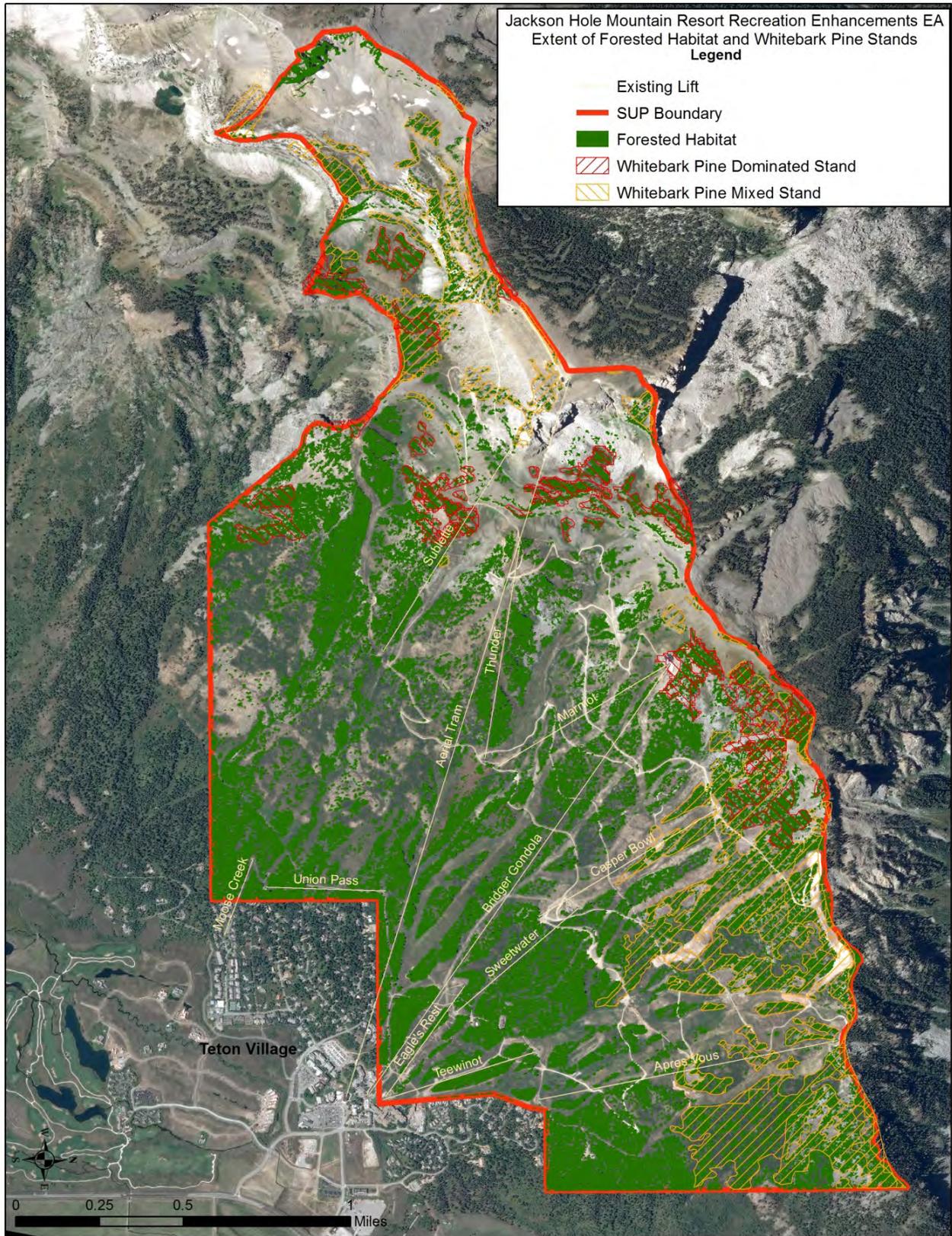


Figure 3-2. JHMR Recreation Enhancements EA forested habitat and whitebark pine stands.

Clearing projects would involve the removal of all trees and large shrubs in order to create open corridors that would accommodate lift alignments or zip-lines. The forested communities in cleared corridors would be converted to low-statured shrub or herbaceous communities. This treatment may also increase shrub and herbaceous-species cover. Clearing projects may result in minor, temporary ground disturbances as cut vegetation is removed from those corridors but would not include major, permanent ground disturbances.

Projects requiring grading would clear away existing vegetation and recontour the ground surface. The recontouring would include depositing or removing soil and fill material to create a smooth and contoured ground surface. Grading is used most often to construct ski runs or to level areas around other infrastructure. The result may be a permanent conversion from a forested to a low-statured shrub or herbaceous vegetation community. As part of their rehabilitation efforts, and to improve revegetation success, JHMR often either stockpiles or imports topsoil for use on disturbed areas.

Excavation projects would also clear away existing vegetation, as well as top soil and subsurface soil or rock in order to adequately accommodate infrastructure. Excavation would most often be associated with footings and foundations for buildings, lift towers, and terminals. Vegetation communities disturbed by excavation would be permanently converted to a developed condition within the project footprint, though buffer areas around excavations may be rehabilitated following the disturbance. When excavation is used to construct hiking and biking trails, the use of small equipment and hand tools would allow for strategic avoidance of special-status plants or trees greater than 3 inches in diameter.

3.5.3.1 Alternative 1 – No Action

3.5.3.1.1 Special-Status Species

Under the No-Action Alternative, JHMR would continue to operate within the SUP boundary as permitted. Ground-disturbing activities associated with previously approved projects or routine operations and maintenance would still be authorized. As described in section 2.3, the previously approved projects include constructing 3.7 miles of hiking and biking trails, widening of Upper Apres Vous Traverse, modifying the halfpipe, widening the Lower Sundance run, constructing a new Lower's Rest Cut-Off (with snowmaking), and completing the Casper Traverse (previously Upper Headwall Ridge run).

The No-Action Alternative does not include any projects that would involve glading, clearing, or excavation. However, widening of Upper Apres Vous Traverse and Lower Sundance run, construction of the Lower Eagle's Rest Cut-Off and Casper Traverse, modifying the halfpipe, and constructing the hiking and biking trails would all involve grading. With the exception of the halfpipe project, which would be located entirely within a recently disturbed area, these grading projects may affect special-status plants or habitat. The grading associated with the Lower Sundance run and Eagle's Rest Cut-Off would affect mixed conifer/aspen stands and would remove approximately 5.4 acres of aspen habitat. The Casper Traverse and Upper Apres Vous projects are located in stands that include a component of whitebark pine; however, only the Casper Traverse project would affect whitebark pine. This project is estimated to result in the removal of 14 whitebark pine trees with a diameter greater than 3 inches, including two that are 24 inches in diameter. Although no other special-status species have been observed in the footprints of these grading projects, the Casper Traverse would also pass through potential milk kelloggia habitat. No other special-status plants are known to occur in areas affected by grading.

Constructing the hiking/biking trails under the No-Action Alternative would require some grading work to create favorable grades, establish the running surface, and remove some obstacles. Though a temporary disturbance corridor would be created along the trail during construction, the trail running surface would be approximately 24 inches wide (section 2.3.4). And as design criteria (section 2.5), removal of trees greater than 3 inches in diameter would be avoided, and trails would be routed around large trees and, where possible, the roots of large trees to prevent root damage. The grading for hiking and biking trails is

anticipated to remove approximately 0.2 acres of aspen/conifer forest and 0.4 acres in forest stands with a whitebark pine component.

Collectively, the No-Action Alternative would have no effect on aromatic pussytoes, green spleenwort, Shultz’s milkvetch, rockcress draba, Payson’s bladderpod, broad-leaved twayblade, and large-flower triteleia. The No-Action Alternative may impact individuals but is not likely to cause a trend toward federal listing or loss of viability for milk kelloggia or whitebark pine. The Forest-wide population trend for aspen would not be affected.

3.5.3.1.2 Forest Vegetation

Table 3-10 summarizes the amount of forest vegetation affected by the various disturbance types (see introduction above under Environmental Consequences) by the No-Action Alternative and the Proposed Action.

The effect of the No-Action Alternative on forest vegetation would be the reduction of 6.5 acres of forested stands. Constructing the Upper Apres Vous Traverse and Casper Traverse would also contribute to forested habitat fragmentation by dividing existing forest stands; however, the stands where these projects would be located are relatively open.

Table 3-10. Amount of forest vegetation affected by glading, clearing, grading, and excavation associated with the No-Action Alternative and Proposed Action.			
Disturbance Type	No-Action (acres)	Proposed Action, Gondola Option 1 (acres)	Proposed Action, Gondola Option 2 (acres)
Glading	--	1.5	1.5
Clearing	--	2.7	3.0
Grading	6.5	20.1	20.0
Excavation	--	3.1	3.2
Total	6.5	27.4	27.7

3.5.3.2 Alternative 2 - Proposed Action

Special-Status Species

The projects comprised by the Proposed Action would result in 4.0 acres of glading (Table 3-3), all associated with the Grizzly Glade run. Whitebark pine is the only special-status plant species known to occur in that area, where it is a component in mixed conifer stands. However, as discussed in section 2.5, the glading treatment would selectively remove other conifer species while leaving whitebark pine in place. Removing other conifer species would decrease inter-species competition and should improve whitebark pine health. Therefore, glading projects would likely result in a beneficial effect on whitebark pine.

The clearing projects associated with the Proposed Action would create open corridors to accommodate the alignments of the Sweetwater gondola, Eagle’s Rest lift, and zip-line. Clearing the Sweetwater gondola would remove 2.5 acres of mixed conifer/aspen stands under Option 1 and 2.8 acres under Option 2. The upper portion of the Sweetwater gondola alignment under Option 1 was also previously cleared to construct the Casper Restaurant. Clearing for the Eagle’s Rest lift and zip-line alignment would remove approximately 0.2 acres of mixed conifer/aspen stands. The majority of the Eagle’s Rest lift and the lower portion of the Sweetwater gondola alignment were cleared previously to create ski runs near the base area, so areas most affect by the clearing are above the mid-way terminal of the gondola.

Clearing for the gondola would pass approximately 50 feet north of a recently documented occurrence of milk kelloggia under Option 1 (Delmatier 2015a). Clearing for the gondola alignment could also affect potential broad-leaved twayblade habitat, especially if Option 2 were selected. There is a documented occurrence of broad-leaved twayblade in the riparian corridor crossed by the gondola alignment under Option 2, though it is located approximately 435 feet downslope of the proposed alignment. No other special-status plant species are known to occur in the vicinity of the clearing projects.

The grading projects associated with the Proposed Action overlap with known habitat of aspen and whitebark pine. Under the Proposed Action, grading for the Solitude conveyor, Sweetwater gondola mid-way terminal, Eagle's Rest top terminal, and lower portion of the realigned Ashley Ridge run would remove approximately 5.7 acres of mixed conifer/aspen stands. Grading for the Washakie, and Solitude, runs, Via Ferrata, and hiking and biking trails would pass through mixed conifer stands having a whitebark pine component. Grading these upper-elevation runs would result in the removal of 26 whitebark pines, including a small number less than 3 inches in diameter. Grading for the Via Ferrata and hiking and biking trails in the Craggs area would be located near known occurrences of milk kelloggia, and in potential green spleenwort and milk kelloggia habitat, while hiking and biking trails near the summit of Rendezvous Mountain would be located near known occurrences of rockcress draba. If these species are found to occur within the proposed project footprints during pre-construction surveys, slight adjustments would be made to avoid them during the final lay-out. No other special-status plants are known to occur in areas that will be subject to grading disturbances.

The excavation projects associated with the Proposed Action overlap habitat types for some special-status species. For example, the excavation disturbances required for construction of the GazEx project would occur in potential aromatic pussytoes, rockcress draba, and Payson's bladderpod habitat. However, slight adjustments would be made in the placement of the GazEx components to avoid impacting individual plants. And the excavation associated with the storage facility east of Apres Vous lift would result in the removal of approximately 15 aspen trees. Otherwise, there are no known occurrences of special-status species within the disturbance area associated with the Proposed Action. As a result, the excavation projects are not likely to directly affect aromatic pussytoes, rockcress draba, or Payson's bladderpod. No other special-status plant species are known to occur in areas that will be excavated.

Considering the disturbances described above and their location relative to known special-status plants or potential habitat, the Proposed Action would have no effect on Shultz's milkvetch, or large-flower triteleia. However, since elements of the Proposed Action are located in potential habitat for, or near known locations of, aromatic pussytoes, green spleenwort, rockcress draba, milk kelloggia, Payson's bladderpod, and broad-leaved twayblade, it may impact individuals but is not likely to cause a trend to federal listing or loss of viability. The Proposed Action would also directly affect whitebark pine, and aspen, but is not likely to cause a trend to federal listing or loss of viability for whitebark pine or to affect Forest-wide aspen trends. As described above in section 2.5, design criteria would limit the potential impact on these species.

Forest Vegetation

The glading, clearing, grading, and excavation associated with the Proposed Action would remove approximately 27 to 28 acres or 3 percent of existing forested habitat within the JHMR SUP boundary. The amount removed would be slightly less if Option 1 of the Sweetwater gondola were selected, and slightly more if Option 2 were selected (Table 3-10). In either option, grading disturbances account for the majority of forested habitat that would be removed. The removal of forested vegetation, especially for the proposed ski runs, would further fragment forested habitats at JHMR. The projects that would most notably contribute to fragmentation are the Sweetwater gondola and Washakie, Solitude, and Lower Ashley runs.

3.5.4 CUMULATIVE EFFECTS

As discussed in section 3.3, the cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impacts on the same resources affected directly or indirectly by these alternatives – generally those occurring within the Fish Creek subwatershed (HUC 12) – in the past, present, or reasonably foreseeable future. Only the Teton to Snake Fuels Management project meets the spatial and temporal overlap requirements.

The purposes of the Teton to Snake Fuels Management Project are to (1) reduce wildland fire threat to residential areas, (2) improve firefighter and public safety, and (3) allow BTNF managers to transition from suppressing most fires to a more natural fire regime. The project would restore and maintain fire adapted ecosystems by reducing wildfire hazards using prescribed fire, cutting, and thinning. The project area begins approximately 2 miles south of the JHMR SUP boundary, and extends 22 miles to the south. The project is still in the analysis process, and the specific details of how the fuel reduction would affect vegetation are not yet available. However, the description of alternatives in the scoping documents indicates that design features will be employed to decrease impacts on sensitive plant species. Those design features include such practices as not igniting fires in sparse or alpine vegetation and not piling fuels on the ridgelines.

Reducing fuel loads in the Teton to Snake Fuels Management project area will reduce the risk of catastrophic wildland fires and the associated negative impacts on rare or sensitive plant species, and on establishment of noxious weeds, that accompany catastrophic fires. As a result, the Teton to Snake Fuels Management project is anticipated to have a long-term beneficial impact on special-status vegetation and forested habitats. The cumulative effect of the Teton to Snake Fuels Management Project and the Proposed Action would not be detrimental to any special-status plant species or forested habitats.

3.6 WILDLIFE

3.6.1 SCOPE OF ANALYSIS

- *How would the proposed infrastructure affect special-status wildlife species and other species of interest or concern?*

Potential habitat for 3 federally listed species, 10 Forest Service Region 4 sensitive species, and 8 MIS species – some in more than one category – occurs in the JHMR permit area. Other species of concern to the public or agencies are also present and were analyzed, such as migratory birds. These species could be affected through habitat alteration resulting from clearing, grading, excavation, or changed patterns of human activity.

Indicators: Species-specific determinations of potential individual- and population-level impacts, based primarily on past surveys, surveys completed for this analysis, published information on the species' habitat distribution and population status, and efficacy of proposed mitigation.

3.6.2 AFFECTED ENVIRONMENT

Table 3-11 identifies all special-status species known, or suspected, to occur on the Jackson Ranger District of the BTNF (Forest Service 2015b). Seventeen of these species have habitat in the project area and are discussed in detail below. The remaining species have no habitat in the project area and would not be affected by the alternatives.

Table 3-11. Special-status species (threatened, endangered, sensitive, and management indicator species) on the BTNF and their status in the project area.				
Species Name	Habitat Description	Status	Known Occurrences in the Project Area	Habitat Present in Project Area
Mammals				
American marten (<i>Martes americana</i>)	Dense, old growth forests. Requires tree cavities for resting and denning. ¹	MIS	Yes	Yes
Bighorn sheep (<i>Ovis Canadensis</i>)	Rugged terrain and areas near rugged terrain with grasses and forbs. ¹	R4 Sensitive, MIS	Yes	Yes
Canada lynx (<i>Lynx canadensis</i>)	Coniferous or mixed forests, thick undergrowth for hunting, old growth with deadfall for denning and resting. ²	Threatened	No	Yes
Rocky Mountain Elk (<i>Cervus elaphus</i>)	Habitat generalist occupying a wide range of habitats.	MIS	Yes	Yes
Gray Wolf (<i>Canis lupus</i>)	Variable. Any area supporting sufficient prey, offering denning and rendezvous sites with minimal exposure to humans.	Experimental Non-essential	No	Yes
Grizzly bear (<i>Ursus arctos horribillis</i>)	Diverse habitats that provide relative solitude, ungulate prey and carrion, herbaceous vegetation and mast cops such as whitebark pine.	Threatened, MIS	Yes	Yes
Spotted bat (<i>Euderma maculatum</i>)	Associated with cliffs and a variety of habitats, including openings in high-elevation conifer and aspen communities. ¹	R4 Sensitive	No	Yes
Fisher (<i>Martes pennant</i>)	Mid-to-low elevation coniferous or mixed forests with dense canopies, large trees, abundant snags, and downed logs. Avoids areas of high human activity. ¹	R4 Sensitive	No	No
Moose (<i>Alces alces</i>)	Associated with aquatic, riparian, and densely forested areas. ¹	MIS	Yes	Yes
Mule deer (<i>Odocoileus hemionus</i>)	Habitat generalist occupying a wide range of habitats.	MIS	Yes	Yes
Pronghorn (<i>Antilocarpra americana</i>)	Open, low-elevation, flat or gently rolling habitats.	MIS	No	No

Table 3-11 (cont'd) . Special-status species (threatened, endangered, sensitive, and management indicator species) on the BTNF and their status in the project area.				
Species Name	Habitat Description	Status	Known Occurrences in the Project Area	Habitat Present in Project Area
Townsend's western big-eared bat (<i>Corynorhinus townsendii townsendii</i>)	Uses a wide variety of roosting and foraging habitats, including caves and mines for roosting and open areas for foraging. ¹	R4 Sensitive	No	Yes
Wolverine (<i>Gulo gulo</i>)	Wide ranging species that uses a variety of montane habitats. ¹	R4 Sensitive	Yes	Yes
Birds				
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Roosts in large trees. Generally nests in mature, old-growth trees within 2 kilometers of water. ³	R4 Sensitive, MIS	Yes	Yes
Brewer's sparrow (<i>Spizella breweri</i>)	Associated with sagebrush shrublands. Requires areas of tall, dense sagebrush for nesting.	MIS	Yes (eBird location at the base area)	No
Boreal owl (<i>Aegolius funereus</i>)	High-elevation spruce/fir or mixed forests. Requires cavities for nesting. Cavities generally found in older trees and snags. ³	R4 Sensitive	No	Yes
Greater sage-grouse (<i>Centrocercus urophasianus</i>)	Sagebrush obligate. Requires expansive areas dominated by sagebrush of varying densities and age classes. ³	R4 Sensitive	No	No
Trumpeter swan (<i>Cygnus buccinator</i>)	Freshwater ponds, lakes, or marshes with abundant aquatic vegetation. ³	R4 Sensitive	No	No
Peregrine falcon (<i>Falco peregrinus anatum</i>)	Habitat varies widely. Nesting habitat most commonly associated with cliffs. ³	R4 Sensitive, MIS	Yes	Yes
Common loon (<i>Gavia immer</i>)	Large water bodies with islands and fish. ³	R4 Sensitive	No	No
Harlequin duck (<i>Histrionicus histrionicus</i>)	Large, fast-flowing rivers with forested banks for nesting. ³	R4 Sensitive	No	No
Flammulated owl (<i>Psiloscops flammeolus</i>)	Dry upland ponderosa pine; sometimes Douglas fir or aspen forests with brushy understory. ³	R4 Sensitive	No	No
Three-toed woodpecker (<i>Picoides dorsalis</i>)	Coniferous or mixed forests, generally with abundant beetle-killed snags. ³	R4 Sensitive	Yes	Yes

Table 3-11 (cont'd) . Special-status species (threatened, endangered, sensitive, and management indicator species) on the BTNF and their status in the project area.				
Species Name	Habitat Description	Status	Known Occurrences in the Project Area	Habitat Present in Project Area
Great gray owl (<i>Strix nebulosi</i>)	Mixed lodgepole pine, Douglas fir, or aspen forests. Commonly nests in large broken-topped snags. ³	R4 Sensitive	No	Yes
Northern goshawk (<i>Accipiter gentilis</i>)	Coniferous or mixed, old-growth forests. Often nests in small (~10-acre) patches of trees, such as those present in the project area. ³	R4 Sensitive	Yes	Yes
Whooping crane (<i>Grus americana</i>)	Experimental population extirpated in Wyoming.	MIS	No	No
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Large stands of riparian woodlands greater than 25 contiguous acres at least 330 feet wide below 7,000 feet. ³	Threatened	No	No
Amphibians				
Columbia spotted frog (<i>Rana luteiventris</i>)	Requires perennial, slow-moving, or standing water, generally with emergent vegetation. ¹	R4 Sensitive	No	No
Boreal chorus frog (<i>Pseudacris maculata</i>)	Requires perennial, slow-moving, or standing water, generally with emergent vegetation. ¹	MIS	No	No
Boreal toad (<i>Bufo boreas</i>)	Requires perennial, slow-moving, or standing water, generally with emergent vegetation. ¹	R4 Sensitive, MIS	No	No
Fish				
Yellowstone cutthroat trout (<i>Oncorhynchus clarki bouvieri</i>)	Cold-water perennial streams or lakes and ponds with suitable substrate for spawning and sufficient food source. ¹	R4 Sensitive	No	No
¹ Natureserve 2015. http://explorer.natureserve.org/index.htm ² Forest Service 2007. ³ Birds of North America. http://bna.birds.cornell.edu/bna				

3.6.2.1 Threatened and Endangered Species

The Endangered Species Act of 1973, as amended (ESA), is administrated by the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS). The act requires federal agencies to ensure that any activities they authorize, fund, or carry out do not jeopardize the continued existence of any federally listed threatened, endangered, or proposed species. Compliance with this direction is

documented in a Biological Assessment (BA), and the findings from the BA prepared for this Proposed Action are summarized here (Cirrus 2015).

Canada Lynx

The Canada lynx was listed as threatened in the contiguous U.S. under the ESA in March 2000 (FWS 2000). Critical habitat for Canada lynx, none of which occurs within the project area, was designated September 2014 (FWS 2014).

Their primary prey, the snowshoe hare, is found throughout the BTNF in suitable habitat. In the project area, suitable habitat for snowshoe hares is found in the small dense coniferous tree stands located in the Moran Face, Craggs, and Solitude Cabin areas, as well as in the more extensive conifer stands in the lower Cheyenne Bowl. Snowshoe hares were detected by tracks and fecal pellets in these areas during surveys conducted in 2002. However, there was much more snowshoe hare sign in the lower Cheyenne Bowl area, and it was more consistent between survey sessions (Pioneer 2002). This is to be expected given the high level of habitat fragmentation in the remaining areas.

Since the creation of JHMR in 1965, recreational improvements occurred similar to those described for the proposed action. New ski runs were cut through potential lynx habitat (mapped as part of the *Lynx Conservation and Assessment Strategy* and the *Northern Rockies Lynx Management Direction and Forest Plan Amendment*), most recently as part of the ski run installation along the ridgetop north of the new Teton lift top terminal (Hugie 2013a, b). This project removed approximately 8 acres of an isolated parcel of mapped lynx habitat (see Figures 2 and 3 in Cirrus 2015).

The Fall Creek North Lynx Analysis Unit (LAU), which includes JHMR, covers 75,383 acres and contains 34,797 acres of lynx habitat. While a few isolated patches of potential lynx habitat exist within the JHMR permit area, there are no records of lynx occurrences on or near JHMR (WNHD 2015). Surveys for lynx have been completed on other areas of the BTNF with positive results, but none have been undertaken at the resort (Holden 2004). Regardless, according to the Canada Lynx Conservation Agreement between the Forest Service and the FWS (FWS 2006), all mapped lynx habitat on the BTNF must be considered “occupied” because lynx have been found on the Forest.

Gray Wolf

Gray wolves were originally classified as endangered in 1967 under the Endangered Species Preservation Act of 1966. In 1973, the northern Rocky Mountain wolf subspecies was listed as endangered under the ESA of 1973. The FWS began reintroducing the gray wolf into Yellowstone National Park in 1995, and classified this population as “nonessential experimental” on federal lands outside national parks and refuges in the U.S. Northern Rocky Mountains, according to section 10 (j) of the ESA.

On September 23, 2014, the Federal District Court for the District of Columbia vacated the delisting of wolves in Wyoming under the ESA. Therefore, wolves are again listed as a nonessential experimental population in all of Wyoming. Take of wolves may be authorized only by the nonessential experimental population (10j) rules

Gray wolves occupy a wide variety of habitat types, given sufficient prey. Wolves tolerate low levels of human activity in their territories, but generally choose natal dens at sites that are undisturbed. No wolf sightings have been recorded at or near JHMR (WNHD 2015). The area is currently not within the range of a wolf pack (WGFD et al. 2014), although no surveys have been conducted. It is likely that high levels of year-round human activity in and around the resort deter use of the project area by wolves.

Grizzly Bear

The grizzly bear was listed as threatened in the lower 48 States in July of 1975 (FWS 1975). Critical habitat for grizzly bears has not been designated. Grizzly bears occur in forest environments, grasslands, and shrublands, particularly riparian zones. They prefer habitats that provide relative solitude and that support animal prey and provide herbaceous vegetation or mast crops such as berries or nuts.

The project area is within the Demographic Monitoring Area (DMA) for the Greater Yellowstone Ecosystem bear population. Recent research by the IGBST indicates that the trend of female grizzly bears with cubs of the year was up for the period between 1983 and 2013 (IGBST 2014). While this does not necessarily indicate that the population has increased over the same period, it is suggestive of an upward population trend for grizzly bears in the DMA. Since no BTNF-specific information for this MIS is available, for the purposes of this analysis we will treat the upward trend on the DMA as indicative of the trend on the BTNF.

There are a handful of Wyoming Natural Heritage database records for grizzly bears in and around the project area, all of which are from 2009 and 2010 (ICST 2007, WNHD 2015). No surveys for grizzly bears have been conducted specifically at JHMR. Given the historic sightings in the area, it is possible that a grizzly bear could be in the area during project implementation, attracted to mast crops (e.g., huckleberries and occasional ungulate carcasses) in the area.

3.6.2.2 Forest Service Sensitive Species

The population trend and viability of sensitive species is a concern. They are managed under the authority of the National Forest Management Act (PL 94-588; NFMA), and are administratively designated by the Regional Forester (FSM 2670). Table 3-11 shows which sensitive wildlife species and associated habitats occur in the project area.

Bighorn Sheep

Bighorn sheep are a widely distributed species, ranging from the northern Rockies south to the Baja peninsula. The subspecies present in the project area is the Rocky Mountain bighorn. Rocky Mountain bighorn are found in and around rugged terrain they use as escape terrain where their adaptations allow them to outrun and outmaneuver potential predators. This dependence on escape terrain limits potential habitat. Human activity is known to impact this species by causing avoidance of otherwise suitable habitat (Longshore and Thompson 2013, Courtemanch 2014). The population of Rocky Mountain bighorn in the project area avoids habitat used by winter recreationists (Courtemanch 2014).

Hiking trails have been shown to be avoided by desert bighorn sheep, and to have no effect on Sierra Nevada bighorn sheep, both closely related to Rocky Mountain bighorn sheep (Hicks and Elder 1979, Longshore and Thompson 2013). Trail avoidance by desert bighorn was very short lived. Sheep avoided trails during high-use weekends and returning during weekdays (Longshore and Thompson 2013).

The bighorn sheep population around JHMR is a part of the Targhee herd unit (WGFD 2014). The herd extends northward from Highway 22 (Teton Pass) to the northern extent of the Teton Range. It is spaced as southerly and northerly subpopulations with little demographic or genetic connectivity. It is estimated that there are 125 bighorn sheep in this population. The population objective is 125, which is also the approximate size of the 2012 and 2013 population.

Surveys conducted March 29 and 30, 2015, yielded observations of bighorn sheep within 2 miles, and their tracks within 1 mile, of the JHMR permit area (WGFD 2015a). The permit area was not surveyed as part of this effort. GPS data collected in 2008 and 2009 indicate that JHMR is not within utilized summer or winter ranges for the Targhee herd (Courtemanch 2014).

Spotted Bat

Spotted bats are found throughout the west in a wide variety of habitats. In Wyoming they are found in the western third of the state and have been recorded at elevations up to 9,000 feet in caves and rock crevices (Watkins 1977, Priday and Luce 1999, Luce et al. 2004). In general, spotted bats are found within 6 miles of cliffs with nearby permanent water (Priday and Luce 1999).

Little is known about spotted bat populations in western Wyoming (Priday and Luce 1999, Luce et al. 2004). No records exist in the Wyoming Natural Heritage Database within 2 miles of the project area (WNHD 2015). Cliffs in the vicinity of the proposed Via Ferrata routes were inspected with spotting

scopes in an attempt to identify any potential cave roosting sites. No such sites were identified. However this species also roosts in rock crevices, which are plentiful in the low-elevation cliffs and rocky outcrops at JHMR.

Townsend's Western Big-eared Bat

There is some disagreement and ambiguity as to whether the western subspecies of Townsend's big-eared bat, the subspecies listed as sensitive in Region 4, are found in Wyoming. However, Townsend's big-eared bats do occur in Wyoming, and for purposes of this analysis it is assumed they are of the western subspecies (Handley 1959, Piaggio and Perkins 2005). During spring, summer, and fall Townsend's big-eared bats roost in buildings, mines, and caves at elevations up to 11,000 feet. Hibernacula used in winter are almost exclusively mines or caves and can be up to 20 miles away from summer-use sites. Townsend's big-eared bats eat moths and other flying insects that they take on the wing, generally at the margins of forest patches (Kunz and Martin 1982).

No records for this species exist in the Wyoming Natural Heritage Database within 2 miles of the project area (WNHD 2015). Cliffs in the vicinity of the proposed Via Ferrata routes were inspected with spotting scopes in an attempt to identify any potential roosting or hibernating sites. No such sites were identified.

Wolverine

In North America, wolverines occur within a wide variety of alpine, boreal, and arctic habitats, including boreal forest, tundra, and montane forests throughout much of Alaska and Canada. The southern portion of the species' range extends into the contiguous United States, including high-elevation alpine portions of Washington, Idaho, Montana, Wyoming, California, and Colorado (Copeland et al. 2010). This species' requirement for cold, snowy conditions means that, in the southern portion of the species' range where ambient temperatures are warmest (like Wyoming), wolverines occur principally at high (> 8,000 feet) elevations (Murphy et al. 2011, Inman et al. 2012). Deep snow is required for successful wolverine reproduction because female wolverines dig elaborate natal dens in the snow (FWS 2010).

Wolverines are opportunistic feeders and consume a variety of foods depending on availability. Home ranges of wolverines are large, and vary greatly in size depending on availability of food, gender and age of the animal, and differences in habitat quality. Wolverine in the Greater Yellowstone Area had average adult male home ranges of 311 square miles and average adult female home ranges of 128 square miles (Inman et al. 2012).

Wolverines have been observed at JHMR (WGFD 2015b). They generally avoid high levels of human disturbance; however, they appear to tolerate low to moderate levels of human recreational activity (Heinemeyer and Squires 2014). No surveys for this species were conducted in the project area.

Bald Eagle

Bald eagles are closely associated with water, and their nest sites are commonly found less than 1 mile from a lakeshore or riverbank. Large trees are necessary to support eagle nests. Old-growth stands, with their structural diversity and open canopies, provide important habitat for eagles because snags and open-canopied trees located near the nest site and foraging areas offer favorable perches. Bald eagles with access to open water or alternate food sources near their nesting territories may not migrate in winter; however, many eagles migrate southward to areas with available prey (Buehler 2000).

Bald eagles are common in and around the project area. Several records for this species exist in the WNHD and additional records exist on eBird (eBird 2015, WNHD 2015). No surveys for this species were conducted in the project area.

Boreal Owl

Boreal owls are generally associated with dense, mature, and old growth subalpine forests dominated by subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmanni*; Hayward and Hayward 1993). They also often occur in other conifer and mixed-conifer aspen forests that support inclusions of mature

subalpine forests, and may forage in forest openings. In western Wyoming, subalpine forests typically occur above 8,000 feet in elevation, with stringers extending to low elevations along stream courses. They are often bordered by Douglas fir and/or lodgepole pine forests, sagebrush steppe, or grassland steppe at low elevations, and by alpine habitats and white-bark pine (*Pinus albicaulis*) at high (9,500 feet) elevations. Prey species include voles, mice, shrews, pocket gophers, squirrels, chipmunks and, less frequently, small birds and insects (Hayward and Hayward 1993).

No WNHD records exist for boreal owls within 2 miles of the project area (WNHD 2015). There is one record on eBird approximately 1 mile northeast in GTNP (eBird 2015). Two rounds of surveys for this species were conducted in the project area in 2015, using recorded calls from 13 calling stations in potential habitat across the project area. The taped calls were audible for over 0.5 miles from calling stations, ensuring complete coverage of potential habitat in the project area. No boreal owls were detected during these surveys. However, boreal owls could potentially utilize the project area as some marginal quality habitat is present. Boreal owls are common in other areas of the BTNF.

Peregrine Falcon

Peregrine falcons occupy a wide range of habitats. They are typically found in open country near rivers, marshes, and coasts. Cliffs are preferred nesting sites, although reintroduced birds now regularly nest on man-made structures such as towers and high-rise buildings. Peregrines may travel more than 15 miles from the nest site to hunt for ducks, shorebirds, or songbirds. However a 5-mile radius around the nest is an average hunting area, with 60 percent of foraging occurring within this distance (White et al. 2002).

One record for peregrine falcons exists in the WNHD within 2 miles of the study area, and an additional record exists on eBird for this species (eBird 2015, WNHD 2015). Surveys for peregrine falcon nests were conducted in the cliff areas near the Via Ferrata routes. Surveys involved scanning the cliff faces, using a spotting scope, for indicative whitewash from fecal deposits. No peregrine nests were detected, although suitable habitat is present.

Three-toed Woodpecker

Three-toed woodpeckers require coniferous forest with snags that are used for nesting and feeding. They are primarily associated with recent coniferous forest burns and bark beetle infestations, foraging on insects in recently dead and dying trees. They excavate a new cavity annually for nesting (Leonard 2001).

No WNHD records for three-toed woodpeckers exist within 2 miles of the project area (WNHD 2015). However, there are several records in the vicinity of the project area on eBird, most of which occur in GTNP (eBird 2015). While there has been some beetle kill at JHMR, some of the snags are cut down for skier safety. When compared with GTNP, the snag density at JHMR is very low. No surveys have been conducted for this species in the project area.

Great Gray Owl

This species inhabits mixed coniferous forests usually bordering small openings or meadows. It is generally associated with lodgepole pine, Douglas fir, spruce fir, and aspen forests. Semi-open areas where small rodents are abundant, and that occur near dense coniferous forests for roosting and nesting, are optimum habitat for great gray owls. These owls prefer mature or old growth forests on flat or moderate slopes for nesting and high crown cover for security, using broken top snags, stumps, dwarf-mistletoe platforms, or old hawk and raven nests as nesting structures. Dense stands of smaller diameter trees are also used for roosting by adults and their young. They forage primarily in wet montane meadows and older open forest stands with a high density of pocket gophers and voles (Duncan and Franklin 1993).

Records for this species exist in both the WNHD and on eBird (eBird 2015, WNHD 2015). None of these records are in the project area, but there are several in the vicinity. Two rounds of surveys for this species were conducted in the project area in March 2015, using recorded calls from 13 calling stations in potential habitat across the project area. The taped calls were audible for over 0.5 miles from calling

stations, ensuring complete coverage of potential habitat in the project area. No great gray owls were detected during these surveys. However, they could potentially utilize the project area. Some habitat is present, though generally poor quality due to insufficient tree density.

Northern Goshawk

Goshawks typically nest in mature to old-growth forests composed primarily of large trees with high (60–90 percent) canopy closure (Squires and Reynolds 1997). High canopy closure is one of the most uniform habitat characteristics of goshawk nest stands (Hayward and Escano 1989). Although the habitat-use and preferences of foraging goshawks are poorly understood for North American populations, they generally forage in diverse habitats ranging from open-sage steppes to dense forests, including riparian areas (Squires and Reynolds 1997). Average goshawk home range sizes during nesting are 1,400–8,600 acres in N. America, depending on sex and habitat characteristics (Squires and Reynolds 1997).

This species has been documented at JHMR, including records from eBird and the WNHD (eBird 2015, WNHD 2015). Two rounds of surveys were conducted in the project area in March 2015. Morning surveys were conducted at five sites between 6:30 AM to 8:30 AM. The surveys consisted of an individual observer at each site listening for goshawk calls. This survey protocol is considered to be extremely effective in detecting nesting goshawks if they are present (Woodbridge and Hargis 2006). No goshawks were detected. Goshawks may still use habitats at JHMR, as has been documented previously; however, based on the surveys completed for this analysis, there are no goshawks currently nesting in the project area.

3.6.2.3 Forest Service Management Indicator Species (MIS)

NFMA implementing regulations (36 CFR 219.19) and Forest Service Manual (FSM) 2600 guidance require that forest plans identify select vertebrates and/or invertebrates as management indicator species (MIS), and that these species be monitored “in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent” (FSM 2620.5).

American Marten

This species is an ecological MIS for old growth habitats on the BTNF. Marten inhabit late-successional, old growth, and mixed-age stands of conifers, especially those with complex physical structure at ground level. They eat a variety of foods such as small mammals, rodents, berries, eggs, and fish (Clark et al. 1987). The marten is broadly distributed—its range extends from the southern Sierras and northern New Mexico to northern Alaska, Canada and to Newfoundland Island. Within the lower 48 states, its distribution is limited to mountain ranges that provide habitat (Clark et al. 1987).

This species has been documented at JHMR (WNHD 2015); however, no Forest-wide population or trend data is available.

Bighorn Sheep

Bighorn sheep are an economic MIS on the BTNF. See the Sensitive Species section above for a discussion of bighorn sheep habitat and life history attributes.

Rocky Mountain Elk

Elk are habitat generalists. During the summer, they spend the majority of their time in montane, subalpine, and alpine habitats. During the winter, elk movements are restricted by forage availability and snow conditions. Elk migrate to lower elevations with shallow snow, and typically inhabit coniferous forests interspersed with riparian areas, as well as south-facing slopes with aspen, sagebrush and other shrubs, and grasslands.

The elk population around JHMR is a part of the Jackson herd (WGFD 2014). It is estimated that there are 11,600 elk in this population. The population objective is 11,000 individuals. This population is meeting objectives and has remained fairly stable in the last 6 years.

Grizzly Bear

See preceding discussion of the grizzly bear as a federally listed species.

Moose

Moose use a variety of habitats from dense coniferous or quaking aspen forests to mixed-mountain shrublands, open meadows, and riparian areas. During the summer months, they are associated with coniferous forests, often with standing water, where they seek relief from warm temperatures. Moose typically move to lower elevation and use willow-dominated riparian areas in the winter

Moose occur at lower elevations in the project area on a yearlong basis. The moose population around JHMR is a part is of the Sublette herd (WGFD 2014). It is estimated that there are 1,400 moose in this population. The population objective is 1,500 individuals. This population is below objectives and has been increasing in the last 6 years.

Mule Deer

Mule deer are habitat generalists. They are often associated with early-successional vegetation and use sagebrush grasslands, mixed-mountain shrublands, quaking aspen forests, various types of conifer forests, and recent burns. Mule deer in mountainous regions migrate to lower elevations when winter snow pack is deep.

Mule deer occur at lower elevation in the project area on a yearlong basis. The mule deer population around JHMR is a part is of the Sublette herd (WGFD 2014). It is estimated that there are 22,900 mule deer in this population. The population objective is 32,000 individuals. This population is below objectives and no clear trend is apparent as the population has been fluctuating for the last 6 years.

Bald Eagle

See discussion of the bald eagle as a sensitive species.

There is no information on population or trend on the BTNF for this MIS. However, Breeding Bird Survey data from the USGS indicates that the overall trend for Wyoming is up for the period of 1968 to 2013 as well as for the period of 2003 to 2013 (USGS 2015).

Peregrine Falcon

See discussion of the peregrine falcon as a sensitive species.

There is no information on population or trend on the BTNF for this MIS. However, Breeding Bird Survey data from the USGS indicates that the overall trend for Wyoming is up for the period of 1968 to 2013 as well as for the period of 2003 to 2013 (USGS 2015).

3.6.2.4 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act of 1918. Executive Order 13186 details the responsibilities of federal agencies to protect bald and golden eagles and other migratory birds. In December 2008, an MOU between the Forest Service and the FWS to promote the conservation of migratory birds was signed (Forest Service 2008). Pursuant to the Executive Order and the MOU, the Forest Service ensures that environmental analyses of federal actions required by NEPA evaluate the effects of actions and agency plans on migratory birds, with emphasis on: 1) species of management concern along with their priority habitats; and 2) species of conservation concern.

A list of birds of conservation concern is published and maintained by the FWS, Division of Migratory Bird Management (FWS 2008). The current list is available at <http://www.fws.gov/migratorybirds>. The project area is located within the Northern Rockies Bird Conservation Region (BCR 10).

There are a total of 22 FWS birds of conservation concern for BCR 10. Three of these species are also Forest Service sensitive species, one is a threatened species under the ESA, and one is a BTNF MIS. The ESA-listed and Forest Service sensitive species are discussed above, and the MIS is included in Table 2 since there is no habitat on the project area to warrant discussion as an MIS. The remaining 18 species are described in Table 3-12 below.

Table 3-12. FWS Region 10 Birds of Conservation Concern, their habitat, and their presence in the project area.			
Species Name	Habitat Description	Known Occurrences in the Project Area	Habitat Present in Project Area
Bald eagle	See sensitive species section.	Yes	Yes
Swainson's hawk	Most habitats below 9,000 feet with open areas for foraging. Nests in trees, occasionally on cliffs. Feeds mostly on small mammals.	Yes	Yes
Ferruginous hawk	Basin prairie shrublands, mountain foothills grasslands, cottonwood-riparian. Nests on rock outcrops, the ground, banks, or in trees. Feeds mostly on small mammals.	No	No
Peregrine falcon	See sensitive species section.	Yes	Yes
Upland sandpiper	Eastern great plains grasslands, dry-land grass pastures. Nests in depressions on open ground, usually concealed by grass. Feeds on insects, terrestrial invertebrates, seeds.	No	No
Long-billed curlew	Sagebrush-grasslands, meadow grasslands, irrigated meadows. Nests on the ground near water. Feeds on insects, aquatic invertebrates.	No	No
Yellow-billed cuckoo	See Table 3-11.	No	No
Flammulated owl	See sensitive species section.	No	No
Black swift	Small islands of breeding populations in Intermountain West. Nests on ledges or shallow caves in steep rock faces and canyons, usually near or behind waterfalls, and in sea caves.	No	No
Calliope hummingbird	Coniferous forests, woodland chaparral, mountain-foothills, shrublands, riparian shrub, mountain park-meadows, alpine grasslands. Uses many habitats during migration. Nests on limbs or conifer cones. Feeds on nectar, insects.	Yes	Yes
Lewis's woodpecker	Ponderosa pine savannah, pine-juniper, other coniferous forests, aspen, cottonwood-riparian, below 8,500 ft. Nests in cavities in dead or live trees or poles. Feeds on insects, nuts, and berries.	No	Yes

Table 3-12 (cont'd). FWS Region 10 Birds of Conservation Concern, their habitat, and their presence in the project area.			
Species Name	Habitat Description	Known Occurrences in the Project Area	Habitat Present in Project Area
Williamson's sapsucker	Coniferous forests, especially those that have burned. Also aspen. Nests in cavities in aspen, pine, or fir. Feeds on insects, tree sap.	Yes	Yes
White-headed woodpecker	Coniferous forests from 4,000 to 9,000 feet. Feeds on insects, conifer seeds. Wyoming is considered out of this species geographical range.	No	No
Olive-sided flycatcher	Coniferous forests from 8,000 feet to timberline, aspen-riparian. Nests often high in conifer on horizontal branches. Feeds exclusively on insects that can be caught in the air.	Yes	Yes
Willow flycatcher	Riparian shrub including willow, hawthorn, water birch, and alder below 9,000 feet. Nests in upright or slanting fork in a shrub. Feeds primarily on insects, occasionally berries.	No	Yes
Loggerhead shrike	Pine-juniper, woodland-chaparral, basin-prairie and mountain-foothills shrublands. Nest is usually hidden below the crown in the crotch or on a large branch of a deciduous tree or shrub. Feeds on insects, small vertebrates, carrion.	No	No
Sage thrasher	Basin-prairie and mountain-foothills shrublands. Nest is concealed in or beneath a sagebrush shrub. Feeds on insects, some fruit.	No	No
Brewer's sparrow	See Table 3-11.	Yes (eBird location at base area)	No
Sagebrush sparrow (formerly sage sparrow)	Basin-prairie and mountain-foothills shrublands. Usually nests in or under sagebrush. Feeds on insects, seeds.	No	No
McCown's longspur	Eastern great plains and great basin foothills, grasslands, basin-prairie shrublands, agricultural areas. Nests on the ground in a shallow, natural or scraped depression. Feeds on seeds, insects.	No	No
Black rosy-finch	Alpine grasslands, alpine moss-lichen-forb, barren ground, fallow agricultural areas. A variety of habitats during the winter. Nests on the ground or on a cliff. Feeds on seeds, insects.	Yes	Yes
Cassin's finch	Coniferous forests up to timberline, including burns. Lower habitats during the winter, especially urban areas. Nests in conifers; nest is usually placed near the end of a large limb. Feeds on buds, berries, and conifer seeds.	Yes	Yes

3.6.3 DIRECT AND INDIRECT EFFECTS

3.6.3.1 Alternative 1 - No Action Alternative

Threatened and Endangered Species

Canada Lynx

The 1996 EIS (p. 4-2) identified no effect on Canada lynx due to a general lack of habitat at the resort. The 2000 EA (p. 3-107) identified impacts associated with removal of prey habitat that would occur as a result of some of the projects in this No-Action Alternative. Since these analyses were completed, the *Northern Rockies Lynx Management Direction* document provided objectives, standards, and guidelines to address the risks posed to lynx habitat by ski areas (Forest Service 2007). Applicable objectives, standards, and guidelines for lynx management are addressed below.

Habitat Linkage and Movement

- **Objective ALL O1**: Maintain or restore lynx habitat connectivity in and between LAU's and/or linkage areas.
- **Standard ALL S1**: New or expanded permanent development and vegetation management projects must maintain habitat connectivity in LAU and/or linkage area.
- **Objective HU O2**: Manage recreational activities to maintain lynx habitat and connectivity.
- **Objective HU O3**: Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.
- **Guideline HU G3**: Recreation development and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat.

Regional habitat connectivity for lynx would not be impacted by the No-Action Alternative as no barriers to lynx travel would be created and the project area does not fall within a linkage area. Habitat in the project area is currently highly fragmented, both naturally and as a result of past ski area development and operations. The project area is also surrounded on all sides by unsuitable or naturally highly fragmented habitat. A lynx that chose to move through the project area would have no more difficulty doing so before implementation of these projects than after.

Habitat Quality and Effectiveness

- **Objective HU O2**: Manage recreational activities to maintain lynx habitat and connectivity.
- **Guideline HU G1**: When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris, so winter snowshoe hare habitat is maintained.
- **Guideline HU G2**: When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.
- **Guideline HU G3**: Recreation development and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat.
- **Guideline HU G10**: When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat, if it has been identified as a need.

The No-Action Alternative would impact approximately 0.2 acres of mapped lynx habitat, representing less than 1 percent of the mapped lynx habitat within JHMR's permit boundary. Most impacts from this alternative would occur in areas neither mapped as lynx habitat nor suitable for lynx. Given these facts, combined with the fact that the Fall Creek North LAU is very sparsely populated if populated at all by lynx, it is extremely unlikely that any lynx in the area would choose to occupy the project area regardless of whether these projects were implemented.

- **Objective HU O1:** Maintain the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat.

The No-Action Alternative would increase the extent of snow grooming at JHMR. However, most new groomed runs are adjacent to existing groomed runs, so access for lynx competitors or predators already exists in these areas. The groomed runs that are not adjacent to existing groomed runs are within lift served terrain that is skied regularly. This terrain would be compacted by skiers regardless of whether or not the proposed run improvements are completed.

For the reasons discussed above, the No-Action Alternative is consistent with the objectives, standards, and guidelines found in the Northern Rockies Lynx Management Direction. However, in accordance with the Canada Lynx Conservation Agreement between the Forest Service and the FWS, mapped lynx habitat on the BTFN must be considered "occupied," and a small amount of mapped habitat would be impacted. Therefore, it is our determination that the No-Action Alternative may affect, but is not likely to adversely affect the Canada lynx because any effects would be both insignificant and discountable. This determination differs from the 1996 and 2000 findings due to the requirements of the 2006 Conservation Agreement.

Gray Wolf

The 1996 EIS (p. 4-2) and the BA for the 2000 EA (p. 9) determined that the projects in this No-Action Alternative would have no effect on wolves since human disturbance in the area would discourage use of the project area.

We concur with the previous analysis and determine that the No-Action Alternative would have no impact on the gray wolf and is therefore consistent with the Forest Plan goal of achieving recovery of endangered species. Wolves are currently achieving recovery targets in Wyoming and would continue to do so with implementation of this alternative.

Grizzly Bear

The 1996 EIS identified no impacts on grizzly bears associated with the projects in this No-Action Alternative. The 2000 EA (p. 3-107) suggested that the high-elevation bike trails included in this No-Action Alternative may disturb grizzly bears. This was followed by a determination of "may affect, but is not likely to cause adverse effects to grizzly bear" in the 2000 BA (p.15).

We concur with the previous analysis and conclude that implementation of the No-Action Alternative is consistent with the Forest Plan goal of contributing to the recovery of grizzly bears. This alternative is consistent with the standards for grizzly bear-human management and grizzly bear-habitat management in the Forest Plan. JHMR is not in the grizzly bear recovery zone or in management situations 1, 2 or 3.

Forest Service Sensitive Species

Bighorn Sheep

The 1996 EIS (p. 4-2) identified a beneficial impact associated with development of trails in close proximity to rock outcrops since foraging habitat would be created. The 2000 EA identified no impacts related to these No-Action Alternative projects. The line of reasoning from the 1996 EIS remains valid when applied to this alternative, particularly the Casper Traverse project. However, there is an existing summer trail in the area of the Casper Traverse, so any new habitat created may not be fully utilized due

to the already high human use of the area (Longshore and Thompson 2013). Therefore, it is our determination that the No-Action Alternative would have a small beneficial impact on bighorn sheep.

Spotted Bat

Neither the 1996 EIS nor the 2000 EA identified any impacts on spotted bats. While blasting of rock would be required to construct the Casper Traverse, this blasting would impact only marginal bat roosting habitat since it is near ground level. Ample higher-quality roosting habitat is available in and around the project area. Furthermore, none of these projects would substantially change the habitat in which spotted bats forage. Therefore, we concur that there would be no impacts on spotted bats associated with the projects in this No-Action Alternative.

Townsend's Western Big-eared Bat

The 1996 EIS (p. 4-2) identified a low likelihood of impacts on Townsend's western big-eared bats on the premise that prior human disturbance likely caused bats to abandon the area. The 2000 EA identified no impacts on this species. We disagree that human disturbance has caused big-eared bats to avoid the project area since little disturbance occurs in the cliff areas that may support roosting sites. However, we agree that potential impacts of this alternative on big-eared bats would be minimal. These projects would not impact the cliff areas where this species may occur, nor would they substantially change the available habitat in which the bats forage. Therefore, it is our determination that the No-Action Alternative would have no impacts on Townsend's western big-eared bats.

Wolverine

The 1996 EIS (p. 4-2) identified no impacts on wolverines since 1) wolverines are rare at the resort, 2) the resort constitutes only a small fraction of a wolverine home range, and 3) ongoing projects limit the attractiveness of the resort as wolverine habitat. The 2000 EA mentioned potential impacts from human disturbance on wolverines (p. 3-107). We concur with these analyses. There is already extensive year-round disturbance in the project area. The projects included in the No-Action Alternative would not meaningfully increase the level or extent of this disturbance. As a result, it is our determination that the No-Action Alternative would have no impacts on wolverines as none of the projects involved would constitute relevant changes to the project area in terms of wolverine habitat needs.

Bald Eagle

Neither the 1996 EIS (p. 4-2) nor the 2000 EA (p. 3-100) identified any impacts on bald eagles since this species primarily occurs in areas near the Snake River and only sporadic foraging would occur in the project area. While a small amount of potential roosting habitat could be affected by the run improvement projects, such habitat is not limiting. We concur with the previous assessments and determine that the No-Action Alternative would have no impact on bald eagles.

Boreal Owl

The 1996 EIS (p. 4-2) determined that the projects analyzed may impact individuals but were not likely to contribute to a trend toward federal listing or loss of viability to the population or species. This determination was due to impacts on potential nesting habitat at the resort. The 2000 EA identified no impacts on this species. The Casper Traverse may impact a small amount (less than 1 acre) of potential boreal owl nesting habitat. Therefore, we concur with the 1996 EIS and determine that the No-Action Alternative may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Peregrine Falcon

The 1996 EIS (p. 4-2) identified no impacts on peregrine falcons based on a lack of documented sightings of the species at the resort, poor habitat quality, and extensive high-quality habitat in adjacent areas. The 2000 EA identified no impacts on this species. Since these analyses were completed there have been documented sightings of peregrine falcons in the area (eBird 2015, WNHD 2015). However, no nesting

habitat would be impacted by this alternative and no foraging habitat would be detrimentally altered. Therefore, even when taking into account this new information, our determination is the same as previous analyses. This alternative would have no impact on peregrine falcons.

Three-toed Woodpecker

The 1996 EIS (p. 4-2) identified no impacts on three-toed woodpeckers. This determination was based on the low number of snags in the area and the absence of the species during surveys. The 2000 EA identified no impacts on this species associated with the projects in this No-Action Alternative. We concur with the determination of the 1996 EIS and the reasoning behind it. While three-toed woodpeckers have been documented nearby in GTNP, it is our determination that the No-Action Alternative would have no impact on this species.

Great Gray Owl

Neither the 1996 EIS (p. 4-2) nor the 2000 EA identified any impacts on great gray owls. This determination was based on the general poor quality of potential great gray owl habitat at the resort and the high level of human disturbance during the courtship and nest preparation period. We concur with the reasoning and determination that the No-Action Alternative would have no impact on great gray owls.

Northern Goshawk

The 1996 EIS (p. 4-2) determined that that projects analyzed may impact individuals but would not likely contribute to a trend toward federal listing or loss of viability. This determination was based on the lack of detections of nesting goshawks in the project area, the small amount of habitat impacted, and the anecdotal detection of a foraging goshawk in the area. The 2000 EA identified impacts on this species associated with hiking/biking trails on the incorrect premise that short-term human presence in the vicinity of a nest could lead to nest failure (p. 3-107). In fact, there is no evidence to suggest that this is the case, and published literature suggests it is not (Squires and Reynolds 1997). We concur with the determination and the rationale from the 1996 EIS and determine that the No-Action Alternative may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Management Indicator Species

Neither the 1996 EIS nor the 2000 EA analyzed the impacts of the projects in this No-Action Alternative on MIS. However, due to the small scale of the No-Action Alternative projects it is extremely unlikely that they would have any impact on Forest-wide population trends for any MIS.

Migratory Birds

Neither the 1996 EIS nor the 2000 EA analyzed the impacts of the actions in this No-Action Alternative on migratory birds. However, due to the small scale of the No-Action Alternative projects it is extremely unlikely that they would have any substantial impact any migratory birds. Furthermore, mitigation measures required for this project prohibit cutting of trees between May 15 and July 15 in order to protect nesting birds (see section 2.5).

3.6.3.2 Alternative 2 – Proposed Action

Threatened and Endangered Species

Canada Lynx

As noted above under the No-Action Alternative, the Northern Rockies Lynx Management Direction provides guidance for management of lynx habitat to address the risks posed by ski areas. Applicable objectives, standards, and guidelines are listed above under the No-Action Alternative. Compliance under the Proposed Action is discussed below.

Habitat Linkage and Movement

Regional habitat connectivity for lynx would not be impacted by the Proposed Action as no barriers to lynx travel would be created, and the project area does not fall within a linkage area. Habitat in the project

area is currently highly fragmented, both naturally and as a result of past ski area development and operations. The project area is also surrounded on all sides by unsuitable or naturally highly fragmented habitat (BA Figure 3; Cirrus 2015). A lynx that chose to move through the project area would have no more difficulty after implementation of these projects than before.

Habitat Quality and Effectiveness

The Proposed Action would impact 2.1 acres of mapped lynx habitat, 0.6 acres of which have been previously cleared (BA Figure 3; Cirrus 2015). These 2.1 acres represent less than 1 percent of the mapped lynx habitat at JHMR. Most impacts would occur in previously cleared areas, and the remaining areas do not have sufficient tree density to serve as lynx habitat or high-quality snowshoe hare habitat, as evidenced by previous snowshoe hare surveys (see discussion of snowshoe hare populations above under Affected Environment). These factors, combined with the fact that the Fall Creek North LAU is populated very sparsely, if at all by lynx, make it extremely unlikely that any lynx would use the project area regardless of whether these projects were implemented.

The Proposed Action would increase the extent of snow grooming, mainly in the Craggs area. However, most new groomed runs are adjacent to existing groomed runs, so access for lynx competitors or predators already exists in these areas. The groomed runs that are not adjacent to existing groomed runs (Washaki and to some extent Upper Wide Open) are in the pod of the previously approved Teton lift. This terrain would be compacted by skiers from the Teton lift regardless whether or not the proposed run improvements are completed.

On the basis of this analysis, the Proposed Action is consistent with the objectives, standards, and guidelines found in the Northern Rockies Lynx Management Direction. However, in accordance with the Canada Lynx Conservation Agreement between the Forest Service and the FWS, mapped lynx habitat on the BTNF must be considered “occupied,” and a small amount of mapped habitat would be impacted. Therefore, it is our determination that the Proposed Action may impact the Canada lynx but is consistent with the Northern Rockies Direction and its amendment to the Forest Plan. No Critical Habitat would be affected.

Gray Wolf

The Proposed Action would have no direct or indirect effects on wolves. The resort does provide habitat for prey species, and could be used by wolves. However, high levels of human activity year-round discourage wolf use of the area.

Wolves do not regularly occupy the project area, and no known wolf dens or rendezvous sites occur there. Prey species could be temporarily displaced during project implementation, but this should not negatively affect gray wolves because this predator is wide ranging and has areas adjacent to JHMR readily available to hunt.

For these reasons, it is our determination for gray wolves is that the Proposed Action would have no impact on the gray wolf and is therefore consistent with Forest Plan goal of achieving recovery of endangered species. Wolves are currently meeting recovery targets in Wyoming and would continue to do so with implementation of this alternative.

Grizzly Bear

The project area occurs in occupied grizzly bear range and in biologically suitable habitat identified by the FWS. However, the project area is not in the Yellowstone Ecosystem Grizzly Bear Recovery area. The area falls under Management Situation #5 where grizzly bears are expected to be uncommon and federal land management is unlikely to affect the species’ recovery. No conflicts with grizzly bears are likely to occur because BTNF food storage regulations (in effect March 1 to December 1) would be enforced during construction and subsequent recreational use. Human activity generally keeps this species at a safe distance, should bears be present during project implementation. This displacement due to construction would be short-term and would not measurably impact individual fitness. Very little grizzly

bear habitat (< 1 acre) would be lost as a result of the Proposed Action, specifically areas where structures would be built (e.g., buildings, lift towers, etc.). Ungulates that serve as prey and a source of carrion would continue to occur in the project area.

For these reasons, it is our determination that the Proposed Action is consistent with the Forest Plan goal of contributing to the recovery of grizzly bears. This alternative is consistent with the standards for grizzly bear-human management and grizzly bear-habitat management in the Forest Plan. JHMR is not in the grizzly bear recovery zone or in management situations 1, 2 or 3.

Forest Service Sensitive Species

Bighorn Sheep

The primary potential impacts on bighorn sheep associated with the Proposed Action are related to the construction and use of summer hiking/biking trails and Via Ferrata routes. Some proposed hiking trails and all of the Via Ferrata routes fall within potential bighorn sheep summer habitat, but this habitat is not within the actual summer range of the bighorn sheep herd in the area (Courtemanch 2014). As discussed above under Affected Environment, bighorn sheep may avoid these activities temporarily (Longshore and Thompson 2013), or they may show no avoidance of these activities (Hicks and Elder 1979). There is already a considerable amount of activity within and adjacent to the potential bighorn sheep habitat at the resort (JHMR 2015). However, the area of disturbance would expand incrementally under this alternative.

Hardware (e.g., cables and rungs) installed for the Via Ferrata routes may impact the ability of bighorn sheep to traverse areas crossed by the Via Ferrata routes. This could occur on the steepest slopes (~60° and above) where hardware protruding from the rock surface may present an obstacle for bighorn sheep attempting to traverse the rock face. In lower angle areas bighorn sheep would be able to step over any hardware easily. In order to minimize the impact of the Via Ferrata routes on traveling bighorn sheep, mitigation measures requiring all hardware to be less than 8 inches from the rock face is suggested. Furthermore, in areas where the slope exceeds 60 degrees, any rungs should be installed horizontally level and have a flat surface with positive grip that could be used as a step by bighorn sheep (section 2.5).

While there is potential for impacts on bighorn sheep due to the hiking and biking trails and the Via Ferrata routes, the potential is small. JHMR is not within the summer range of the bighorn sheep population in the area. Any impacts that did occur would be in the future, assuming the herd expanded to fill the potential habitat available. Even so, summer habitat is widely distributed, well connected, and not limiting to the current population (Courtemanch 2014). Furthermore, most of the hiking/biking trails and Via Ferrata routes are below elevation ranges used by this bighorn population during the high-use season for these activities (Courtemanch 2014).

Assuming bighorn sheep populations exhibit temporary avoidance of the hiking/biking trails and Via Ferrata routes during periods of high use (rather than no avoidance), potential future habitat use may be temporarily shifted. Shifting from high-quality habitat to lower-quality habitat, should this occur, could impact individual fitness of the displaced sheep. If future population and range expansion resulted in use of potential habitat in the project area, the population should be able to absorb these impacts. Furthermore, there are a total of five bighorn sheep populations on the BTNF, four of which have no potential for impacts from this alternative. One of these populations is estimated at 4,500 individuals. This population alone would maintain the viability of bighorn sheep on the BTNF even if the population in the vicinity of the project area were to be detrimentally impacted. Therefore, it is our determination that the Proposed Action may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability.

Spotted Bat

The primary concern regarding spotted bats is the impact of the Via Ferrata routes. While all of these routes are at or above the highest elevation at which this species has been recorded in Wyoming, insufficient data exists to determine that spotted bats cannot occur above this elevation (Priday and Luce

1999, Luce et al. 2004). Rock climbing is considered to be a disruptive activity on spotted bats as it may displace them from suitable roosting sites (Pierson and Rainey 1998). Should spotted bats occur in the vicinity of the Via Ferrata routes, they would likely be displaced.

Given its rocky nature, climbing in the Teton Range is common. However, there is so much potential habitat on the Forest in the Teton and Snake River ranges that it is likely that any spotted bats displaced by the Via Ferrata routes would be able to find other suitable roosting areas not subject to disturbance from rock climbing activities. Therefore, it is our determination that the Proposed Action may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Townsend's Western Big-eared Bat

No suitable roosting caves were identified in the vicinity of the Via Ferrata routes during surveys, and none of the other projects in the Proposed Action have the potential to impact Townsend's western big-eared bats. Therefore it is our determination that the Proposed Action would have no impact on this species.

Wolverine

Areas with high levels of recreational activity are generally avoided by wolverines (Heinemeyer and Squires 2014). No additional disturbance of potential wolverine habitat would occur as a result of the Proposed Action. The trails in the pod for the new Teton lift would be subject to high levels of use regardless of whether the clearing and grading in these areas were approved. Similarly, the backcountry access into Granite Canyon (provided by the Teton lift), which has the potential to disturb wolverines, would be the same regardless of whether or not this alternative were selected. The resort already receives substantial summer use throughout the SUP, and the hiking and biking trails added under this alternative would not increase the distribution or intensity of summer disturbance of wolverines in the project area or vicinity in any way.

Based on this analysis, it is our determination that the Proposed Action would have no impact on wolverines.

Bald Eagle

Relative to the No-Action Alternative, there would be a slight loss of potential roosting habitat due to trail development in the Solitude area and Lower Ashley Ridge. Bald eagles may sporadically enter this area in search of carrion, but no nesting is expected to occur in this area due to the distance from water that supports fish, the bald eagle's primary prey. Roosting habitat is generic and is not limited in the project or surrounding area and impacts associated with the loss of roosting habitat would be completely negligible. Therefore, it is our determination that the Proposed Action would have no impact on bald eagles.

Boreal Owl

While no boreal owls were detected during surveys conducted for this project, some patches of habitat for this species exist in the disturbance areas for the Upper Wide Open, Washaki, Grizzly Glade, and Solitude ski runs. The total amount of habitat (dense subalpine fir or other conifer patches above 8,000 feet) disturbed by these ski runs would be approximately 1.5 acres, split between 11 patches within the footprints of the four Teton-pod ski runs. They represent poor quality boreal owl habitat at JHMR due to their small size, low density, and lack of maturity and old growth characteristics. To put these impacts in context, approximately 73 acres of much higher quality (in terms of density and patch size) habitat exists elsewhere on the resort, and the surrounding area provides an abundance of high-quality habitat. The substantial amount of nesting habitat elsewhere does not preclude the possibility that an individual could choose to nest in the patches that would be removed by the Proposed Action.

The proposed hiking and biking trails pass through one patch of potential nesting habitat. Trail construction would not impact the quality of the nesting habitat in this patch since no trees above 3 inches dbh would be removed. Subsequent use of the trails by hikers and mountain bikers is not likely to

negatively impact this species since it is generally not sensitive to disturbance by humans (Hayward and Hayward 1993).

Given the minimal intensity and minimal spatial extent of impacts on nesting habitat for boreal owls in the project area, our determination is that the Proposed Action may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Peregrine Falcon

No peregrine falcon activity was detected, and no nests were located during surveys of the cliff areas that would be potentially impacted by the Via Ferrata routes. Rock climbing has been identified as an activity that is not detrimental to peregrine falcons as long as reasonable precautions are taken (White et al. 2002). Reasonable precautions may include avoiding climbing too close to peregrine nesting areas or knocking rocks onto nesting ledges. Should any peregrines choose to nest in the vicinity of the Via Ferrata routes in the future, such precautions may need to be taken. Given the absence of nesting peregrine falcons in the area it is our determination that the Proposed Action would have no impact on this species.

Three-toed Woodpecker

A few snags that could potentially be used by three-toed woodpeckers may be removed under the Proposed Action. Such snag removals would typically occur in areas cleared for ski run development. Snags are already periodically removed throughout the resort for skier safety. Given the already low density of snags, the general absence of three-toed woodpeckers in the project area, and large amount of suitable habitat in areas adjacent to the project area, it is our determination that the Proposed Action may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Great Gray Owl

While no great gray owls were detected during surveys conducted for this project, some patches of nesting habitat for this species exist in the disturbance areas for the Upper Wide Open, Washaki, Grizzly Glade, Solitude, and Lower Ashley Ridge ski runs as well as the clearance corridor for Sweetwater gondola Option 2. The total amount of nesting habitat (patches of trees with dense canopy) disturbed by these ski runs would be approximately 4.5 acres, split between 15 patches representing poor quality great gray owl nesting habitat at JHMR due to their low canopy closure. To put these impacts in context, approximately 88 acres of much higher quality (in terms of canopy closure) habitat exists elsewhere on the resort, and the surrounding area provides hundreds of acres of quality habitat. The substantial amount of nesting habitat elsewhere does not preclude the possibility that an individual could choose to nest in the patches that would be removed by the Proposed Action. Furthermore, all the forested areas impacted by the Proposed Action (see Table 3.10) could be considered foraging habitat for great gray owls.

The proposed hiking and biking trails pass through two patches of potential nesting habitat. Trail construction would not impact the quality of the nesting habitat in these patches since no trees above 3 inches dbh would be removed. Subsequent use of the trails by hikers and mountain bikers is not likely to negatively impact this species since the period of high use (June through September) would not coincide with the nesting period (March through May; Duncan and Franklin 1993).

Given these minimal impacts on nesting and foraging habitat for great gray owls, our determination is that the Proposed Action may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Northern Goshawk

While no northern goshawks were detected during surveys conducted for this project, some patches of nesting habitat for this species exist in the disturbance areas for the Upper Wide Open, Washaki, Grizzly Glade, Solitude, and Lower Ashley Ridge ski runs as well as the clearance corridor for Sweetwater gondola Option 2. The total amount of nesting habitat (patches of trees with dense canopy) disturbed by these ski runs would be approximately 4.5 acres, split between 15 patches representing some of the

poorest quality goshawk nesting habitat at JHMR due to their small size and low canopy closure. To put these impacts in context, approximately 88 acres of much higher quality (in terms of canopy closure and patch size) habitat exists elsewhere on the resort, and the surrounding area provides hundreds of acres of quality habitat. The substantial amount of nesting habitat elsewhere does not preclude the possibility that an individual could choose to nest in the patches that would be removed by the Proposed Action. Furthermore, all the forested areas impacted by the Proposed Action (see Table 3.10) could be considered foraging habitat for goshawks.

The proposed hiking and biking trails pass through two patches of potential nesting habitat. Trail construction would not impact the quality of the nesting habitat in these patches since no trees above 3 inches dbh would be removed. Subsequent use of the trails by hikers and mountain bikers is not likely to negatively impact this species since goshawks are generally not negatively affected by short-duration disturbance near nests. While goshawks may produce alarm calls and even attempt to drive off intruders, sporadic activities generally do not produce nest desertion or failure (Squires and Reynolds 1997).

Given these impacts on nesting and foraging habitat for northern goshawks, and the importance of quality nesting habitat for nest success, our determination is that the Proposed Action may impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Management Indicator Species

American Marten

A small amount (less than 1 acre) of marten habitat would be impacted by the alignment clearing for the Sweetwater gondola Option 2. Relative to the amount of habitat on the Forest, this impact would be negligible. This species is common on the BTNF in suitable habitat. The Proposed Action would not have a measurable impact on Forest-wide population trends for this species.

Bighorn Sheep

Potential impacts of this alternative on bighorn sheep are described above in the Forest Service Sensitive Species section. These minor impacts are unlikely to measurably affect population trends of bighorn sheep on the BTNF.

Rocky Mountain Elk

As elk are habitat generalists, the conversion of some forested areas to open areas would not change, and may improve, foraging habitat value at JHMR. An increase in human activity during the summer is also unlikely to impact elk because activity is already substantial and there is a substantial amount of habitat elsewhere should individuals find the increased summer activity a nuisance. Elk are currently at the management objective in the Jackson herd unit. It is unlikely that this alternative would measurably impact elk population trends in the unit and on the BTNF.

Grizzly Bear

The impacts of this alternative on grizzly bears are described above in the Threatened and Endangered Species section. While this alternative could have minor impacts on individuals, it would have no impact on population trends of grizzly bears on the BTNF.

Moose

The increased activity and habitat modification in the vicinity of the Sweetwater gondola mid-station may have detrimental effects on the quality of winter moose habitat, and may restrict local movement in that area. The Sublette moose herd is slightly below management objectives, but the recent trend for the herd is up. Given the impacts of this alternative on moose, it is possible that these projects could contribute, in a minor way, to a slowing of the upward trend for moose on the BTNF.

Mule Deer

As mule deer are habitat generalists, the conversion of some forested areas to open areas would not change the habitat value at JHMR. Foraging habitat would likely improve due to the removal of conifer cover that currently shades herbaceous vegetation and shrubs. An increase in the already substantial human use in summer is also unlikely to impact mule deer as there is a substantial amount of habitat elsewhere should individuals find the increased summer activity a nuisance. While mule deer are currently below the management objective in the Sublette herd, the trend has fluctuated in recent years. It is unlikely that this alternative would measurably impact mule deer population trends in the herd and on the BTNF.

Bald Eagle

Potential impacts of this alternative on bald eagles are described above in the Forest Service Sensitive Species section. This alternative would have no impact on population trends of bald eagles on the BTNF.

Peregrine Falcon

The impacts of this alternative on peregrine falcons are described above in the Forest Service Sensitive Species section. This alternative would have no impact on population trends of peregrine falcons on the BTNF.

Migratory Birds

Most of the migratory birds from Table 3.12 use habitats that are common at JHMR and in the surrounding areas. Forest nesters would be impacted by the Proposed Action through habitat loss; however, design criteria applied for this project would prevent tree cutting during the nesting season, thereby eliminating direct impacts on nesting individuals (section 2.5). The impacts on these species from habitat loss would not be substantial given the large amount of alternative habitat available at JHMR and on adjacent lands, and the relatively small amount of habitat lost.

Species such as Lewis's woodpecker, Williamson's sapsucker, willow flycatcher, and black rosy-finch that use habitats that are less common at JHMR and in the surrounding areas. Both Lewis's woodpeckers and Williamson's sapsuckers use snag habitats similar to those of the three-toed woodpecker, discussed above. Impacts on these two species would be similar to those discussed for three-toed woodpeckers.

Willow flycatchers primarily use riparian areas for nesting and feeding. The Sweetwater gondola and Solitude grading projects would impact high-quality habitat for this species. However, no individuals have been documented at JHMR.

Black rosy-finches are common at JHMR, sometimes appearing in flocks of up to 200 individuals (eBird 2015). JHMR provides prime habitat for this species due to the many cleared ski runs present. The graded ski run projects in the Proposed Action would create additional prime habitat, particularly those in the Craggs area since this species prefers open, high-elevation habitats and nests in rocky or cliffy areas.

3.6.4 CUMULATIVE EFFECTS

As discussed in section 3.3, the cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impact on the same resources affected directly or indirectly by these alternatives. Table 3-13 identifies these projects and summarizes their cumulative effects on wildlife.

Table 3-13. Cumulative actions from the BTNF SOPA and how the effects of these projects would interact cumulatively on the species affected by the Proposed Action.	
Action	Cumulative Effects
Canada lynx (Analysis area: Fall Creek North LAU)	
Teton to Snake Fuels Management	Under this project, large areas of lynx habitat south of JHMR in the Snake River and southern Teton Range would be treated using prescribed burns and mechanical treatments to reduce woody fuels, negatively affecting lynx and snowshoe hares. However, the projects are collectively consistent with the <i>Northern Rockies Lynx Management Direction</i> . The adverse impacts of the Teton to Snake Fuels Management project would not interact cumulatively with the minor and unlikely effects of this project in any way that would substantially impact Canada lynx populations in the area.
Grizzly bear (Analysis area: Individual home range defined as 12.5 miles from SUP)	
Teton to Snake Fuels Management	This fuels reduction project may negatively affect individuals if present during project operations. However, the project will not reduce secure grizzly bear habitat because no new permanent roads will be constructed and standard food storage regulations will apply. Post treatment habitats will transition to a more productive state with more herbaceous vegetation and mast crops, yielding a long-term beneficial impact on grizzly bear habitat. These net beneficial effects would not interact cumulatively with the minor impacts of this project in any way that would substantially impact grizzly bear populations in the area.
Snow King Mountain Aerial Adventure Course	This project may affect individuals due to removal of a small amount of habitat that would be fenced off and due to increased human disturbance in the area. Grizzly bears are currently uncommon in the area. This would not interact cumulatively with the minor effects of this project in any way that would substantially impact grizzly bear populations in the area since the effects of both projects are so minor.
Snow King Mountain Rafferty Lift Replacement and Ski Trail Construction	The minimal habitat alteration and unlikely disturbance of individuals passing through the project area during implementation of this project would have minor effects on grizzly bears. The ski trail would not interact cumulatively with the minor impacts of this project in any way that would substantially impact grizzly bear populations in the area since the effects of both projects are so minor.
Greater Snow King Area Trails	This project will have no effect on grizzly bears and thus would not interact cumulatively with the minor effects of this project.
Bighorn sheep (Analysis area: Targhee herd unit)	
Teton to Snake Fuels Management	This project would have slight beneficial impacts on bighorn sheep due to creation of foraging habitat. These would not interact cumulatively with the minor impacts of this project in any way that would threaten bighorn sheep populations in the Targhee herd.
Spotted bat (Analysis area: the BTNF)	
None	No other projects from the BTNF SOPA would impact cliff areas, the sensitive portion of spotted bat habitat.
Boreal owl (Analysis area: Individual home range defined as 1.5 miles from SUP)	
None	No other projects from the BTNF SOPA are within the home range of a boreal owl at JHMR.

Table 3-13 (cont'd). Cumulative actions from the BTNF SOPA and how the effects of these projects would interact cumulatively on the species affected by the Proposed Action.	
Action	Cumulative Effects
Three-toed woodpecker (Analysis area: Individual home range defined as 0.25 miles from SUP)	
None	No other projects from the BTNF SOPA are within the home range of a three-toed woodpecker at JHMR.
Great gray owl (Analysis area: Individual home range defined as 2.75 miles from SUP)	
Teton to Snake Fuels Management	This project will have mixed positive and negative effects on great gray owls. These effects are expected to be small and will be offset by mitigation measures designed to protect nesting habitat. These impacts would not interact cumulatively with the minor impacts of this project in any way that would threaten great gray owl populations in the area since the effects of both projects are so minor.
Northern goshawk (Analysis area: Individual home range defined as 2 miles from SUP)	
None	No other projects from the BTNF SOPA are within the home range of a northern goshawk.

Two additional items not on the BTNF SOPA have the potential to impact the Targhee bighorn sheep herd: domestic sheep grazing and backcountry winter recreation.

The Caribou-Targhee National Forest administers several sheep allotments that create the potential for domestic sheep to interact with wild bighorn sheep in the Targhee herd, foraging rams in particular. Domestic sheep can transfer pneumonia and other diseases to wild sheep that can cause significant population die offs (Foreytd and Jessup 1983). Recognizing this potential, the Forest Service Intermountain Region has actively been working with state wildlife and agricultural agencies and grazing permittees to assess and mitigate the risk domestic and wild sheep interactions. As management actions are determined and implemented from this effort beginning as early as next year, potential for cumulative population impacts on bighorn sheep from disease are expected to decline relative to existing conditions. While disease is a concern for this sheep herd, it will not interact cumulatively with the impacts of this project in a way that would threaten bighorn sheep populations in the area.

As described in section 3.6.2.2.1, even low levels of recreational use displace wintering bighorn sheep from suitable habitat (Courtemanch 2014). In response to this recent discovery the Forest Service has asked the Wyoming Game and Fish Department to reconvene the Targhee Bighorn Sheep Working Group, which includes Idaho Game and Fish, the Forest Service, and Grand Teton National Park representatives to develop and document management recommendations for how best to incorporate this new information into conservations strategies for the Targhee herd. The Forest Service is committed to following through on the management recommendations once they are developed. As risks and hazard are identified and recreational use altered as appropriate, the potential for cumulative effects on bighorn sheep will decline relative to existing levels. While backcountry recreation is a concern for this sheep herd, it will not interact cumulatively with the impacts from this project in a way that would threaten bighorn sheep populations in the area.

3.7 SCENIC RESOURCES

3.7.1 SCOPE OF ANALYSIS

- *How would the proposed infrastructure affect the scenic quality of the SUP area?*

The SUP area viewscape has been affected by 50 years of ski-area development but generally retains its natural character. Additional clearing and infrastructural development could alter that character and detract from the area's scenic integrity.

Indicators: Analysis of effects using the methods prescribed in the Forest Service Visual Management System (VMS), in accordance with the BTNF Forest Plan.

The 1996 EIS provides a detailed discussion of the VMS, describes the ski area setting using the concepts and terminology of the VMS, and identifies a series of critical viewpoints from which scenic impacts are to be assessed (p. 62). The EIS goes on to employ the VMS framework, including the critical viewpoints, to assess impacts of the previous JHMR MDP, which comprises projects of various types (i.e., base-area and on-mountain buildings, ski lifts, ski runs, access roads, hiking trails, and snowmaking) located across the SUP area (p. 4-50). The 2000 EA built on the same analytical approach to assess the effects of a series of ski run, hiking/biking trail, access road, snowmaking, and terrain park projects spread across the SUP area (p. 3-43).

Both the 1996 and the 2000 NEPA reviews concluded that the proposed ski area development was consistent with the Visual Quality Objectives (VQOs) assigned by the Forest Plan to the SUP area. The following assessment of the scenic impact of the current Proposed Action and No-Action Alternative, which include similar types of development, utilizes the same methodology and draws on the preceding analyses for context. The cited 1996 and 2000 NEPA documents are incorporated by reference and can be consulted for additional detail.

3.7.2 AFFECTED ENVIRONMENT

JHMR is in the Central Rockies Physiographic Region of the Rocky Mountain Forest Province. The principal landscape feature of the area is Jackson Hole, an alpine valley surrounded by the Teton Range on the west and the Gros Ventre Range on the east. The Snake River winds through the valley in a north-south direction. The area is characterized by rugged, glaciated mountains exceeding 12,000 feet in elevation and montane depressions of parks with floors around 6,000 feet. The area features perennial snow fields on mountain peaks, green meadows, and alpine and glacial lakes. Characteristic vegetation is diverse as a result of climate and topography.

The valley outside the town of Jackson consists of privately-owned lands that are essentially rural ranchland in character although, in recent years, some of these lands have been subdivided and developed. Public lands, including the BTNF, Grand Teton National Park (GTNP), and Yellowstone National Park are essentially natural in appearance. The visual resources of these lands are among the most spectacular found in the western U.S. and are a primary reason for the region's popularity as a tourist destination.

JHMR, as seen from a distance, is part of a landscape dominated by spectacular mountain peaks. The SUP portion of the Teton Range is visually dominated in the landscape by more spectacular peaks to the north in GTNP and does not draw as much attention from the casual visitor. Lower slopes present a uniform green and forested canopy. Closer views reveal a diversity of vegetation interspersed with grassy openings and rock outcrops that create a mosaic of texture, size, and color. The spring-to-fall landscape consists of a mosaic of various shades of green, brown, and grey; the artificial clearings for ski runs and lifts are evident, interspersed among the natural clearings. In the wintertime, there is greater degree of visual contrast between the dark green of evergreen trees and the white clearings through trees for the ski

lifts and runs. The area is essentially natural in appearance, but skiing infrastructure, residences, and commercial developments, primarily at the base area, are also evident.

To maintain architectural consistency and integration with the surroundings, structures within the SUP boundary are designed and built according to an established architectural theme, consistent with the Built Environment Image Guide (BEIG) and the design guidelines of the Teton Village master plan.

This evidence of human disturbance is present but not visually dominant. Ski trail and lift clearings are evident at the lower and middle elevations. On forested slopes, the artificial lines and patterns of vegetation clearings are clear, as are on-mountain structures – lifts and buildings – from closer vantage points. The sparse vegetation and exposed geology reduce the visual evidence of ski area development on the upper mountain.

The area has been assigned a high level of visual sensitivity because it is visible from several vantage points, including the Moose-Wilson Road, which offers some of the best close-up views of the resort. The area is also visible at a greater distance from the Jackson Hole Airport, Highway 26/89, GTNP, and other important viewpoints in the vicinity.

As noted above, the seven critical viewpoints used in the 1996 EIS and 2000 EA are also used in this analysis. Most of these viewpoints are located along the Moose-Wilson Road (Highway 390) but align with other, more distant, viewpoints. As a result, assessment of scenic impacts from these viewpoints provides a conservative evaluation of effects on the larger viewshed. The critical viewpoints are:

- Viewpoint 1 is located within GTNP on Highway 390 approximately 1.1 miles northeast of JHMR. Ski runs on the upper slopes of Rendezvous Mountain are apparent but harmonize with natural clearings. Teton Village is not visible; the base of the mountain appears undisturbed. Rangeland and scattered residential buildings are visible in the foreground.
- Viewpoint 2 is approximately 0.8 miles northeast of JHMR on Highway 390. East-facing slopes are slightly more prominent in this view than at Viewpoint 1. The view is similar to that from the Jackson Hole Airport only at much closer proximity. The foreground presents a typical rural setting of Jackson Hole.
- Located at the intersection of Highway 390 and Teton Village Road, Viewpoint 3 offers the best line-of-sight direct view of the base facilities at JHMR. This view also simulates that of the Curtis Canyon Overlook and the GTNP-boundary pull-off on Highway 26 only at much closer proximity. Pastures in the foreground are used for grazing.
- Located on Highway 390 approximately 0.75 mile south of the main entrance to JHMR, Viewpoint 4 offers views of the southeast-facing slopes on Apres Vous Mountain and the development associated with Teton Village. As with most other viewpoints, runs are evident on the upper slopes of the ski terrain, although they blend with the surrounding environment and natural clearings. The foreground is pastureland used for cattle grazing.
- Also located on Highway 390, about 1.7 miles south of the JHMR entry, Viewpoint 5 offers the first unobstructed view of the resort for northbound travelers. This viewpoint is similar to what motorists would see from Highway 22, only at closer proximity. A large portion of base operations and Teton Village are obscured from view at this location. Ski runs are evident to the casual observer on the upper slopes. The foreground offers views of pasture land.
- Located 4.8 miles south of the main entrance on Highway 390, Viewpoint 6 is representative of a long-duration view as seen from residences and commercial establishments along the Moose-Wilson Road. Teton Village is not visible from this location, although ski runs are still evident on the upper slopes. Pastures dominate the foreground.

- Viewpoint 7 is located more than 6 miles south of JHMR on the Snake River Bridge on Highway 22, east of the intersection with Highway 390. Looking almost due north, the south-facing slopes are most visible. JHMR is not a dominant feature viewed by the casual observer from this distance. More dominant peaks in the Teton Range and the presence of the Snake River draws the casual observer's eye.

The Forest Plan assigns the VQOs of Modification and Partial Retention to the ski area. Under the Modification VQO, "management activities may visually dominate the original characteristic landscape. However, activities of vegetative and land form alterations must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities such as structures, roads, slash, root wads, etc., must remain visually subordinate to the proposed composition. Activities which are predominantly introduction of facilities such as buildings, signs, roads, etc., should borrow naturally established form, line, color, and texture so completely and at such a scale that its visual characteristics are compatible with the natural surroundings" (Forest Service 1974).

Under the Partial Retention VQO, "management activities are to remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture, which are found infrequently or not at all in the characteristic landscape, but they should remain visually subordinate to the visual strength of the characteristic landscape" (Forest Service 1974).

3.7.3 DIRECT AND INDIRECT EFFECTS

The short-term visual impact of a ski area project is generally greater than its long-term impact. At JHMR, successful disturbed-site reclamation has been documented in the 1996 and 2000 NEPA reviews to reduce adverse effects on scenic integrity. As a result, this analysis focuses on long-term effects.

3.7.3.1 Alternative A – No Action

The 1996 EIS described the visual impact of trail clearing, including the three trails included in this alternative, as follows (p. 4-52): "The ... ski trail clearings would be visible in both winter and summer seasons. In winter, snow-covered linear clearings would contrast sharply with the dark green and brown of tree stands. The contrast would be softer in the summer months, as the light greens and browns of the cleared swaths would contrast less with the darker green of the trees."

That analysis went on to conclude: "In general, the quality of the visual resources would not change significantly in the permit area and on the adjacent public lands. The nature of the user experience would not be affected in areas disturbed by the Proposed Action as there would be no less opportunity to experience an isolated and natural setting because the area is already developed" (p. 4-53).

The 2000 EA, notes that the terrain park and portions of the hiking and biking trail system that traverse open terrain and deviate substantially from the natural contour would be visible from several viewpoints (pp. 3-45 and 3-46). Raising the height of halfpipe's platforms under this alternative would not add to the facility's visual impact at this point. The hiking and biking trail segments identified as visually evident in the 2000 EA (pp. 3-45 and 3-46) do not include those included in this alternative. While the 2000 EA's analysis does not mention Apres Vous Traverse, it would likely be visible from some nearby viewpoints, but the site is high on the mountain. The EA concludes that "implementation of these activities would be consistent with the VQOs of Partial Retention and Modification" (pp. 3-45 and 3-46), and nothing occurring since 2000 would alter that conclusion.

3.7.3.2 Alternative B – Proposed Action

Drawing on the methodology established in the 1996 EIS and 2000 EA, Table 3-14 summarizes the scenic impact of each element of the Proposed Action from each of the seven viewpoints described above, under Affected Environment.

Photographs were taken of JHMR from each of the seven viewpoints in June 2015 to facilitate this analysis. They are included in the project record.

This analysis indicates that the Sweetwater gondola and the Ashley Ridge run upgrade and realignment are the only two projects that could have a notable impact on scenic resources under the Proposed Action. In both cases, the impact would result from clearing forest vegetation. As discussed in the 1996 EIS and 2000 EA, clearing for such projects results in a stark contrast between the cleared areas and adjacent forest in the winter, and the shift to greens, browns, and greys after snowmelt softens the contrast. As noted above (section 2.5, measure 31), clearing edges would be feathered (i.e., trees cut in to leave an irregular edge rather than a stark, straight border) to decrease contrast and lend a more natural appearance.

Nevertheless, these clearings would stand out as breaks from the natural viewscape, particularly Option 2 for the Sweetwater gondola, as it would traverse a large, intact forest stand. The primary factor mitigating the impact of these projects would be the setting. Both projects would add incrementally to visual evidence of 50 years of ski area development. They would fit in and be consistent with the current viewscape.

JHMR is assigned by the Forest Plan to Desired Future Condition 9B, for which “The Visual Quality Objectives are Partial Retention and Modification. Facilities are often dominant, but harmonize and blend with the natural setting” (Forest Plan Appendix E, p. 65). Built as proposed, with required design criteria in place, this alternative would be consistent with the assigned VQOs.

Table 3-14. Summary of project scenic effects from seven viewpoints.	
Project	
Sweetwater Gondola Installation – Option 1	From about midway station down, lift not visible from any viewpoint except Viewpoint 3. From that point alignment blends into the developed, lower mountain context. Upper portion visible from Viewpoints 1 – 5 but visual impact reduced by relatively sparse forest cover and adjacent ski runs on Jackson Face. Screened by vegetation from Viewpoint 6; too far to be discernable from Viewpoint 7.
Sweetwater Gondola Installation – Option 2	Same as Option 1 but visual impact greater because alignment transects intact forest stand. Forest vegetation would screen upper alignment from southernmost viewpoints (6 and 7).
Eagle’s Rest Lift Relocation	Visible only from nearest viewpoints (3 – 5) but not an impact as it would blend into developed lower-mountain context.
Solitude Conveyor Lift Installation	Not visible from any viewpoint except Viewpoint 3 due to screening development and vegetation. From Viewpoint 3, not an impact as it would blend into developed lower-mountain context.
Casper Restaurant Remodel/Expansion	Visible on close examination from nearest viewpoints (1 – 4) but not an impact due to distance, scale of infrastructure, and blending with background. Not discernible from other viewpoints due to distance, scale of infrastructure, or screening vegetation.
Storage Facility	Not visible from any viewpoints due to screening vegetation.
Bridger Gondola Ski Patrol Station	Not visible from any viewpoints due to distance, scale of infrastructure, and blending with background.

Project	
Ashley Ridge Run Upgrade and Realignment	Visible from all viewpoints except Viewpoint 6 (screening vegetation). Impact greatest from nearest viewpoints (2 – 4). Section below South Pass Traverse transects intact forest stand.
Wide Open Run Expansion	Screened by terrain from northern viewpoints (1 and 2). Visible from other viewpoints but not an impact due to previously approved clearing and distance (roughly 2 miles from Highway 390).
Solitude Run Development	Screened by vegetation from most northern viewpoint. Visible from other viewpoints but not an impact due to natural clearings and distance (roughly 1.5 miles from Highway 390).
Washakie Run Development	Visible from all but the southernmost viewpoint, but not an impact due to diversity of existing ground cover, limited amount of disturbance proposed, and distance.
Grizzly Glade Development	Visible on close examination from nearest viewpoints (2 and 3) but not an impact due to sparse nature of existing vegetation, limited amount of disturbance proposed, and distance.
Snowmaking System Expansion	Infrastructure not visible from any viewpoints due to scale of above-ground infrastructure. Possible change in location of mist, but likely indiscernible.
GazEx® Avalanche System Completion	Visible on close examination from nearest viewpoints (3 and 4) but not an impact due to scale of infrastructure, blending with background, and distance (2 miles from Highway 390).
Hiking/Biking Trail Network Expansion	Portions of trail system visible on close examination from nearest viewpoints (3 – 5), particularly segments crossing steep slopes off contour on the upper mountain. Much of system screened from any given viewpoint by topography, vegetation, or development. Upper mountain trails more than 1.5 miles from Highway 390.
Via Ferrata Installation	Not visible from any viewpoints due to distance and scale of infrastructure.

3.7.4 CUMULATIVE EFFECTS

As discussed in section 3.3, the cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impact on the same resources affected directly or indirectly by these alternatives – generally those occurring within the Fish Creek subwatershed (HUC 12) in the past, present, or reasonably foreseeable future. Only the Teton to Snake Fuels Management Project meets the spatial and temporal overlap requirements.

The purposes of the Teton to Snake Fuels Management Project are to (1) reduce wildland fire threat to residential areas, (2) improve firefighter and public safety, and (3) allow BTNF managers to transition from suppressing most fires to a more natural fire regime. The project would restore and maintain fire adapted ecosystems by reducing wildfire hazards using prescribed fire, cutting, and thinning.

The project area begins approximately 2 miles south of the JHMR SUP boundary, and extends an additional 15 miles to the south. As a result, management actions at the northern end of the project area would affect the same viewscape as the JHMR projects. While analysis of the fuels management project is not complete, the scoping documents identify design criteria which would limit its impact on scenic resources. These include dropping visually sensitive treatment units, avoiding straight-line road and skid trail cuts, avoiding fall-line road alignments and road cuts over 5 feet, and prompt removal of equipment and treatment of debris.

With these considerations in mind, the Proposed Action coupled with the Teton to Snake Fuels Management Project would not generate notable cumulative effects on scenic resources.

3.8 RECREATION

3.8.1 SCOPE OF ANALYSIS

- *How would the two optional locations for the upper terminal of the Sweetwater gondola affect skier circulation, lift access, and safety?*

Under Option 1, the terminal would be built just above Casper Restaurant, at a site that is limited by topography and subject to heavy skier traffic. Skiers visiting the restaurant, entering the area from either Togwotee or South Pass traverse, or dropping down Easy-Does-It run to the lower terminal of Casper lift all pass through the area. Option 2 would place the terminal just below the intersection of the Togwotee and Solitude traverses – another high-use area. The mixing of skiers of diverse ability levels, doing different things, in relatively small spaces could impact circulation and access to the lifts and restaurant. Either option could result in more collisions and injuries.

Indicators: Assessment of projected skier volumes and routes through and around the alternative terminal locations, relative to the existing and proposed infrastructure, to identify any significant, adverse effects on these variables.

3.8.2 AFFECTED ENVIRONMENT

There are two general areas in the Casper pod that are potentially affected by these alternatives: a “pinch point” near the base of the pod, and an area known as The Crossing (commonly known as Croakie Crossing).

The Casper pod includes the main runs Easy-Does-It, Sundog, and Sleeping Indian, which funnel skiers back to the base of the Casper lift. This traffic is joined by skiers from both South-Pass Traverse and Sweetwater lift at a topographic pinch point adjacent to the existing Casper restaurant on a ridgeline roughly 100 feet wide. A recent analysis of skier traffic through this pinch point calculated the density of skiers at 9 skiers per acre, 29 percent over the target of 7 skiers per acre for terrain of this ability level (SE Group 2015). The current level of congestion is noticeable on busy days and is managed through the use of “slow” signs.

The Crossing is located near the eastern margin of the Casper pod at the intersection of Solitude Traverse and Togwotee Pass Traverse. This is a fairly low traffic area compared to the pinch point at the base of the Casper pod; however, skier circulation in this area is complicated by the intersection of the two traverses on which traffic is traveling in opposite directions, with both traverses continuing on after the intersection. Visibility is good from both directions when approaching this intersection, with skiers traveling in either direction able to see oncoming skiers approximately 200 feet prior to the intersection. The topography in this area is a relatively low angle hillside with consistent slopes extending away from The Crossing.

3.8.3 DIRECT AND INDIRECT EFFECTS

3.8.3.1 Alternative A – No Action

Of the six projects in this alternative, only the Casper Traverse has the potential to impact either proposed location of the Sweetwater gondola. The Casper Traverse would provide skiers riding the Bridger gondola improved access to the Easy-Does-It and Camp Ground runs, both of which funnel skiers into the pinch point described above.

Currently intermediate skiers from the Bridger gondola desiring to reach the Casper pod must ski a “more difficult” intermediate run, Sundancer, to reach the Solitude Traverse which enters the Casper pod near the bottom. These skiers then need to ride the Casper lift to get to the top of the Casper pod. The alternate

route from the base area to the top of the Casper pod requires riding one of two combinations of three lifts: Eagle's Rest, Sweetwater, and Casper; or Teewinot, Apres Vous, and Casper. The increased convenience of access to the top of the Casper pod via the Bridger gondola and Casper Traverse may increase use of the pod and may exacerbate the current crowding at the pinch point.

Skier traffic at The Crossing would likely be reduced somewhat by the completion of the Casper Traverse. This could occur because the Togwotee Pass Traverse is the route into the Casper pod from the Apres Vous lift. With the completion of the Casper Traverse, skiers would be less likely to use this route for out-of-base access to the Casper pod since accessing the pod via the Bridger gondola and Casper Traverse would require one lift ride rather than three.

3.8.3.2 Alternative B – Proposed Action

Option 1 for the location of the Sweetwater gondola top terminal would add additional skiers to the Casper restaurant pinch point due to the higher capacity of the Sweetwater gondola relative to the existing Sweetwater lift. A quantitative analysis indicates that the skiers per acre at the pinch point would reach 14 (SE Group 2015). This density of skiers would be 100 percent over the target of 7 and 56 percent over the current level of congestion.

Option 1 would also reduce skier traffic at The Crossing similar to the No-Action Alternative since out-of-base access to the Casper pod would be provided by the Sweetwater gondola rather than Teewinot and Apres Vous.

Option 2 for the location of the top terminal would alleviate some of the congestion at the Casper pinch point since there would no longer be a lift discharging skiers there. Skiers using the Sweetwater gondola to access the Casper pod would enter the pod via the Togwotee Pass Traverse, just below the pinch point.

Under Option 2, the terminal would be located just downslope from The Crossing. Skier circulation at The Crossing would not be notably impacted by this top terminal location because the traverses have adequate capacity and the long sight lines would not be obstructed by the terminal on the downhill side.

Most skier traffic leaving the terminal would likely travel down Ashley Ridge run which would be widened, graded, and lengthened under the Proposed Action. Partway down Ashley Ridge, skier traffic from the Sweetwater gondola would likely split, with some of the traffic proceeding down lower Ashley Ridge and the remainder catching South Pass Traverse to the base of the Teton lift. Limited circulation and access issues are expected associated with Option 2.

3.8.4 CUMULATIVE EFFECTS

As discussed in section 3.3, the cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impact on the same resources affected directly or indirectly by these alternatives. No projects from the BTNF SOPA qualify as temporally and spatially overlapping; therefore, no analysis of cumulative effects is warranted.

3.9 SAFETY

3.9.1 SCOPE OF ANALYSIS

- *Would the Via Ferrata provide a safe recreational opportunity given the character of the rock at the proposed sites?*

While the cliffs in upper Casper Bowl are generally sound granite, the proposed sites below Tram towers #4 and #5 are on rock that is more fractured and, in some cases, relatively soft. This results in potential for rock fall and may make placement of secure anchors difficult.

Indicators: Qualitative assessment of the proposed routes, installed infrastructure, and management practices for the Via Ferrata as they interact with the rock type and structure occurring in the area.

- *Would the proposed hiking and mountain bike trails increase the potential for wildlife conflicts?*

The proposed trail systems traverse most habitat types in the SUP area, including thick mountain brush and forested areas where sudden encounters with bears, moose, or cougars could result in attacks, with adverse consequences for both the people and the animals involved.

Indicators: Qualitative assessment of the potential for wildlife and hiker/biker conflicts, incorporating the species, habitat types, and recreational activities involved.

3.9.2 AFFECTED ENVIRONMENT

3.9.2.1 Via Ferrata Safety

Via Ferrata installations are proposed on five geologic formations: Bighorn Dolomite, Death Canyon Limestone, Rendezvous Metagabbro, Wolsey Shale, and Flathead Sandstone. The 2000 EA describes each of these formations (p. 3-9) and is incorporated by reference as a source of further information. The relevant formation descriptions from the 2000 EA are as follow.

3.9.2.1.1 Bighorn Dolomite

Forms the cliffs between 9,600 and 10,100 feet on the (east) side of Rendezvous Mountain. The formation is mottled, light and dark gray, siliceous dolomite but has a 50-foot-thick chalky white, fine grained, brittle dolomite layer on top.

3.9.2.1.2 Death Canyon Limestone

Forms cliffs between 9,200 and 9,700 feet in the SUP area. The limestone is fine grained, thin bedded, dense, and blue to dark gray with tan splotches. It contains a 30-foot-thick, fossiliferous green shale in the middle of the unit.

3.9.2.1.3 Rendezvous Metagabbro

Located on Rendezvous Mountain between 6,500 and 9,400 feet forming moderate to steep slopes, upper ridges, and glacial cirques. The metagabbro is gray to dark green, coarse grained, and non-layered.

3.9.2.1.4 Wolsey Shale and Flathead Sandstone

Located between 9,000 and 9,600 feet on Rendezvous Mountain. The Wolsey Shale is green-gray, highly fissile, micaceous, and silty near the base. The lower part is glauconitic and contains sandstone interbeds. The Flathead Sandstone is white, tan, brown, and maroon crossbedded sandstone with a conglomeratic base.

While providing general information about the type of rock present at JHMR, these formation descriptions provide little in terms of the precise characteristics of the rock in the specific locations of the proposed Via Ferrata routes. The exact characteristics of the rock, and the appropriate hardware to install, will need to be determined at the time of final design and engineering for each route.

3.9.2.2 Wildlife Conflicts

The existing hiking and biking trail network traverses the entire range of habitat types at JHMR. Currently wildlife conflicts are uncommon, and there has never been a reported injury related to a human-wildlife conflict on any JHMR trails. According to JHMR staff, there have been two incidents in which a trail user came into close contact with a black bear and one incident in which a trail user had a close encounter with a moose. Neither incident resulted in the injury of the trail user or the animal (Schreiber 2015b, d'Arge 2015, Walker 2015). Grizzly bears are uncommon on JHMR ski runs.

Current actions taken to avoid human-wildlife conflicts include signs noting trails where bears have been seen recently, advising trail users of what to do if they see a bear, and trail closures where bears are expected nearby.

3.9.3 DIRECT AND INDIRECT EFFECTS

3.9.3.1 Via Ferrata Safety

3.9.3.1.1 Alternative 1 – No Action

Under this alternative no Via Ferrata routes would be constructed, eliminating this issue.

3.9.3.1.2 Alternative 2 – Proposed Action

The Via Ferratas will be designed and constructed by experienced professionals with the expertise required to assess potential routes then design and install appropriate hardware to ensure user safety. Forest Service inspections and certifications will be required similar to aerial adventure courses and zip-lines prior to authorizing use. Some of the JHMR rock formations are more geologically sound than others. However, each proposed Via Ferrata route and associated geologic formation contains sections of stable rock and sections that will need to be scaled (i.e., cleaned of loose rock) regularly to maintain a safe climbing environment. Routes in particularly fissile formations (e.g., Wolsey Shale) may need to be scaled more often. Since the Via Ferrata routes will be used by guided climbers only, this routine scaling is feasible.

Via Ferrata hardware is designed to be installed in a wide variety of situations, including loose or poor quality rock. Installation of Via Ferrata routes in the formations found at JHMR can be done in a way that creates a safe and secure route. In some cases additional measures such as installing hardware deeper into the rock, securing loose rock with anchors or netting, or rerouting the Via Ferrata away from unstable areas, may be required to ensure route safety.

3.9.3.2 Wildlife Conflicts

3.9.3.2.1 Alternative 1 – No Action

The hiking and biking trails constructed under this alternative pass through similar habitats to those already in use at JHMR. The levels of wildlife conflict associated with the proposed trails would be similar to levels of conflict associated with existing trails. That is, the potential for wildlife conflict would be minimal, and current practices to manage this risk should be sufficient to provide for user safety.

3.9.3.2.2 Alternative 2 – Proposed Action

The hiking and biking trails constructed under this alternative pass through similar habitats to those already in use at JHMR. The levels of conflict associated with the proposed trails would be similar to the levels of wildlife conflict associated with existing trails. That is, the potential for wildlife conflict would be minimal, although the conflicts associated with the new trails would be largely additive to those for existing activity. This means that the annual number of conflicts on the JHMR could rise slightly with implementation of this alternative. However, the existing practices to manage the risks of conflict should be sufficient to provide for user safety across the entire area.

3.9.4 CUMULATIVE EFFECTS

As discussed in section 3.3, the cumulative actions considered in this analysis are any projects listed in the BTNF SOPA that would have temporally and spatially overlapping impact on the same resources affected directly or indirectly by these alternatives – generally those occurring within the Fish Creek subwatershed (HUC 12) in the past, present, or reasonably foreseeable future. Since this analysis has identified no direct or indirect impacts associated with these alternatives, there is no potential for cumulative effects.

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CHAPTER 4: CONSULTATION AND COORDINATION

4.1 PUBLIC SCOPING AND NOTICE AND COMMENT ON THE PROPOSED ACTION

In December 2014, the Bridger-Teton National Forest (BTNF) issued a public scoping notice summarizing JHMR's proposed Recreation Enhancements Project, the Proposed Action, and inviting comments regarding the scope of the associated NEPA review. The recreation enhancement projects included in the Proposed Action are described in detail in JHMR's 2013 master development plan (MDP), formally accepted by the BTNF in August 2014.

A public scoping notice was mailed to 415 agencies, organizations, and individuals. The notice was also posted on the BTNF website at <http://www.fs.usda.gov/goto/btnf/projects> and made available on CD or in hard-copy form to anyone requesting it.

In addition to meeting NEPA's scoping requirements, this exercise also met the agency's obligations regarding public notice and comment on a proposed action, per the objection process mandated by 36 CFR 218, Subpart B.

The comment period formally began on January 11, 2015, when the BTNF's Legal Notice of Comment Period was published in the *Casper Star Tribune* (Newspaper of Record), and closed on February 10, 2015. Comment letters were received from one agency, one organization, and three individuals. Three additional comment letters were received after the close of the comment period. The scoping notice and comment letters are included in the Administrative Record, as is a *Scoping Report and Response to Comment on the Proposed Action: Jackson Hole Mountain Resort Recreation Enhancements Project*. This report identifies commenters, comments received, and the disposition of those comments. Substantive public comments and our responses are summarized below.

One commenter questioned why the Teton lift and the Craggs-area ski run development were not addressed in the same NEPA review, assuring that their cumulative effects were disclosed. We responded that most of this development, including the lift and runs, has been included in the resort's master planning, addressed in several NEPA reviews, and authorized in 1996 then reauthorized in 2000. Some of the work has been completed, and the Teton lift is being built this summer. The selected alternative includes project elements that have been modified (e.g., grading of Upper Wide Open, realignment of Ashley Ridge) and some elements have been added (e.g., development of Grizzly Glades run). Analysis of these elements in this EA simply augments and updates past analyses of the Teton pod development as a whole.

Several comments questioned the purpose and need for additional cleared and groomed trails in the Craggs area. We responded that JHMR's terrain mix is heavily skewed toward advanced and expert ability levels, a fact recognized in the resort's master planning over the years. Given the mountain's topography, JHMR will never match the "industry standard" terrain mix targeted by ski area planners. However, the proposed efforts to develop more opportunities for less advanced skiers will meet the demands of a wider segment of the skier market. This makes sound business sense for the resort and is consistent with the Forest Service's recreation objectives.

Other commenters suggested leaving tree islands on Craggs-area runs or designating different runs in that area for new snowmaking coverage. However, many of these steeper runs will require winch grooming, which is impractical with tree islands, and the resort's snowmaking plans reflect extensive knowledge these runs snow-collection and holding capabilities of likely patterns of skier use and wear.

A commenter suggested a new shortcut run from Upper Wide Open to access the Teton lift, but we pointed out that there are already two groomed routes available. Another comment suggested changing the name of Ashley Ridge run to Lower Wide Open. While this sounds logical, naming runs is not an agency role.

One comment questioned purpose and need for the Via Ferrata. We noted that the objective is to allow recreationists to enjoy this steep and rocky area and experience the thrill of rock climbing without providing their own equipment and without the risks of unprotected scrambling and climbing. Providing a wider range of opportunities to at our permitted recreation areas is an agency policy objective.

In regard to the Sweetwater gondola upper terminal, a commenter opposed a new restaurant facility if Option 2 were selected. No such facility has been proposed at this time. Skiers could readily access the existing Casper restaurant from this location via Togwotee traverse. Another comment suggested shifting the location of the upper terminal under Option 2 to provide better access to the adjacent traverses, but our analysis (EA section 3.8) indicates that the proposed location will provide for adequate access and circulation.

One commenter observed that base-area development has not proceeded as indicated in past plans. However, development of commercial amenities in the privately owned base area is outside of the scope of the Proposed Action. The BTNF is unable to stipulate the types of commercial amenities available.

A comment from Wyoming Department of Game and Fish indicated that they would like to work with the resort to develop a game retrieval point at the resort. We responded that this is an administrative matter outside the scope of this EA which would require separate negotiations between JHMR and the state, which could occur at any time.

Most remaining comments focused on specific resource issues which were addressed in the EA, including the impact of construction disturbance ongoing recreational use on watershed resources and water quality (EA section 3.4); tree stands and forest vegetation, including whitebark pine (section 3.5); wildlife, including federally listed species, Forest Service sensitive and management indicator species, and migratory birds (section 3.6); visitor safety, particularly Via Ferrata and trail users (section 3.9), and scenic resources, including the bike trail that will switchback down lower Sundance Gully (section 3.7).

Specific resource issues not addressed in the EA included increased access to Granite Canyon due to the Sweetwater gondola. We responded that while the previously approved Teton lift will likely have this effect, the Sweetwater gondola will not notably increase delivery of skiers to the Teton lift, as a primary function of the gondola will be to provide access to beginner facilities around the mid-way station. Beyond that, another lift system accessing the Teton pod with similar capacity was reviewed and approved in the past, so no new impacts are anticipated. Note also that JHMR and the BTNF work on an ongoing basis with the Park to develop and implement effective boundary management procedures.

The remaining comments were supportive of the overall proposal or separate elements of it.

4.2 OTHER CONSULTATION

Other consultation completed in association with this EA process includes the following:

- Consultation with Utah's State Historic Preservation Office (SHPO) on National Historic Preservation Act compliance (see section 3.7). Teton County Historic Preservation Board was a consulting party in per 36 CFR 800.3 (f)(3).
- Informal consultation with the FWS on Endangered Species Act compliance (see section 3.6).
- Government-to-government consultation with Native American Tribal groups (see section 1.7.2).

CHAPTER 5: LIST OF PREPARERS

Name	Position	Contribution
Forest Service Team		
Dale Deiter	Jackson District Ranger	Project oversight.
Ray Spencer	ID Team Leader/Winter Sports	Project administration and ID team coordination.
John Kuzlowski	NEPA Coordinator	NEPA compliance review.
Karl Buermeyer	Vegetation and Timber Specialist	Agency direction on vegetation analysis.
Bernadette Barthelenghi	Landscape Architect	Agency direction on scenic resources analysis.
Tim Farris	Trails Specialist	Agency direction on hiking and biking trails analysis.
Jamie Schoen	Archaeologist	Agency direction on heritage resources analysis.
Eric Winthers	Soil Scientist	Agency direction on watershed analysis.
Dave Fogle	Fisheries Biologist	Agency direction aquatic resources analysis.
Kerry Murphy	Wildlife Biologist	Agency direction on wildlife analysis.
Ronna Simon	Hydrologist	Agency direction watershed analysis.
Tyler Johnson	Botanist	Agency direction on vegetation analysis.
Brian Goldberg	GIS Specialist	GIS data provision and management.
Cirrus Ecological Solutions, LC Team		
Neal Artz	Project Manager	Project management, NEPA oversight, QA/QC review, and preparation of scenic and heritage resources analyses.
Eric Duffin	Hydrologist	Preparation of soil, water, and watershed resources analysis.
Tim Royer	Botanist and Wetland Specialist	Preparation of vegetation analysis.
Matt Westover	Wildlife Biologist	Preparation of wildlife, recreation, and safety analyses.
Judy Seamons	Document Production Specialist	Document production and preparation of the administrative record.
Delmatier, Inc., Botanical Consulting		
Charmaine Delmatier	Botanist	Review of vegetation analysis.

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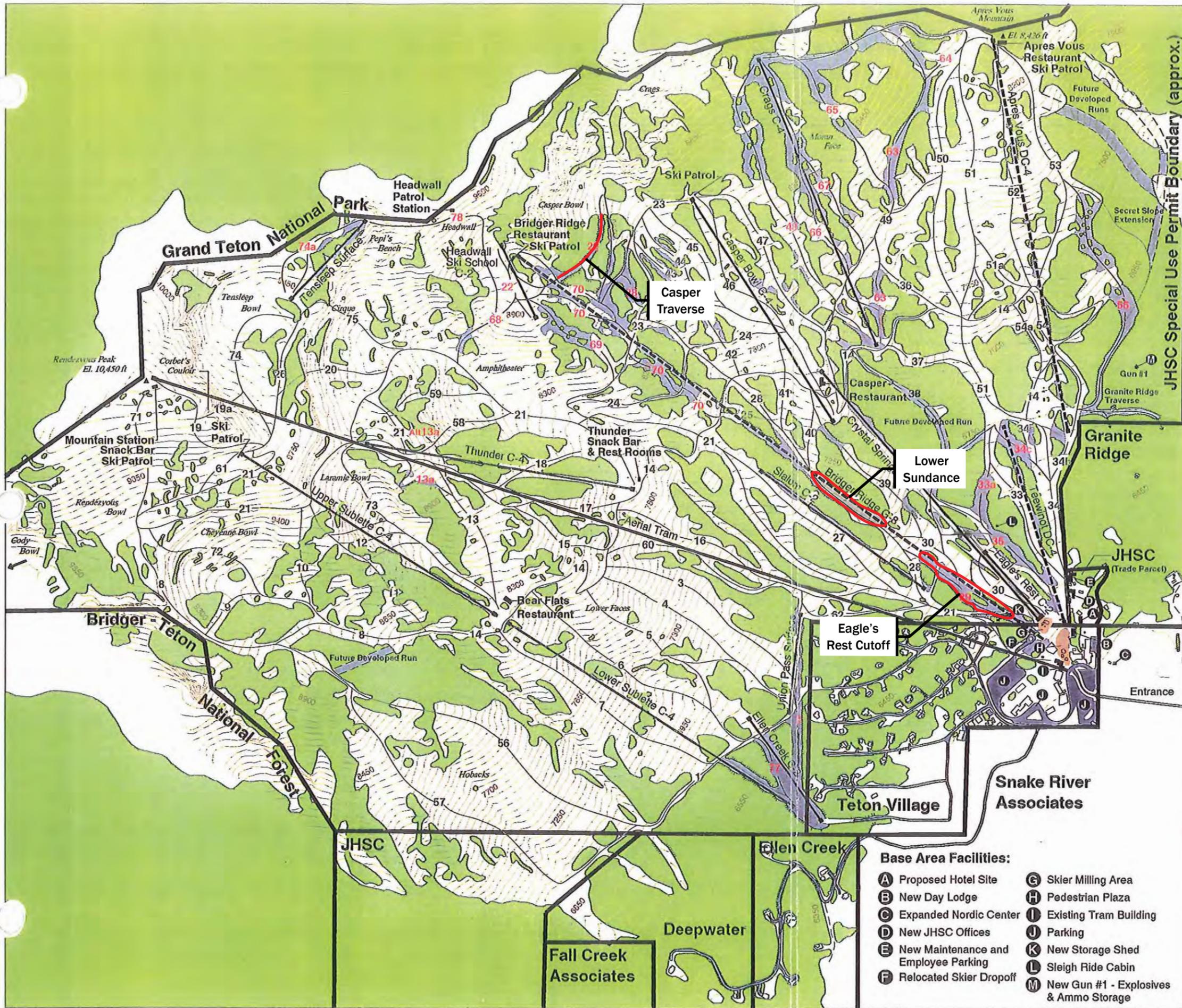
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APPENDIX A – FIGURES ILLUSTRATING NO-ACTION ALTERNATIVE

Ski Area Master Plan

Legend

-  EXISTING SKI TRAILS
-  PROPOSED SKI TRAILS
-  FIXED GRIP LIFT SYSTEM
-  HIGH SPEED LIFT SYSTEM
-  STRUCTURES
-  PAVED ROADS



- Base Area Facilities:**
- A** Proposed Hotel Site
 - B** New Day Lodge
 - C** Expanded Nordic Center
 - D** New JHSC Offices
 - E** New Maintenance and Employee Parking
 - F** Relocated Skier Dropoff
 - G** Skier Milling Area
 - H** Pedestrian Plaza
 - I** Existing Tram Building
 - J** Parking
 - K** New Storage Shed
 - L** Sleigh Ride Cabin
 - M** New Gun #1 - Explosives & Ammo Storage

Mountain Proposal

August 1993

prepared for:
 Jackson Hole Ski Corporation
 P.O. Box 290
 7658 Teewinot Road
 Teton Village, WY 83025

prepared by:
 sno engineering
 Mountain View Center
 610 Main Street
 P.O. Box 2729
 Ft. Collins, CO 80543
 USA



Jackson Hole Mountain Resort

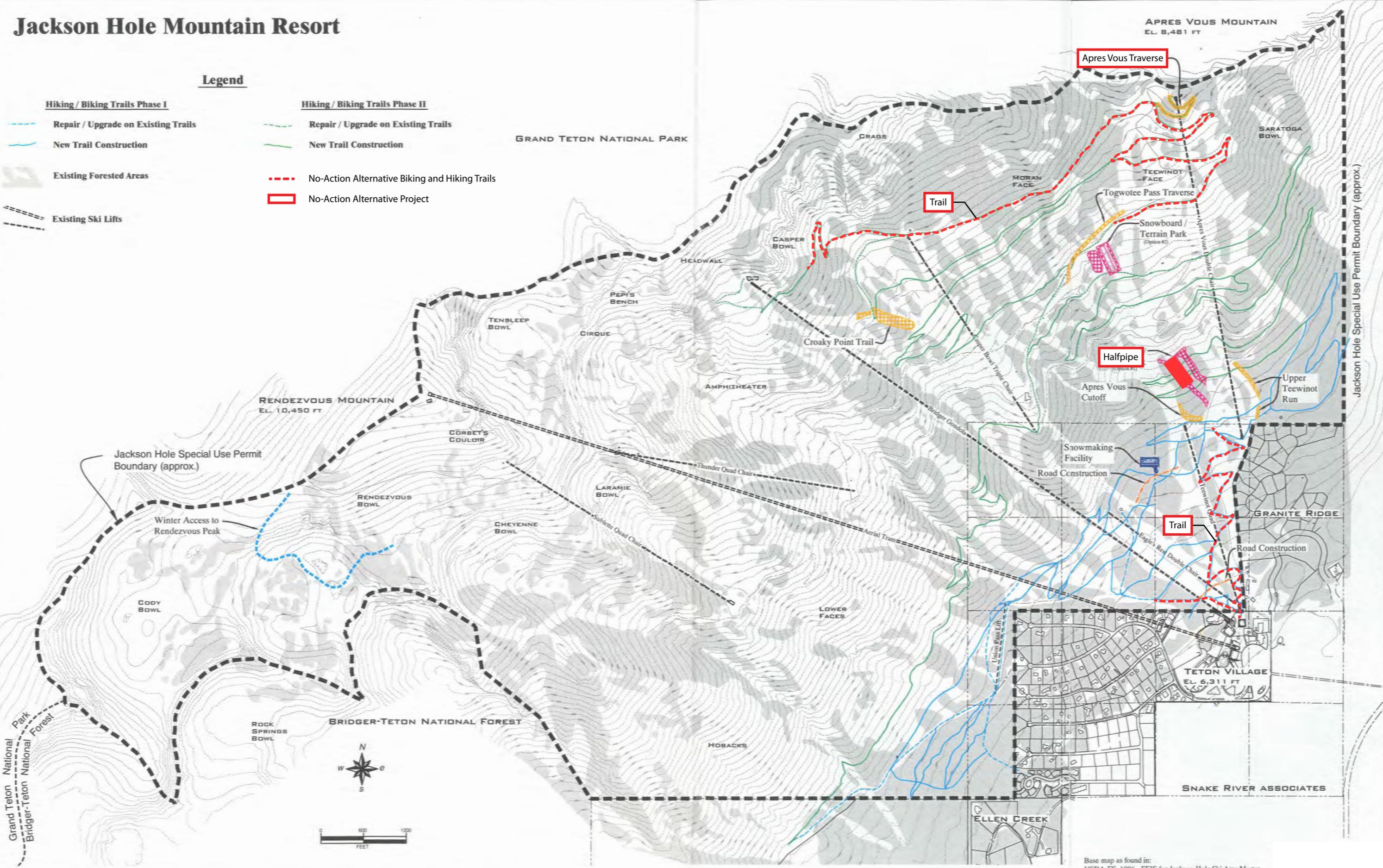


Figure 2.16. Depiction of elements included under Alternative C - Limited Development.

Base map as found in:
 USDA-FS, 1996. FEIS for Jackson Hole Ski Area Master
 Development Plan Revision. Bridger-Teton National Forest,
 Jackson Ranger District. November

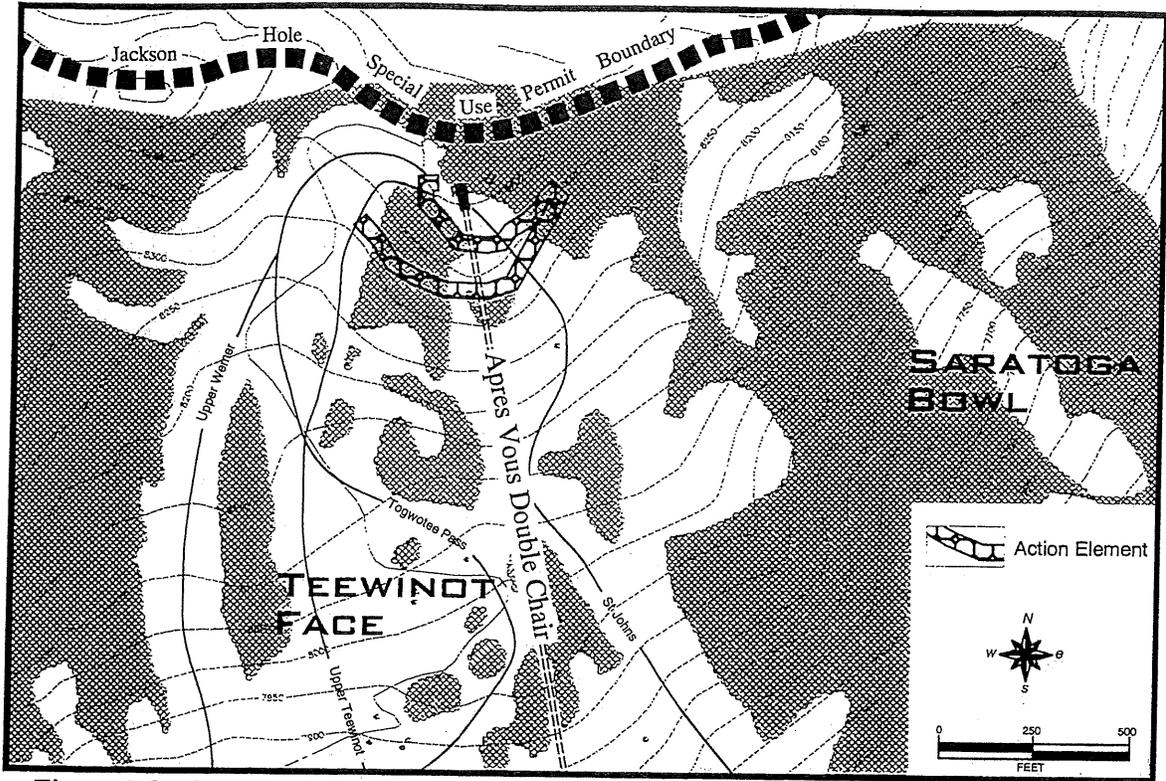


Figure 2.8. Construction of Upper Apres Vous Traverse - Alternative B.

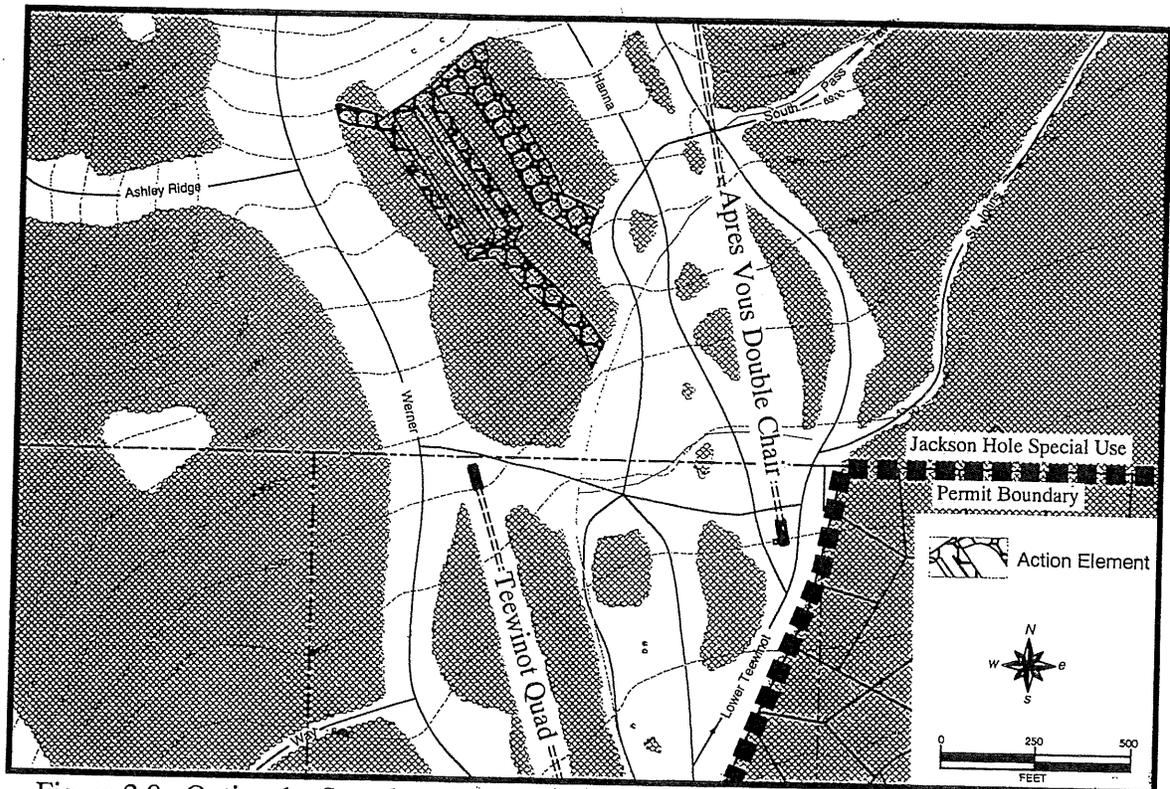


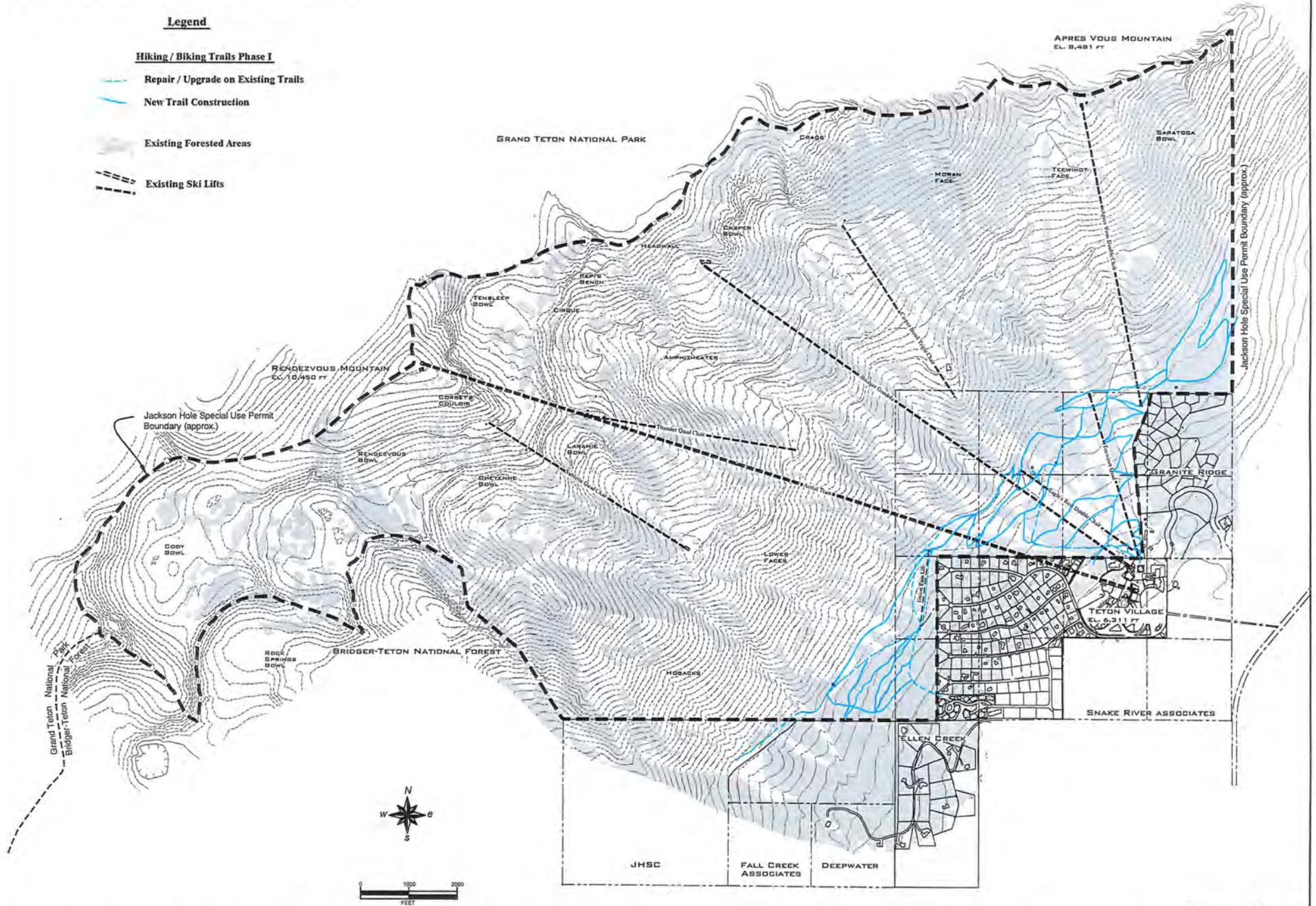
Figure 2.9. Option 1 - Snowboard / Terrain Park - Alternative B.

Jackson Hole Mountain Resort

Legend

Hiking / Biking Trails Phase I

-  Repair / Upgrade on Existing Trails
-  New Trail Construction
-  Existing Forested Areas
-  Existing Ski Lifts



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Figure 2.11. Phase I - Hiking / Biking Trails - Alternative B.

Base map as found in:
 USDA-FS, 1996. FEIS for Jackson Hole Ski Area Master
 Development Plan Revision. Bridger-Teton National Forest,
 Jackson Ranger District, November

Modifications & enhancements by:



June 9, 2000

Jackson Hole Mountain Resort

Legend

Hiking / Biking Trails Phase II

-  Repair / Upgrade on Existing Trails
-  New Trail Construction
-  Existing Forested Areas
-  Existing Ski Lifts

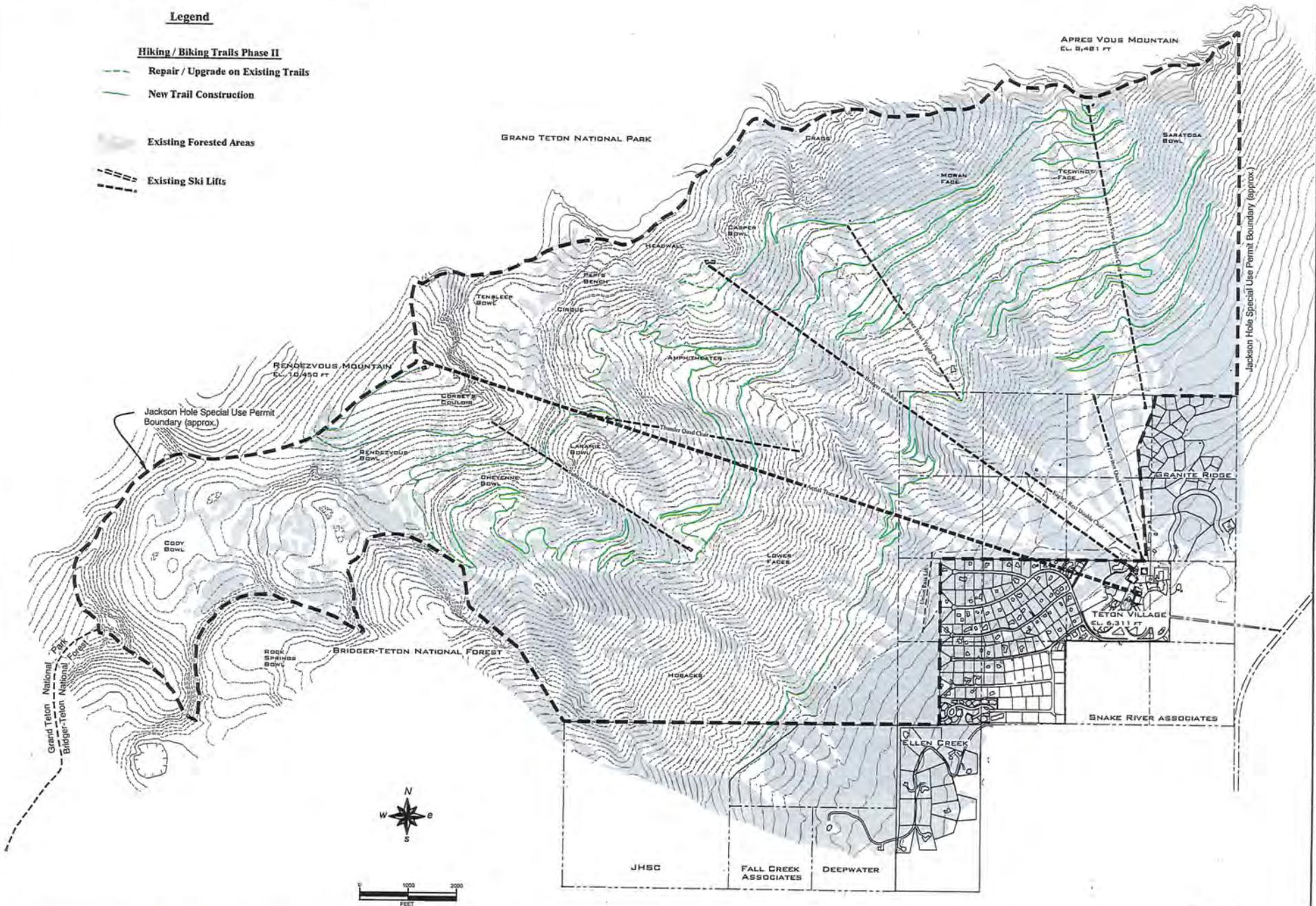


Figure 2.12. Phase II - Hiking / Biking Trails - Alternative B.

Base map as found in:
 USDA-FS, 1996, FEIS for Jackson Hole Ski Area Master
 Development Plan Revision, Bridger-Teton National Forest,
 Jackson Ranger District, November

Modifications & enhancements by:



June 9, 2000

APPENDIX B – WATERSHED RESOURCES BEST MANAGEMENT PRACTICES

Best Management Practices included in this section were selected from *National Best Management Practices for Water-Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide, USDA-Forest Service, FS-990a, April 2012*. The BMPs in this section are organized in the same order as they appear in Forest Service (2012), but specific BMPs that are not applicable have been deleted.

AqEco-2. Operations in Aquatic Ecosystems

- Use applicable practices of BMP Plan-2 (Project Planning and Analysis) and BMP Plan-3 (AMZ Planning) when planning operations in aquatic ecosystems.
- Identify the aquatic and aquatic-dependent species that live in the waterbody, Aquatic Management Zone (AMZ), or on the flood plain and their life histories to determine protection strategies, such as timing of construction, sediment management, species relocation, and monitoring during construction.
- Coordinate stream channel, shoreline, lake, pond, and wetland activities with appropriate State and Federal agencies.
 - Incorporate Clean Water Act (CWA) 404 permit requirements and other Federal, State, and local permits or requirements in to the project design and plan.
- Use suitable measures to protect the waterbody when preparing the site for construction or maintenance activities.
 - Clearly delineate the work zone.
 - Locate access and staging areas near the project site but outside of work area boundaries, AMZs, wetlands and sensitive soil areas.
 - Refuel and service equipment only in designated staging areas (see BMP Road-10[Equipment Refueling and Servicing])
 - Develop an erosion and sediment control plan to avoid or minimize downstream impacts using measures appropriate to the site and the proposed activity (see BMP Fac-2 [Facility Construction and Stormwater Control]).
 - Prepare for unexpected failures of erosion control measures.
 - Consider needs for solid waste disposal and worksite sanitation.
 - Consider using small, low ground pressure equipment, and hand labor where practicable.
 - Ensure all equipment operated in or adjacent to the waterbody is clean of aquatic invasive species, as well as oil and grease, and is well maintained.
 - Use vegetable oil or other biodegradable hydraulic oil for heavy equipment hydraulics wherever practicable when operating in or near water.
- Schedule construction or maintenance operations in waterbodies to occur in the least critical periods to avoid or minimize adverse effects to sensitive aquatic and aquatic-dependent species that live in or near the waterbody.
 - Avoid scheduling instream work during the spawning or migration seasons of resident or migratory fish and other important life history phases of sensitive species that could be affected by the project.
 - Avoid scheduling instream work during periods that could be interrupted by high flows.
 - Consider the growing season and dormant season for vegetation when scheduling activities within or near the waterbody to minimize the period of time that the land would remain exposed, thereby reducing erosion risks and length of time when aesthetics are poor.

Environmental Assessment: Jackson Hole Mountain Resort Recreation Enhancements Project

- Use suitable measures to protect the waterbody when clearing the site.
 - Clearly delineate the geographic limits of the area to be cleared.
 - Use suitable drainage measures to improve the workability of wet sites.
 - Avoid or minimize unacceptable damage to existing vegetation, especially plants that are stabilizing the bank of the waterbody.
- Use suitable measures to avoid or minimize impacts to the waterbody when implementing construction and maintenance activities.
 - Minimize heavy equipment entry into or crossing waters as is practicable.
 - Conduct operations during dry periods.
 - Stage construction operations as needed to limit the extent of disturbed areas without installed stabilization measures.
 - Promptly install and appropriately maintain erosion control measures.
 - Promptly install and appropriately maintain spill prevention and containment measures.
 - Promptly rehabilitate or stabilize disturbed areas as needed following construction or maintenance activities.
 - Stockpile and protect topsoil for reuse in site revegetation.
 - Minimize bank and riparian area excavation during construction to the extent practicable.
 - Keep excavated materials out of the waterbody.
 - Use only clean, suitable materials that are free of toxins and invasive species for fill.
 - Properly compact fills to avoid or minimize erosion.
 - Balance cuts and fills to minimize disposal needs.
 - Remove all project debris from the waterbody in a manner that will cause the least disturbance.
 - Identify suitable areas offsite or away from waterbodies for disposal sites before beginning operations.
 - Contour site to disperse runoff, minimize erosion, stabilize slopes, and provide a favorable environment for plant growth.
 - Use suitable species and establishment techniques to revegetated the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
- Use suitable measures to divert or partition channelized flow around the site or to dewater the site as needed to the extent practicable.
 - Remove aquatic organisms from the construction area before dewatering and prevent organisms from returning to the site during construction.
 - Return clean flows to channel or waterbody downstream of the activity.
 - Restore flows to their natural stream course as soon as practicable after construction or before seasonal closures.
- Inspect the work site at suitable regular intervals during and after construction or maintenance activities to check on quality of the work and materials and identify need for midproject corrections.
- Consider short- and long-term maintenance needs and unit capabilities when designing the project.
 - Develop a strategy for providing emergency maintenance when needed.
- Include implementation and effectiveness monitoring to evaluate success of the project in meeting design objectives and avoiding or minimizing unacceptable impacts to water quality.

- Consider long-term management of the site and nearby areas to promote project success.
 - Use suitable measures to limit human, vehicle, and livestock access to site as needed to allow for recovery of vegetation.

AqEco-4. Stream Channels and Shorelines

Stream Channels

- Determine stream type and classification using suitable accepted protocols.
- Determine design flows based on the value or safety of area to be protected, repair cost, and the sensitivity and value of the ecological system involved.
 - Obtain peak flow, low flow, channel forming flow, and flow duration estimates.
 - Use these estimates to determine the best time to implement the project, as well as to select design flows.
- Avoid changing channel alignment unless the change is to reconstruct the channel to a stable meander geometry consistent with stream type.
- Design channels with natural stream pattern and geometry and with stable beds and banks; provide habitat complexity where reconstruction of stream channels is necessary.
 - Consider sediment load (bedload and suspended load) and bed material size to determine desired sediment transport rate when designing channels.
 - Avoid relocating natural stream channels.
 - Return flow to natural channels, where practicable.

Fac-2. Facility Construction and Stormwater Control

- Obtain Clean Water Act (CWA) 402 stormwater discharge permit coverage from the appropriate State agency or the U.S. Environmental Protection Agency (EPA) when more than 1 acre of land will be disturbed through construction activities.
- Obtain CWA 404 permit coverage from the U.S. Army Corps of Engineers when dredge or fill material will be discharged to waters of the United States.
- Establish designated areas for equipment staging, stockpiling materials, and parking to minimize the area of ground disturbance (see BMP Road-9 [Parking Sites and Staging Areas] and BMP Road-10 [Equipment Refueling and Servicing]).
- Establish and maintain construction area limits to the minimum area necessary for completing the project and confine disturbance to within this area.
- Develop and implement a post construction site vegetation plan using suitable species and establishment techniques to revegetate the site in compliance with local direction and requirements per Forest Service Manual (FSM) 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
- Schedule, to the extent practicable, construction activities to avoid direct soil and water disturbance during periods of the year when heavy precipitation and runoff are likely to occur.
 - Limit the amount of exposed or disturbed soil at any one time to the minimum necessary to complete construction operations.
 - Limit operation of equipment when ground conditions could result in excessive rutting, soil puddling, or runoff of sediments directly into waterbodies.
- Maintain erosion and stormwater controls as necessary to ensure proper and effective functioning.
 - Prepare for unexpected failures of erosion control measures.
 - Implement corrective actions without delay when failures are discovered to prevent pollutant discharge to nearby waterbodies.

- Routinely inspect construction sites to verify that erosion and stormwater controls are implemented and functioning as designed and are appropriately maintained.

Fac-9. Pipelines, Transmission Facilities, and Rights-of-Way

- Consider soil and water impacts from factors such as stream head cutting and channel expansion, stream crossings, slope stability and steepness, and amount of riparian area, floodplain, and wetland acreage to be disturbed when determining corridor location.
 - Co-locate pipelines and transmission lines with roads or their rights-of-way where practicable.
 - Limit corridor disturbance, particularly in or near AMZs, surface waters, shallow groundwater, unstable areas, hydric soils, or wetlands.
- Consider service road location and standards, type of construction equipment (wheeled, tracked, and helicopter), size and location of footings and guy anchors, and revegetation requirements during project design.
 - Use applicable BMPs for Mechanical Vegetation Management Activities when using mechanical treatments to remove vegetation from the project corridor.
 - Use applicable practices of BMP Road-2 (Road Location and Design) for planning access roads.
- Use design and construction measures that sustain long-term wetland or stream function when a buried transmission line, pipeline, or tower support must be placed in a wetland or cross a stream (see BMP AqEco-2 [Operations in Aquatic Ecosystems]).
 - Use suitable measures for pipeline thickness, corrosion prevention, pipeline casing, cathodic protection and pipeline valves, and shut-off systems to prevent or minimize spills or leaks where pipelines cross waterbodies.

Rec-4. Motorized and Nonmotorized Trails

- Locate or relocate trails to conform to the terrain, provide suitable drainage, provide adequate pollutant filtering between the trail and nearby waterbodies, and reduce potential adverse effects to soil, water quality, or riparian resources.
 - Avoid sensitive areas, such as riparian areas, wetlands, stream crossings, inner gorges, and unstable areas to the extent practicable.
 - Use suitable measures to mitigate trail impacts to the extent practicable where sensitive areas are unavoidable.
 - Use suitable measures to hydrologically disconnect trails from waterbodies to the extent practicable.
- Design, construct, and maintain trail width, grades, curves, and switchbacks suitable to the terrain and designated use.
- Install and maintain suitable drainage measures to collect and disperse runoff and avoid or minimize erosion of trail surface and adjacent areas.
- Design stream crossings to use the most cost-efficient structure consistent with resource protection, facility needs, and types of use and safety obligations (see BMP Road-2 [Road Location and Design] and BMP Road-7 [Stream Crossings]).
- Monitor trail condition at regular intervals to identify drainage and trail surface maintenance needs to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.
- Close and rehabilitate unauthorized trails that are causing adverse effects on soil, water quality, and riparian resources (see BMP Fac-10 [Facility Site Reclamation]).

Rec-10. Ski Runs and Lifts

- Locate ski runs and lifts on stable geology and soils to minimize risk of slope failures.
- Avoid wetlands and riparian areas when locating ski runs and lifts wherever practicable.

- Incorporate suitable measures in the design and construction of ski runs, including consideration of runoff of additional water from snowmaking, to avoid or minimize undesirable increases in runoff.
- Use applicable practices of Mechanical Vegetation Management Activities BMPs when clearing vegetation for ski runs and lift lines.
 - Use yarding equipment suitable to the steepness of the terrain to avoid or minimize adverse effects to soil and water quality (see BMP Veg-1 [Vegetation Management Planning]).
- Use applicable practices of BMP Veg-2 (Erosion Prevention and Control) to provide erosion and stormwater controls when constructing ski runs and lifts.
 - Clear and construct ski runs and lift lines in sections to limit the area of exposed disturbed soil at any one time.
 - Stabilize a completed section before beginning work on the next section.
- Avoid diverting streams and minimize disrupting swales, ephemeral channels, and wetlands.
- Minimize grading or recontouring of hill slopes to maintain intact soil horizons and infiltrative properties.
- Cut stumps flush with soil surface or grind in place instead of grubbing when clearing trees from ski runs wherever practicable.
- Use applicable practices of BMP Road-7 (Stream Crossings) to design and construct stream crossings to minimize riparian and channel disturbance and pass anticipated flood flows and associated debris, while allowing desired aquatic organism passage.
 - Maintain normal stream patterns, geometry, and habitat features to the extent practicable.
- Use low-pressure construction and maintenance equipment whenever practicable to reduce surface impact on steep slopes.
- Stockpile biologically active topsoil removed during excavation for use in reclamation.
 - Store stockpiled topsoil separately from other vegetative slash, soil, or rock and protect from wind and water erosion, unnecessary compaction, and contaminants.
- Use suitable species and establishment techniques to revegetate the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
- Maintain desired ground cover with irrigation, fertilization, or other treatments as necessary.
- Use suitable measures to direct overland flow on slopes into areas with intact soil horizons to encourage infiltration and disconnect overland flow from waterbodies.
- Treat disturbed soil to promote onsite water capture and infiltration.
- Prohibit traffic on disturbed areas during periods of excessive soil moisture, precipitation, or runoff.
- Monitor revegetation response (height, root growth, ground coverage, etc.) in terms of its capacity to avoid or minimize erosion during runoff.
 - Perform additional revegetation or erosion control as needed to protect water quality and soil integrity.

Rec-11. Ski Area Snowmaking

- Manage snowmaking and snow farming to avoid or minimize slope failures and gully erosion on the hillslopes and excessive bank erosion and sediment in receiving streams.
 - Limit snowmaking on graded terrain to the extent practicable to minimize surface runoff and subsequent erosion from reduced infiltration capacity.
- Use applicable practices of BMP WatUses-1 (Water Uses Planning) when authorizing snowmaking.

- Use applicable practices of BMP AqEco-3 (Ponds and Wetlands), BMP WatUses-4 (Water Diversions and Conveyances), and BMP WatUses-5 (Dams and Impoundments) when obtaining water and developing water storage facilities for snowmaking.
- Transport water to the slopes in the least disruptive manner.
 - Use applicable practices of BMP Fac-9 (Pipelines, Transmission Facilities, and Rights-of-Ways) when constructing, maintaining, and operating pipelines.
- Design snowmaking systems to return runoff water to the source from which it was removed.
 - Avoid interbasin transfer of waters, where practicable, to maintain original duration, magnitude, and patterns of runoff in affected watersheds.
- Avoid contaminating return water with chemicals or other pollutants.
- Monitor all aspects of the process and correct problems as they occur to avoid or minimize long-term effects.
 - Regularly inspect snowmaking lines and equipment to prevent accidental discharges and erosion due to equipment failure.

Rec-12. Ski Area Facilities

- Locate ski area facilities on stable geology and soils to minimize risk of slope failures.
- Avoid wetlands and riparian areas to the extent practicable when locating ski area facilities.
- Use applicable practices of BMP Fac-2 (Facility Construction and Stormwater Control) to provide erosion and stormwater controls when constructing and operating ski area facilities.
- Use applicable practices of BMP Road-2 (Road Location and Design), BMP Road-3 (Road Construction and Reconstruction), BMP Road-4 (Road Operations and Maintenance), BMP Road-8 (Snow Storage and Removal), and BMP Road-9 (Parking Sites and Staging Areas) for designing, constructing, maintaining, and operating roads and parking areas at ski area facilities.
- Use applicable practices of BMP Fac-9 (Pipelines, Transmission Facilities, and Rights-of-Way) for managing power and utility lines at the ski area facilities.
- Use applicable practices of BMP Fac-6 (Hazardous Materials), BMP Fac-7 (Vehicle and Equipment Wash Water), and BMP Road-10 (Equipment Refueling and Servicing) for activities related to storage and maintenance of ski area vehicles and equipment.
- Use applicable practices of BMP Fac-3 (Potable Water Supply Systems) for drinking water, BMP Fac-4 (Sanitation Systems) for managing human waste, and BMP Fac-5 (Solid Waste Management) for managing solid waste at ski area facilities.

Road-7. Stream Crossings

All Crossings

- Plan and locate surface water crossings to limit the number and extent to those that are necessary to provide the level of access needed to meet resource management objectives as described in the RMOs.
- Use suitable surface drainage and roadway stabilization measures to disconnect the road from the waterbody to avoid or minimize water and sediment from being channeled into surface waters and to dissipate concentrated flows.
- Use suitable measures to avoid, minimize, or mitigate damage to the waterbody and banks when transporting materials across the waterbody or AMZ during construction activities.

Stream Crossings

- Locate stream crossings where the channel is narrow, straight, and uniform, and has stable soils and relatively flat terrain to the extent practicable.
 - Select a site where erosion potential is low.

- Orient the stream crossing perpendicular to the channel to the extent practicable.
- Keep approaches to stream crossings to as gentle a slope as practicable.
- Consider natural channel adjustments and possible channel location changes over the design life of the structure.
- Design the crossing to pass a normal range of flows for the site.
 - Design the crossing structure to have sufficient capacity to convey the design flow without appreciably altering streamflow characteristics.
 - Install stream crossings to sustain bankfull dimensions of width, depth, and slope and maintain streambed and bank resiliency and continuity through the structure.
- Use suitable measures to avoid or minimize scour and erosion of the channel, crossing structure, and foundation to maintain the stability of the channel and banks.
- Culverts
 - Align the culvert with the natural stream channel.
 - Cover culvert with sufficient fill to avoid or minimize damage by traffic.
 - Construct at or near natural elevation of the streambed to avoid or minimize potential flooding upstream of the crossing and erosion below the outlet.
 - Install culverts long enough to extend beyond the toe of the fill slopes to minimize erosion.
 - Use suitable measures to avoid or minimize water from seeping around the culvert.
 - Use suitable measures to avoid or minimize culvert plugging from transported bedload and debris.
 - Regularly inspect culverts and clean as necessary.

Standing Water and Wetland Crossings

- Disturb the least amount of area as practicable when crossing a standing waterbody.
- Provide for sufficient cross drainage to minimize changes to, and avoid restricting, natural surface and subsurface water flow of the wetland under the road to the extent practicable.
 - Locate and design roads or road drainage to avoid dewatering or polluting wetlands.
 - Avoid or minimize actions that would significantly alter the natural drainage for flow patterns on lands immediately adjacent to wetlands.
 - Use suitable measures to increase soil-bearing capacity and reduce rutting from expected vehicle traffic.
- Construct fill roads only when necessary.
 - Construct fill roads parallel to water flow and to be as low to natural ground level as practicable.
 - Construct roads with sufficient surface drainage for surface water flows.

Veg-2. Erosion Prevention and Control

- Establish designated areas for equipment staging and parking to minimize the area of ground disturbance (see BMP Road-9 [Parking Sites and Staging Areas]).
- Develop an erosion control and sediment plan that covers all disturbed areas including skid trails and roads, landings, cable corridors, temporary road fills, water source sites, borrow sites, or other areas disturbed during mechanical vegetation treatments.
- Refer to State or local forestry or silviculture BMP manuals, guidebooks, and trade publications for effective structural and nonstructural measures to—
 - Apply soil protective cover on disturbed areas where natural revegetation is inadequate to prevent accelerated erosion before the next growing season.

- Maintain the natural drainage pattern of the area wherever practicable.
- Control, collect, detain, treat, and disperse stormwater runoff from disturbed areas.
- Divert surface runoff around bare areas with appropriate energy dissipation and sediment filters.
- Stabilize steep excavated slopes.
- Use suitable species and establishment techniques to cover or revegetate disturbed areas in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
- Use suitable measures in compliance with local direction to prevent and control invasive species.
- Install sediment and stormwater controls before initiating surface-disturbing activities to the extent practicable.
- Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized.
 - Avoid ground equipment operations on unstable, wet, or easily compacted soils and on steep slopes unless operation can be conducted without causing excessive rutting, soil puddling, or runoff of sediments directly into waterbodies.
 - Evaluate site conditions frequently to assess changing conditions.
 - Adjust equipment operations as necessary to protect the site while maintaining efficient project operations.
- Install suitable stormwater and erosion control measures to stabilize disturbed areas and waterways on incomplete projects before seasonal shutdown of operations or when severe storm or cumulative precipitation events that could result in sediment mobilization to waterbodies are expected.
- Routinely inspect disturbed areas to verify that erosion and stormwater controls are implemented and functioning as designed and are suitably maintained.
- Implement mechanical treatments on the contour of sloping ground to avoid or minimize water concentration and subsequent accelerated erosion.

Veg-8. Mechanical Site Treatment

- Evaluate multiple site factors, including soil conditions, slope, topography, and weather, to prescribe the most suitable mechanical treatment and equipment to avoid or minimize unacceptable impacts to soil while achieving treatment objectives.
 - Consider the condition of the material and the site resulting from the treatment in comparison to desired conditions, goals, and objectives for the site when analyzing treatment options (e.g., a mastication treatment will result in a very different condition than a grapple pile and burn treatment).
 - Use land management plan direction, or other local guidance, to establish residual ground cover requirements and soil disturbance limits suitable to the site to minimize erosion.
 - Consider offsite use options for the biomass material to reduce onsite treatment and disposal.
- Conduct mechanical activities when soil conditions are such that unacceptable soil disturbance, compaction, displacement, and erosion would be avoided or minimized.
- Consider using low ground-pressure equipment, booms, or similar equipment to minimize soil disturbance.
- Operate mechanical equipment so that furrows and soil indentations are aligned on the contour.
- Conduct machine piling of slash in such a manner to leave topsoil in place and to avoid displacing soil into piles.
- Re-establish vegetation as quickly as possible.
 - Evaluate the need for active and natural revegetation of exposed and disturbed sites.
 - Use suitable species and establishment techniques to revegetate the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.

WatUses-1. Water Uses Planning

- Evaluate water levels, flows, and water quality of the affected waterbody or aquifer to ensure that the source can provide an adequate supply and quality of water for the intended purpose(s) and avoid or minimize damage to NFS resources.

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- Consider how the collection, diversion, storage, transmission, and use of the water would directly, indirectly, and cumulatively affect streamflow, water level, channel morphology and stability, groundwater, and aquatic and riparian habitats in source and receiving waterbodies at a watershed scale(s) suitable for the project area and impacts.
- Consider the potential impacts of current and expected environmental conditions such as climate change on precipitation type, magnitude, frequency, and duration and related effects on runoff patterns and water yield.

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APPENDIX C – REGION 4 SENSITIVE PLANT LIST

Table C-1 shows the full list of special-status plant species considered in this analysis, including plants that are federally listed as threatened or endangered, Forest Service sensitive, MIS, or Wyoming Species of Concern or Species of Potential Concern. Inclusion in this list was based on professional judgment of the Forest botanist and Charmaine Delmatier, the third-party botanist contracted by JHMR to conduct the mountain-wide plant inventories over the past 19 years. This list includes 27 taxa and provides relevant information concerning their known or probable occurrence in the Jackson Hole Mountain Resort Recreation Enhancement Projects area. Those species known to occur in the project area were carried into detailed analysis in the EA (section 3.5).

Table C-1. Special-status plant species considered in the JHMR Recreation Enhancements Project EA.					
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area	Risk (likelihood of effects from proposed action)
Threatened or Endangered Species					
Ute ladies'-tresses <i>(Spiranthes diluvialis)</i>	Gravel bars, wet meadow terraces, oxbows, seeps, springs, fens, lakes, and excavations within suitable settings, including ditches and quarries at elevations on slightly alkaline soils between 720 and 7,000 feet (Fertig 2007).	Threatened	No	Yes	None ¹
Region 4 Sensitive Known to Occur on the BTNF					
Sweet-Flowered Rock Jasmine <i>(Androsace chamaejasme ssp. carinata)</i>	Preferred habitat is on exposed settings of rocky ridge crests, slopes with rock outcrops and thin soils of limestone or dolomite substrate at 8,500 to 10,800 feet elevation. (Fertig 2001a)	R4 Sensitive	No	Yes	None ¹
Pink Agoseris <i>(Agoseris lackschewitzii)</i>	This species is found in mid-montane to subalpine wet meadow, saturated soils at 8,500 to 10,600 feet in elevation (Fertig, Refsdal, and Whipple 1994).	R4 Sensitive	No	Yes	None ¹

Table C-1 (cont'd). Special-status plant species considered in the JHMR Recreation Enhancements Project EA.					
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area	Risk (likelihood of effects from proposed action)
Meadow Milkvetch <i>(Astragalus diversifolius var. jejenus)</i>	This species is found in moist, often alkaline meadows and swales in sagebrush valleys at 4,400 to 6,300 feet elevation. Recorded from one historical site in Green River basin (Heidel 2008b).	R4 Sensitive	No	No	None
Starvling Milkvetch <i>(Astragalus jejunus var. jejunus)</i>	This species is found on dry barren ridges and bluffs of shale and stone, clay or cobblestones at 6,000 to 7,100 feet elevation (Fertig, Refsdal, and Whipple 1994).	R4 Sensitive	No	No	None
Payson Milkvetch <i>(Astragalus paysonii)</i>	This species occurs primarily in disturbed areas on sandy soils that have a low cover of forbs and grasses at elevations of 5,850 to 9,600 feet (Heidel 2008c)	R4 Sensitive	No	No	None
Seaside Sedge <i>(Carex incurviformis)</i>	This species occurs primarily in alpine and subalpine moist tundra and wet rock ledges 10,000 to 12,200 elevation (Fertig 2000c).	R4 Sensitive	No	No	None
Black and Purple Sedge <i>(Carex luzulina var. atropurpea)</i>	This species is found in subalpine wet meadows and stream sides at 10,000 to 10,600 feet elevations (Mills and Fertig 2000).	R4 Sensitive	No	No	None
Wyoming Tansymustard <i>(Descurainia torulosa)</i>	Wyoming tansymustard is restricted to the southern Absaroka Range and the Rock Springs Uplift. Habitat is sandy soil at the base of cliffs composed of volcanic	R4 Sensitive	No	No	None

Table C-1 (cont'd). Special-status plant species considered in the JHMR Recreation Enhancements Project EA.					
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area	Risk (likelihood of effects from proposed action)
	breccia or sandstone, under slight overhangs, in cavities in the volcanic rock, or on ledges. It is found at elevations of 7,700 to 10,500 feet (Fertig 2000d).				
Rockcress Draba <i>(Draba apiculata, Draba globosa, Draba densifolia var. apiculata)</i>	Rockcress draba is found in moist, gravelly alpine meadows and talus slopes, often on limestone-derived soils. Found from 8,100 to 12,400 feet (Handley and Fertig 2008).	R4 Sensitive, Wyoming Species of Concern	Yes	Yes	Low
Narrowleaf Goldenweed <i>(Ericameria discoidea var. linearis)</i>	This species is typically found in semi-barren, whitish clay flats and slopes, gravel bars, and sandy lakeshores at elevations of 7,700 to 10,300 feet (Fertig 2000e).	R4 Sensitive	No	No	None
Woolly Daisy <i>(Erigeron lanatus)</i>	This species is found on alpine or subalpine limestone talus slopes at elevations between 10,800 and 11,100 feet elevation (Fertig 2001).	R4 Sensitive	No	Yes	None ¹
Payson's Bladderpod <i>(Lesquerella paysonii)</i>	This species is endemic to the carbonate mountain ranges of west-central Wyoming, eastern Idaho, and southwestern Montana. It is found on rocky, sparsely-vegetated slopes, often calcareous substrates at elevations of 5,500 to 10,600 feet (Heidel 2008a).	R4 Sensitive, Wyoming Species of Potential Concern	Yes	Yes	Low

Table C-1 (cont'd). Special-status plant species considered in the JHMR Recreation Enhancements Project EA.					
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area	Risk (likelihood of effects from proposed action)
Naked-stemmed parrya <i>(Parrya nudicaulis)</i>	This species is found on alpine talus, often on limestone substrates at 10,700 to 11,400 feet elevation (Fertig 2000f)	R4 Sensitive	No	Yes	None ¹
Creeping Twinpod <i>(Physaria integrifolia var. monticola)</i>	Found on barren, rocky, calcareous hills and slopes at 6,500 to 8,600 feet elevation (Fertig, Refsdal, and Whipple 1994). No longer a valid taxon.	R4 Sensitive (if variety monticola)	Yes	Yes	None – species is no longer a valid taxon.
Whitebark Pine <i>(Pinus albicaulis)</i>	This species grows in pure stands near the treeline and in mixed stands in subalpine forests from under 8000 to over 10,000 feet in Wyoming (Arno and Hoff 1990).	Candidate, R4 Sensitive	Yes	Yes	Low
Greenland Primrose <i>(Primula egalikensis)</i>	This species is found in wet meadows along streams and calcareous montane bogs from 6,600 to 8,000 feet (Fertig, Refsdal, and Whipple 1994).	R4 Sensitive	No	No	None
Weber's Saussurea <i>(Saussurea weberi)</i>	Restricted to the Gros Ventre and northern Wind River ranges Habitat is on alpine talus slopes and gravel fields from 9,600 to 11,500 feet (Fertig 2000g).	R4 Sensitive	No	Yes	None ¹
Soft Aster <i>(Symphyotrichum molle)</i>	In Wyoming, this species has been found in the Bighorn Mts and Hoback Canyon. It prefers sagebrush grasslands and mountain meadows in calcareous soils at 6,400 to 8,500 feet elevation (Fertig, Refsdal, and Whipple 1994).	R4 Sensitive	No	No	None

Table C-1 (cont'd). Special-status plant species considered in the JHMR Recreation Enhancements Project EA.					
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area	Risk (likelihood of effects from proposed action)
Management Indicator Species					
Shultz's milkvetch <i>(Astragalus shultziorum)</i>	Distribution centered in Wyoming in the Teton, Salt, and Wind River ranges. Found primarily in subalpine forb communities on shallow, rocky, calcareous soils at elevations of 8,800 to 11,500 feet (Heidel and Fertig 2008a).	MIS, Wyoming Species of Potential Concern	Yes	Yes. The project area is within the elevation range, and subalpine forb communities on shallow soils are present.	Low
Quaking aspen <i>(Populus tremuloides)</i>	Found throughout the BTNF. It occurs in pure stands, or mixed with subalpine fir, lodgepole pine, Douglas-fir, whitebark pine, or Engelmann spruce. In lower elevations, it forms a mosaic with shrublands (NatureServe 2015).	MIS	Yes	Yes	Low
Wyoming Species of Concern or Species of Potential Concern					
Aromatic pussytoes <i>(Antennaria aromatica)</i>	This species is found in crevices on sparsely vegetated ridgelines and summits at and above the timberline on limestone-derived soils at 4,500 to 10,800 feet in elevation (Fertig 2000a).	Wyoming Species of Potential Concern	Yes	Yes	Low
Green spleenwort <i>(Asplenium trichomanes-ramosum)</i>	Crevice on north-facing limestone outcroppings in spruce/subalpine fir forests at elevations between 5,800 and 9,900 feet (Fertig 2000b).	Wyoming Species of Concern	Yes	Yes	Low

Table C-1 (cont'd). Special-status plant species considered in the JHMR Recreation Enhancements Project EA.					
Species Name	Habitat Description	Status and Rank	Known Occurrences in the Project Area	Habitat Present in Project Area	Risk (likelihood of effects from proposed action)
Railhead milkvetch <i>(Astragalus terminalis)</i>	Gravelly outwash terraces, stony or grassy hillsides, and cushion plant communities on summit flats of brownish-sandy clay soil with abundant surface gravel between elevations between 6,400 and 7,500 feet (Heidel and Fertig 2008b).	Wyoming Species of Concern	No	Yes	None ¹
Milk kelloggia <i>(Kelloggia galioides)</i>	Woods and open slopes at elevations between 7,100 and 8,200 feet (Markow and Fertig 2008).	Wyoming Species of Concern	Yes	Yes	Low
Broad-leaved twayblade <i>(Listera convallarioides)</i>	Margins of waterbodies and other moist areas in coniferous or aspen/alder forests at elevations between 6,400 and 9,000 feet (Markow and Fertig 2000).	Wyoming Species of Concern	Yes	Yes	Low
Large-flower triteleia <i>(Triteleia grandiflora)</i>	Grasslands or sagebrush and pinyon-juniper woodlands to pine-forest slopes and hills (NatureServe 2015).	Wyoming Species of Concern	Yes	Yes	Low
¹ Although potential habitat and indicator species associated with this species may be present, it has not been observed at JHMR during mountain-wide plant inventories conducted over the past 19 years.					