FINAL ENVIRONMENTAL IMPACT STATEMENT:

MT. BACHELOR SKI AREA IMPROVEMENTS PROJECT

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Final Environmental Impact Statement:
Mt. Bachelor Ski Area Improvements Project

Deschutes County, Oregon

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Abstract: The Bend-Ft. Rock Ranger District, Deschutes National Forest (DNF) has received a proposal from Mt. Bachelor, Inc., operators of Mt. Bachelor ski resort, requesting authorization to implement improvements included in their recently revised master development plan (MDP). The MDP documents analysis of current conditions at the resort and, based on that analysis, outlines anticipated development and management of the resort over the next 10 years. These improvements are intended to enhance the winter and summer recreational opportunities available at the resort and on the DNF. Mt. Bachelor is located near Bend, Oregon, in Deschutes County, T18S, R9E, Sections 17 – 33. The ski resort operates under a special use permit (SUP) issued by the USDA Forest Service (Forest Service) and administered by the DNF. The DNF has prepared this EIS in compliance with the National Environmental Policy Act (NEPA) and Forest Service regulations regarding its implementation. The Proposed Action is the agency's preferred alternative.

Public Notice and Comment: The DNF provided those interested in or affected by this action an opportunity to make their concerns known. In accordance with agency notice and comment regulations (36 CFR 215), comments on the proposed actions that were analyzed and documented in the Draft EIS were accepted for 45 days following June 1, 2012, the date of publication of Notice of Availability (NOA) of the Draft EIS in the Federal Register.

Eligibility to Appeal: Those who provided substantive comments during that comment period have standing to appeal the Responsible Official's decision, subject to the terms of 36 CFR 215.13, which include the following: Comments received from an authorized representative(s) of an organization are considered those of the organization only; individual members of that organization do not meet appeal eligibility solely on the basis of membership in an organization; the member(s) must submit substantive comments as an individual in order to meet appeal eligibility. When an appeal lists multiple individuals or organizations, each must meet these requirements. Individuals or organizations that do not meet these requirements will not be accepted as appellants.

Filing an Appeal: Instructions on filing an appeal will be included in the Record of Decision.

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SUMMARY

INTRODUCTION

This summary presents an overview of the Final Environmental Impact Statement (Final EIS), prepared in response to a proposal from Mt. Bachelor, Inc., operators of Mt. Bachelor ski resort, requesting authorization to implement improvements included in their recently revised master development plan (MDP). The MDP documents analysis of current conditions at the resort and, based on that analysis, outlines anticipated development and management of the resort over the next 10 years. These improvements are intended to enhance the winter and summer recreational opportunities available at the resort and on the DNF.

Mt. Bachelor is located near Bend, Oregon, in Deschutes County, T18S, R9E, Sections 17 – 33, Willamette Meridian. The ski resort operates under a special use permit (SUP) issued by the USDA Forest Service (Forest Service) and administered by the DNF. The *Land and Resource Management Plan, Deschutes National Forest*, as amended (Forest LRMP), provides primary guidance for permit administration.

Under the terms of the Ski Area Permit Act of 1986, development and operation of ski areas on National Forest System lands is guided by MDPs, which describe existing conditions, identify physical, environmental, and socio-economic opportunities and constraints, establish the permittee's conceptual vision for the ski area, and outline near-to-long-term plans for achieving that vision. As a condition of SUP issuance, the Forest Service must review and accept, modify, or deny a ski area's MDP. MDPs 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.

One component of an MDP is planned development of the ski area's physical infrastructure, some or all of which may lie on National Forest System land and thus require agency approval. When development plans move from the conceptual to the concrete realm, the permittee submits a proposal to the Forest Service describing specific projects that are proposed for implementation, and the agency makes a determination whether to accept the proposal and initiate their decision-making process. If the proposal has the potential to significantly impact the human environment, the agency must analyze and disclose those environmental impacts, in accordance with the National Environmental Policy Act of 1969 (NEPA).

As Mt. Bachelor operates entirely on National Forest System land, all the proposed infrastructural improvements require Forest Service approval prior to implementation. As these projects have the potential to impact the human environment, they constitute the Proposed Action reviewed in this EIS. Based on this EIS and associated documentation, the Responsible Official will determine whether, and under what conditions, the Forest Service will authorize these projects.

A 45-day comment period following publication in the Federal Register of a Notice of Availability of the Draft EIS provided those interested in or affected by this action an opportunity to make their concerns known. Those who participated and provided timely comments are eligible to appeal the Responsible Official's decision pursuant to regulations at 36 CFR 215.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose and need for action reflects the difference between existing conditions at Mt. Bachelor and desired conditions. The overarching purpose for this Proposed Action is to implement direction in the Forest LRMP; specifically the Proposed Action would assist in "Providing a wide variety of recreational

opportunities within a forest environment where the localized settings may be modified to accommodate large number of visitors" (Forest LRMP, p. IV-135). In addition, the standards and guidelines (S&G) for Management Area 11, Intensive Recreation, include the following, more specific guidance reflected in the Proposed Action (Forest LRMP, p. IV-135):

- S&G 11-1. The recreation setting and opportunities provided include the Recreation Opportunity Spectrum (ROS) Categories or Rural and Roaded Natural.
- S&G 11-9. Mt. Bachelor will continue to expand to its approved capacity of approximately 26,000 people each day. In reaching this capacity, the following principals will be maintained … A balance between lift, lodge, run, and parking capacity … The mountain will be a center for both alpine and Nordic skiing … Skier densities will be no more than 4 to 8 skiers/acre in order to maintain the uncrowded feeling for which the area is known.
- S&G 11-10. The experience provided at Mt. Bachelor will be compatible with a ROS category of Rural or Roaded Natural. Secifically this will include a diversity of winter recreation activities that emphasize the Forest setting and provide an introduction to the more rustic natural resource-baed recreation opportunities.
- S&G 11-11. Year-round recreation activities will be encouraged. Summer facilities that are compatible with or enhance natural resource based facilities will be permitted.
- S&G 11-12. Mt. Bachelor will continue to grow as an international destination for both alpine and Nordic skiing. Emphasis will be placed on building up the summer program to make Mt. Bachelor a year-round resort.

In order to achieve these purposes, the Proposed Action addresses the following needs.

1. To improve the skiing experience during windy conditions.
2. To balance the capacities and utilization of resort facilities.
3. To segregate user groups and ability levels.
4. To update outdated resort facilities and infrastructure.
5. To maintain adequate snow coverage in specific high-traffic areas.
6. To provide additional summer recreational opportunities.

PROPOSED ACTION

Mt. Bachelor's current MDP, *Mt. Bachelor Master Development Plan 2010* reflects these purposes and needs. It was accepted by the DNF in January 2011. The infrastructural improvements included in the MDP have the potential to impact National Forest System resources, and DNF authorization is required for their implementation. These improvements comprise the Proposed Action addressed in this EIS. They can be summarized as follows:

<u>Eastside Pod</u>:

- Developing the new Eastside Express lift and associated trails (hereafter referred to as the Eastside pod).
- Constructing a new, lower-elevation catchline delivering skiers to the Eastside Express lower terminal.

- Using selective tree removal and glading to enhance tree skiing opportunities between Eastside pod ski trails and between the existing and proposed catchlines.

Sunrise Area:

- Replacing the Rainbow lift in a shortened alignment.
- Removing Snowmobile Trail No. 40 from the National Forest Trail System and prohibiting the use of snowmobiles by the public within the Mt. Bachelor ski area boundary except as authorized under special use permit.
- Replacing the Sunrise Express lift.
- Developing the Sunrise Learning Center and Kids Adventure Zone.
- Improving Sunrise base area skier services, including a new lodge, parking lot, and access road.
- Constructing a new culinary water reservoir to provide adequate storage for the new lodge and associated facilities.
- Doubling the capacity of the existing Sunrise base area wastewater treatment system, particularly the drain field.
- Installing a vaulted restroom facility near the base of Skyliner Express.

West Village Area:

- Shortening the Red Chair.
- Constructing the Alpine Training Center.
- Adding incrementally to the snowmaking system.
- Removing outdated West Village buildings and expanding the West Village Lodge.
- Moving the tubing hill across the parking lot to the "Old Maid" area.
- Developing a new employee/overflow parking lot.
- Constructing a biomass co-generation facility to provide electrical power and steam heat.

Nordic Center:

- Making minor improvements to the Nordic Center trail network.
- Refurbishing Bob's Bungalow.

Summer Activities:

- Developing new hiking trails.
- Creating a lift-served, downhill mountain bike park.
- Setting up a canopy tour zipline course.
- Installing a rock climbing structure.

Implementation is scheduled to begin in the summer of 2013 and be completed within 10 years. Mt. Bachelor's MDP breaks this planning horizon into two phases, the short-term (1 – 4 years) and the medium term (4 – 10 years). The main short-term priority projects are development of the Eastside pod

and associated infrastructure, relocating the tubing hill, and starting development of projects associated with summer activities, including the mountain bike park. Medium-term priorities are base-area improvements at both Sunrise and West Village, snowmaking improvements, and development of the Alpine Training Center and associated facilities. The biomass plant project may be scheduled in either the short- or medium-term depending on the outcome of ongoing feasibility analyses and financing discussions. The actual phasing of specific projects is subject to change on the basis of funding availability, changes in skier market preferences, and other unforeseeable variables.

All the proposed infrastructural improvements would be within Mt. Bachelor's current SUP boundary. No expansion beyond that boundary is proposed.

ALTERNATIVES

NEPA requires analysis of the alternative of no action to provide a point of comparison for assessing the effects of a proposed action and action alternatives. Under this No-Action Alternative, no further infrastructural development would take place at Mt. Bachelor. Winter and summer recreational facilities and opportunities would remain as they are today. Exceptions would be expanding the ground-level deck at Sunrise Lodge, remodeling of the West Village guest services building, and replacing the adjacent sprung steel administration structure with a new two-story building. These projects were approved in September 2011. The existing ground-level deck at Sunrise Lodge was expanded by 1,600 square feet in October 2011, so that project is considered part of the affected environment and its effects are not addressed in this EA. The two remaining projects are slated for completion in the next 2 – 3 years.

Reflecting concern over fragmentation of undeveloped areas resulting in possible impact on Potential Wilderness Area (PWA), the alternative of a higher elevation catchline was considered but not carried into in-depth analysis because of factors associated with slope and topography. This EIS addresses Alternative A, which would eliminate the proposed lower catchline on the east side of Mt. Bachelor entirely to provide a basis for comparing the impacts of the Proposed Action on PWA. Selective tree removal to improve tree skiing between the catchlines would also not occur.

AGENCY'S PREFERRED ALTERNATIVE

The agency's preferred alternative is the Proposed Action. The Proposed Action would fulfill the DNF statutory mission and responsibilities, and is consistent with economic, environmental, technical, and other factors. The Proposed Action also meets the purposes and needs identified above.

SCOPING AND IDENTIFICATION OF ISSUES

In March 2011, the DNF issued public and government-to-government scoping notices summarizing the Proposed Action and inviting comments regarding the scope of the associated NEPA and National Historic Preservation Act (NHPA) review.

Collectively, public and government-to-government scoping and internal, interdisciplinary review identified the following issues to be addressed in this EIS. They begin with the physical environment, move to the biological environment, and conclude with the human environment.

Air Quality: Air quality may be affected by stack emissions from the proposed biomass cogeneration facility, tailpipe emissions from the additional vehicles accommodated through parking lot expansions, smoke from slash burning, new natural-gas fire pits, a new snow cat for trail grooming, additional grilling at the restaurants, and fugitive dust from construction activities.

Geology and Soils:

- Proposed construction may cause detrimental soil conditions that reduce long-term soil productivity.
- Volcanic features, such as lava tubes and caves, may be damaged by grading and excavation.

Water and Watershed Resources: The project area includes no live water, just a few ephemeral runoff channels that have no defined beds or banks and support no riparian vegetation, which limits the scope of this portion of the analysis.

- Proposed construction and snowmaking projects may disturb the surface-water flow regime, drainage channel characteristics, and groundwater recharge through physical, surface disturbance.
- Runoff from expanded parking lots and the proposed drain field expansion could lead to contamination of groundwater.

Vegetation:

- Proposed projects may result in disturbance, loss, and conversion of existing vegetation through clearing and grading.
- The proposed projects may impact special-status plants through direct, physical disturbance or alteration of habitat. Whitebark pine is addressed as it has recently been classified as a candidate for federal listing.
- The proposed projects may impact wetlands, if any are identified, through clearing and grading or through alteration of surface or subsurface hydrology.
- The proposed projects may increase the types and extent of noxious weed populations in the SUP area through clearing, grading, importing fill material, and accidental seed introduction.

Wildlife:

- The proposed projects may impact the abundance, distribution, structure, and function of habitat for wildlife species. The impacts of construction noise and human activity may also affect wildlife use of project-area habitats.
- Habitat effects may impact special-status wildlife species, including federally listed, Forest Service Sensitive, Management Indicator (MIS), Survey and Manage, and migratory bird species.

Fisheries: No potential direct, indirect, or cumulative fisheries impacts were identified due to the absence of live water in the project area and the lack of hydrological connectivity to fish-bearing water bodies outside the project area.

Riparian Reserves: No potential direct, indirect, or cumulative impacts on Riparian Reserves were identified because only ephemeral run-off channels, with no defined bed and banks and no riparian vegetation, occur in the project area.

Fire and Fuels: Issues associated with disposition of slash generated by proposed construction and creation of defensible space around proposed buildings are addressed through design criteria addressing fuel management in Chapter 2. No other fire or fuels issues were identified through internal, interdisciplinary review or public scoping.

Undeveloped Land:

- Development of the Eastside pod and lower catchline may directly affect the extent of Potential Wilderness Area (PWA), as it may occur in an unroaded and unlogged area contiguous with an Inventoried Roadless Area (IRA).

- Noise associated with construction and subsequent operation of proposed facilities may indirectly affect the experience of recreationists in adjacent Wilderness, IRAs, and other unroaded and undeveloped lands that would not be directly affected by changes in development or use. Noise impacts on inventoried PWA are addressed under the first issue.

Safety:

- The access provided by the Eastside Express lift may result in off-piste (off of developed trails) skiers going too far down the slope and becoming stranded, unable to ski back to the lift.

- Development of hiking and biking trails may create the potential for collisions between hikers and bikers.

Heritage Resources:

- Construction of the proposed projects may damage prehistoric or historic cultural resources.
- Construction, maintenance, operation, and use of the proposed projects may adversely affect Native American traditional cultural places (TCPs).

Recreation: As anticipated effects of the Proposed Action on alpine skiing, mountain biking, hiking within the SUP area, and snow play within the SUP area are well documented in the accepted MDP, this analysis focuses on potential effects on other forms of recreation.

- Relocation of the tubing hill and snow play area to the proposed site may adversely affect the experience of skiers using the Nordic Center.

- Removal of Snowmobile Trail No. 40 from the National Forest Trail System use may adversely affect the recreational opportunities available to snowmobilers on the DNF.

Scenic Resources:

- The proposed on-mountain projects, particularly the Eastside pod and the mountain bike park, may adversely impact scenic resources in the middleground and background as viewed from sensitive viewpoints along Hwys. 45 and 46 (The Cascade Lakes National Scenic Byway).
- The proposed base area improvements and biomass cogeneration facility may adversely affect scenic resources in the foreground as viewed from sensitive viewpoints at Sunrise Village and West Village.

Transportation:

- Proposed improvements may generate traffic increases and parking demand that are beyond the capacity of Hwy. 46 and available parking at the ski area.

Socioeconomics: No socioeconomic issues were identified through internal, interdisciplinary review or public scoping. This results primarily from two aspects of the project: (1) the phasing of proposed developments over the next 10 years, which would limit construction-related jobs and spending; and (2)

the fact that the skier-visitation numbers targeted by the MDP are those already experienced in the mid-2000s, so no major change in effects associated with ski area visitation or employment are anticipated.

Utilities: The issue of the capacity of the proposed site to accommodate the drain field expansion is addressed under Water and Watershed Resources. No other direct, indirect, or cumulative utilities issues were identified through internal, interdisciplinary review or public scoping.

Noise: The issue of noise impacts on Nordic skiers associated with the proposed relocation of the tubing hill area addressed under Recreation. No other direct, indirect, or cumulative noise issues were identified through internal, interdisciplinary review or public scoping.

SUMMARY AND COMPARISON OF ENVIRONMENTAL EFFECTS

The following table summarizes the detailed analysis of the issues outlined above that is documented in the EIS.

Table S-1. Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Air Quality	No notable increase in pollutant emissions associated with the ski area associated with two projects under No-Action Alternative (new administration building and remodeling of guest services building).	Construction emissions transitory, with minimal direct or long-term impacts with standard mitigation in place. Biomass plant's highest modeled NO_2 concentration well below the standard. CO_2 emissions offset by replacement of current propane burners. Tailpipe emissions not projected to exceed levels recorded in 2005/06. Overall, exceedance of the NAAQS or violation of PSD maximum allowable increases unlikely.	Same as Proposed Action.
Geology and Soils:			
- Soil Productivity	No change in percentage of project area in detrimental soil quality condition, as both buildings in West Village parking lot.	Additional 34 acres in permanent detrimental soil condition; potential for 275 more acres depending on success of site rehabilitation efforts.	Similar to Proposed Action, but acreage of potential detrimental soil condition reduced to 264.
- Volcanic features	No damage to lava tubes and caves.	Minor, mitigable potential for damage to lava tubes and caves.	Same potential for damage to lava tubes and caves as Proposed Action.
Water and Watershed Resources:			
- Hydrology	No change from current conditions, as both buildings in West Village parking lot.	Impact limited and localized by lack of live water in project area or surface hydrologic connectivity outside of area. Total disturbance acreage 717 in Dutchman Creek watershed, 39 in Soda Creek watershed. New snowmaking using 2 – 3 million gallons/year in Soda Creek watershed. Standard mitigation stipulations projected to preclude notable effects on hydrology.	Similar to Proposed Action, but disturbance reduced to 315 acres in Dutchman Creek watershed.
- Groundwater Quality	No change from current conditions, as both buildings in West Village parking lot.	Ten acres of new parking lots at Sunrise and West Village bases. Drain field expansion on 1.4 acres; reserve expansion area 1.7 acres. Standard mitigation stipulations projected to preclude notable effects on groundwater quality.	Same as Proposed Action.

Table S-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Vegetation:			
- Vegetation Disturbance	Only the developed cover type would be disturbed by construction of the West Village administration building. No physical disturbance, loss, or conversion of existing vegetation.	Disturbance of 746 acres of vegetated cover types, some leading to permanent type change (e.g., to ski run vegetation), remainder returning to pre-project condition following site rehabilitation. Disturbance would include 64 acres of old growth forest, or 6% of total in SUP area.	Similar to Proposed Action, but disturbance of vegetated cover types reduced to 204 acres. Old growth impact reduced by 1 acre.
- Special Status Plant Species	No impact on special status plants, including federally listed, Forest Service Sensitive, and Survey and Manage species.	Whitebark pine, a candidate for federal listing: About 6 acres of occupied habitat subject to clearing and grading. Proposed Action would impact individuals but not contribute toward a trend toward federal listing. *Ramaria rubrievanescens,* a Category B Survey and Manage fungus species: An individual identified in proposed Eastside lift lower terminal access road; site would be managed through design criteria and mitigation measures to protect this fungus.	Same as Proposed Action; same amount of clearing and grading in potential whitebark pine habitat, and same protection provided for the Survey and Manage fungus species.
- Wetlands	No wetlands present or affected.	Same as No-Action Alternative.	Same as No-Action Alternative.
- Noxious Weeds	Construction in developed cover type would not affect introduction or spread of noxious weeds.	Disturbance of 746 acres of vegetated cover types could introduce or spread noxious weeds. Mitigation anticipated to effectively avoid notable impact.	Same as Proposed Action.
Wildlife:			
- Habitat Disturbance	No disturbance of habitats other than developed cover type.	No effect on northern spotted owl nesting/ roosting/foraging habitat or designated critical habitat units. Convert or degrade 143.2 acres of northern spotted owl dispersal habitat. No effect on elk/mule deer calving/fawning habitat.	Similar to Proposed Action, but noise and activity of summer construction and winter skiing reduced on 403 acres between existing and proposed catchlines.

Table S-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
		147 acres or clearing, grading, or excavation in forest stands containing dead wood habitat. Reduced connectivity due to conversion of mountain hemlock stands (212 acres) and mixed conifer stands (44 acres) to non-forest cover types. Increased noise and human activity during construction and operation phases, both summer and winter.	
- Special Status Wildlife Species	No direct or indirect effect on any special status wildlife species.	May affect, not likely to adversely affect northern spotted owl. May impact wolverine, Pacific fisher, or Townsend's big-eared bat individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability to the population or species; no impact on Oregon spotted frog or American peregrine falcon. Would not affect any Survey and Manage wildlife species. Would have a small negative effect (<0.01 – 0.05 percent of Forest-wide potential reproductive habitat) on eight Management Indicator Species (MIS); no effect on four MIS. Would have small negative impact on Clark's nutcracker and blue grouse; no impact on other Landbird Focal Species, Birds of Conservation Concern, or High Priority Shorebirds.	Similar to Proposed Action, but noise and activity of summer construction and winter skiing reduced on 403 acres between existing and proposed catchlines.
Fisheries	No effect due to the absence of live water in the project area and the lack of hydrological connectivity to fish-bearing water bodies.	Same as No-Action Alternative.	Same as No-Action Alternative.
Riparian Reserves	No effect due to absence of Riparian Reserves in project area.	Same as No-Action Alternative.	Same as No-Action Alternative.
Fire and Fuels	No change from current conditions.	No effect; addressed through design criteria.	Same as Proposed Action.

Table S-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Undeveloped Land:			
- PWA Area	No effect: 7 polygons of PWA totaling 13,310 ac.; three polygons of other undeveloped land totaling 58 ac.; most unroaded resources and features largely intact.	PWA polygons increased to nine but with a loss of 447 acres due to development of Eastside pod and new catchline, and equating to approximately 3.3 percent of the PWA in the analysis area and 0.3 percent of the area incorporating adjacent PWA, IRA, and wilderness. Four polygons of other unroaded land totaling 96 acres. Increased winter recreational use of PWA polygons between existing and proposed catchlines.	PWA polygons remain at seven but with a loss of 280 acres due to development of Eastside pod, and equating to approximately 2.1 percent of PWA within the analysis area and 0.2 percent of the area incorporating adjacent PWA, IRA, and wilderness. Other unroaded land same as Proposed Action. Unroaded resources and features otherwise the same as No-Action Alternative.
- IRA and Wilderness	No change from current conditions. Current sounds of year-round operations and maintenance would continue to be perceptible from the southern-most limits of the Three Sisters Wilderness and Bend Watershed and West-South Bachelor IRAs.	Addition of formal summer operation in the West Village would increase the level of activity and noise that may be perceptible from the Wilderness and adjacent IRA. Construction and operation of Eastside pod would not be perceptible from the Wilderness or other unroaded and undeveloped areas due to topography and distance (at least 3 miles) but would be audible in adjacent portions of IRAs. Hwy. 46 would continue to provide the most consistent source of noise. Any summer traffic increase associated would culminate at the West Village entrance, approximately 1.5 miles from the Wilderness but closer to the adjacent IRA.	Similar to Proposed Action, except West-South Bachelor IRA not affected by construction or maintenance of lower catchline.
Safety:			
- Skier Stranding	No effect; skiers using Eastside area would create traverse to Sunrise area, walk out on Rescue Road, or be stranded.	Would provide easy egress for skiers descending below existing catchline on eastern slope of Mt. Bachelor.	Elimination of lower catchline would increase risk of skier stranding.
- Hiker/Biker Collisions	No effect; mountain bike use would remain minimal and not be allowed on hiking trail.	Would avoid collisions by designating separate uses of trails and patrolling to enforce designations.	Same as Proposed Action.

Table S-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Heritage Resources:			
- Prehistoric and Historic Resources	No effect; no eligible prehistoric or historic resources located in area of potential disturbance.	Same as No-Action Alternative.	Same as No-Action Alternative.
- Native American Traditional Cultural Places	No effect; no TCPs located in area of potential disturbance.	Same as No-Action Alternative.	Same as No-Action Alternative.
Recreation:			
- Tubing hill relocation	No effect; tubing hill and snowplay area would not be relocated, so no change in effect on Nordic Center users.	Relocation of the tubing and snowplay area would add to the noise level in the vicinity of the Nordic Lodge and on the re-aligned portion of Blue Jay's way; added noise would be similar to that currently experienced on Blue Jay's Way but louder due to proximity. No music or increased use of Nordic Lodge anticipated.	Same as Proposed Action.
- Removal of Snowmobile Trail No. 40 from the National Forest Trail System	No change from existing conditions; trail would be open to public snowmobile use, and existing use conflicts and safety issues would continue.	Trail would be removed from the trail system, avoiding worsening safety issues as overall use increases. Snowmobilers would lose access to 2.8 miles of dead-end trail and to the amenities at Sunrise Lodge.	Same as Proposed Action.
Scenic Resources:			
- On-mountain Improvements	No change from existing conditions; views would continue to meet Visual Quality Objective (VQO) of Partial Retention and Scenic Integrity Level (SIL) of Moderate.	Eastside pod and new catchline would be visible from some nearby viewpoints on Hwy. 46, but views would conform to assigned VQO and SIL.	Same as Proposed Action, except no new catchline would be visible from the viewpoint at the junction of Hwys. 45 and 46.

Table S-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
- Base Area Improvements	New Cascadian façade on the guest services building and the new administrative building, would better adhere to the Built Environment Image Guide (BEIG) but would also highlight the divergence of the remaining buildings from the BEIG.	Building removals, remodels of existing buildings, and construction of new buildings would make Sunrise and West villages more consistent with BEIG. Scrubbers and other required technologies would preclude noticeable emissions from biomass plant as viewed from base areas.	Same as Proposed Action.
Transportation	Ski area-related traffic within capacity of Hwy. 46. Drive time from Bend less than an hour. Parking adequate on all but peak days.	Same as No-Action Alternative, except parking increased by 1,228 cars, meeting targeted visitation of about 12,000 per day.	Same as Proposed Action.

DECISIONS TO BE MADE

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

- Whether to authorize the Proposed Action or an alternative, including the required No-Action Alternative, all or in part;
- What design criteria and mitigation measures to require as a condition of the authorization; and
- What evaluation methods and documentation to require for monitoring project implementation and mitigation effectiveness.

The Responsible Official will document his decision and rationale in a Record of Decision (ROD). The Responsible Official is John Allen, the DNF Forest Supervisor.

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LIST OF ACRONYMS

ABAAS	Architectural Barriers Act Accessibility Standard
ACDP	Air Contaminant Discharge Permit
ACS	Aquatic Conservation Strategy
ADA	Americans with Disabilities Act of 1990
AIRFA	American Indian Religious Freedom Act
APE	Area of potential effect
AQRV	Air Quality Related Values
ATV	All-terrain vehicles
BA	Biological Assessment
BART	Best Available Retrofit Technology
BCC	Birds of Conservation Concern
BCR	Bird Conservation Regions
BEIG	Built Environmental Image Guide
BMP	Best Management Practices
CAA	Clean Air Act
CE	Categorical Exclusion
CET	Cascades East Transit
CHU	Critical habitat unit
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_{2e}	Carbon Dioxide equivalent
COE	US Army Corp of Engineers
CWA	Clean Water Act
dBA	Decibels, A-weighted
dbh	Diameter at breast height
DCH	Designated Critical Habitat
DEM	Digital Elevation Model
DNF	Deschutes National Forest
DPM	Deep Percolation Model
DPS	Distinct population segment
Draft EIS	Draft Environmental Impact Statement
Dv	Deciview
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Final EIS	Final Environmental Impact Statement
Forest LRMP	Forest Land and Resource and Management Plan
Forest Service	USDA Forest Service
fpm	Feet per minute
FWS	US Fish and Wildlife Service
GHG	Greenhouse gas
GLO	General Land Office
gpm	Gallons per minute
ID Team	Interdisciplinary Team
IRA	Inventoried Roadless Area
MA	Management Area
MBTA	Migratory Bird Treaty Act of 1918
MDP	Master Development Plan

MIS	Management Indicator Species
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NRF	Nesting, roosting, and foraging
NRHP	National Register of Historic Places
NRIS	Natural Resource Inventory System
NSO	Northern Spotted Owl
NWFP	Northwest Forest Plan
O_3	Ozone
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OHS	Oregon Historical Society
Pb	Lead
PM	Particulate matter
PM_{10}	Fine particulates with a nominal aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$	Fine particulates with a nominal aerodynamic diameter of 2.5 micrometers or less
pph	Persons per hour
PRISM	Parameter-elevation Regressions on Independent Slopes Model
Programmatic BA	Aquatic and Terrestrial Programmatic Biological Assessment
PSD	Prevention of Significant Deterioration
PWA	Potential Wilderness Area
RACR	Roadless Area Conservation Rule
ROD	Record of Decision
S&Gs	Standards and Guidelines
SHPO	State Historic Preservation Office
SIL	Scenic Integrity Level
SMS	Scenic Management System
SO_2	Sulfur dioxide
SUP	Special Use Permit
TCHR	Traditional Cultural Heritage Resources
TCP	Traditional cultural places
TES	Threatened, Endangered, and Sensitive Species
TSP	Total suspended particulate
TTF	Technical Terrain Features
UFAS	Uniform Federal Accessibility Standards
USDA	United States Department of Agriculture
USGS	US Geological Survey
VMS	Visual Management System
VQO	Visual Quality Objective
WPCF	Water Pollution Control Facility
WRAP	Western Regional Air Partnership

CHAPTER 1: PURPOSE AND NEED

1.1 INTRODUCTION

The Bend-Ft. Rock Ranger District, Deschutes National Forest (DNF) has received a proposal from Mt. Bachelor, Inc., operators of Mt. Bachelor ski resort, requesting authorization to implement improvements included in their recently revised master development plan (MDP). The MDP documents analysis of current conditions at the resort and, based on that analysis, outlines anticipated development and management of the resort over the next 10 years. These improvements are intended to enhance the winter and summer recreational opportunities available at the resort and on the DNF. They reflect a substantial public outreach effort completed by Mt. Bachelor, Inc., prior to submittal of the MDP proposal to the DNF (see Chapter 5).

Mt. Bachelor is located near Bend, Oregon (Figure 1-1), in Deschutes County, T18S, R9E, Sections 17 – 33. The ski resort operates under a special use permit (SUP) issued by the USDA Forest Service (Forest Service) and administered by the DNF. The *Land and Resource Management Plan, Deschutes National Forest*, as amended (Forest LRMP; Forest Service 1990), provides primary guidance for permit administration. This EIS is tiered to the Forest LRMP, and the associated NEPA analysis is incorporated by reference.

Under the terms of the Ski Area Permit Act of 1986, development and operation of ski areas on National Forest System lands is guided by MDPs, which describe existing conditions, identify physical, environmental, and socio-economic opportunities and constraints, establish the permittee's conceptual vision for the ski area, and outline near-to-long-term plans for achieving that vision. As a condition of SUP issuance, the Forest Service must review and accept, modify, or deny a ski area's MDP. MDPs 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.

One component of an MDP is planned development of the ski area's physical infrastructure, some or all of which may lie on National Forest System land and thus require agency approval. When development plans move from the conceptual to the concrete realm, the permittee submits a proposal to the Forest Service describing specific projects that are proposed for implementation, and the agency makes a determination whether to accept the proposal and initiate their decision-making process. If the proposal has the potential to significantly impact the human environment, the agency must analyze and disclose those environmental impacts, in accordance with the National Environmental Policy Act of 1969 (NEPA).

As Mt. Bachelor operates entirely on National Forest System land, all the proposed infrastructural improvements require Forest Service approval prior to implementation. As these projects have the potential to impact the human environment, they constitute the Proposed Action reviewed in this environmental impact statement (EIS). Based on this EIS and associated documentation, the Responsible Official will determine whether, and under what conditions, the Forest Service will authorize these projects.

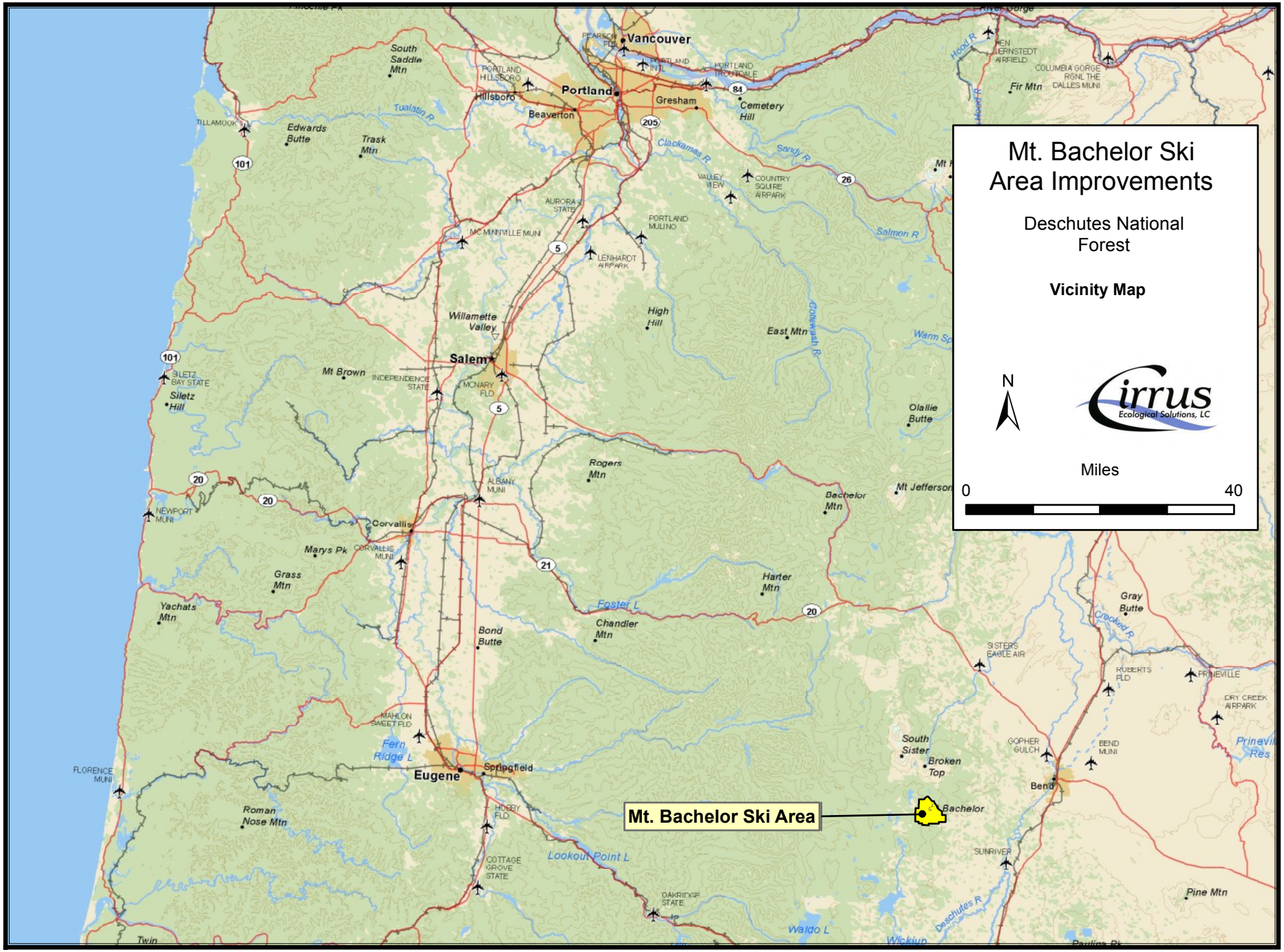

Figure 1-1. Vicinity Map.

1.2 ORGANIZATION OF DOCUMENT

The DNF has prepared this EIS in compliance with NEPA and Forest Service regulations regarding its implementation. The document is organized as follows:

Chapter 1 – Purpose and Need. This chapter introduces the Proposed Action and the EIS process. Specifically, it:

- Summarizes the Proposed Action.
- Outlines the purpose of and need for action.
- Identifies the decisions to be made on the basis of this EIS.
- Discusses the relationship of the Proposed Action to the Forest LRMP.
- Describes how the DNF identified the environmental issues to be addressed in this EIS.
- Discusses the Project Record.
- Lists other required permits and authorizations.

Chapter 2 – Proposed Action and Alternatives. This chapter details the Proposed Action, including associated design criteria and mitigation measures, then outlines the alternative formulation process, lists alternatives considered but not analyzed in depth, describes the alternatives considered in depth, then summarizes the environmental impacts of the Proposed Action and alternatives.

Chapter 3 – Affected Environment and Environmental Consequences. This chapter documents the environmental impact analysis. It is organized by resource area, and each resource section begins with the issues addressed, as identified through public scoping and internal, interdisciplinary review. The affected environment is described next to provide context for the discussion of environmental consequences that follows. The direct, indirect, and cumulative effects of the No-Action Alternative, Proposed Action, and the Action Alternative are outlined in that order. The section concludes with discussion of other required disclosures.

Chapter 4 – List of Preparers. This chapter identifies the DNF and contractor personnel involved in preparation of the EIS.

Chapter 5 – Consultation and Coordination. This chapter identifies the agencies and other entities consulted during the development of this EIS.

Appendices. The appendices provide more detailed information supporting the analyses presented in this EIS.

Additional documentation, including the specialist reports prepared to address the major resource areas of concern, is available in the Project Record available at the Bend-Ft. Rock Ranger District Office in Bend, OR. (See section 1.8 below.)

1.3 PROPOSED ACTION

Mt. Bachelor's current MDP, *Mt. Bachelor Master Development Plan 2010* (Ecosign 2010), was accepted by the DNF in January 2011 (Forest Service 2010a). The infrastructural improvements included in the MDP have the potential to impact National Forest System resources, and DNF authorization is required

for their implementation. These improvements, described in detail in section 2.2, comprise the Proposed Action addressed in this EIS. They can be summarized as follows:

Eastside Pod:

- Developing the new Eastside Express lift and associated trails (hereafter referred to as the Eastside pod).
- Constructing a new, lower-elevation catchline delivering skiers to the Eastside Express lower terminal.
- Using selective tree removal and glading to enhance tree skiing opportunities between Eastside pod ski trails and between the existing and proposed catchlines.

Sunrise Area:

- Replacing the Rainbow lift in a shortened alignment.
- Removing Snowmobile Trail No. 40 from the National Forest Trail System and prohibiting the use of snowmobiles by the public within the Mt. Bachelor ski area boundary except as authorized under special use permit.
- Replacing the Sunrise Express lift.
- Developing the Sunrise Learning Center and Kids Adventure Zone.
- Improving Sunrise base area skier services, including a new lodge, parking lot, and access road.
- Constructing a new culinary water reservoir to provide adequate storage for the new lodge and associated facilities.
- Doubling the capacity of the existing Sunrise base area wastewater treatment system, particularly the drain field.
- Installing a vaulted restroom facility near the base of Skyliner Express.

West Village Area:

- Shortening the Red Chair.
- Constructing the Alpine Training Center.
- Adding incrementally to the snowmaking system.
- Removing outdated West Village buildings and expanding the West Village Lodge.
- Moving the tubing hill across the parking lot to the “Old Maid” area.
- Developing a new employee/overflow parking lot.
- Constructing a biomass co-generation facility to provide electrical power and steam heat.

Nordic Center:

- Making minor improvements to the Nordic Center trail network.
- Refurbishing Bob’s Bungalow.

Summer Activities:

- Developing new hiking trails.
- Creating a lift-served, downhill mountain bike park.
- Setting up a canopy tour zipline course.
- Installing a rock climbing structure.

All the proposed infrastructural improvements would be within Mt. Bachelor's current SUP boundary. No expansion beyond that boundary is proposed.

1.4 PURPOSE AND NEED

The purpose and need for action reflects the difference between existing conditions at Mt. Bachelor and desired conditions. The overarching purpose for this Proposed Action is to implement direction in the Forest LRMP; specifically the Proposed Action would assist in "Providing a wide variety of recreational opportunities within a forest environment where the localized settings may be modified to accommodate large number of visitors" (Forest LRMP, p. IV-135). In addition, the standards and guidelines for Management Area 11, Intensive Recreation, include the following, more specific guidance reflected in the Proposed Action (Forest LRMP, p. IV-135):

- S&G 11-1. The recreation setting and opportunities provided include the Recreation Opportunity Spectrum (ROS) Categories of Rural and Roaded Natural.
- S&G 11-9. Mt. Bachelor will continue to expand to its approved capacity of approximately 26,000 people each day. In reaching this capacity, the following principals will be maintained … A balance between lift, lodge, run, and parking capacity … The mountain will be a center for both alpine and Nordic skiing … Skier densities will be no more than 4 to 8 skiers/acre in order to maintain the uncrowded feeling for which the area is known.
- S&G 11-10. The experience provided at Mt. Bachelor will be compatible with a ROS category of Rural or Roaded Natural. Specifically this will include a diversity of winter recreation activities that emphasize the Forest setting and provide an introduction to the more reustic natural resource-based recreation opportunities.
- S&G 11-11. Year-round recreation activities will be encouraged. Summer facilities that are compatible with or enhance natural resource based facilities will be permitted.
- S&G 11-12. Mt. Bachelor will continue to grow as an international destination for both alpine and Nordic skiing. Emphasis will be placed on building up the summer program to make Mt. Bachelor a year-round resort.

In order to achieve these purposes, the Proposed Action addresses the following needs.

1. To improve the skiing experience during windy conditions.

Wind causes routine closure of the high-elevation lift and frequent closure of the northwest-facing lifts at Mt. Bachelor. Windy conditions also result in occasional closure or reduced efficiency of the north-facing lifts. Outback Express and Northwest Express are closed due to weather an average of 15 days per season, Pine Marten Express 7 days, and Skyliner Express 3 days. These limitations on lift operation significantly reduce the available terrain at Mt. Bachelor on windy days, resulting in increased skier densities in the remaining pods. The MDP indicates a current, skiable acreage of 2,947 acres and a base-

area capacity (the limiting factor on peak visitation) of 10,050, for a maximum density of 3.4 skiers/acre. This is well within the limits set by S&G 11-9 above. However, the cited lift closures result in higher actual densities.

Additional lift-served terrain on the more wind-protected, east-facing slopes of Mt. Bachelor is needed to alleviate this constraint. Development of the proposed Eastside pod, the lower catchline, and the tree skiing opportunity between the two catchlines would address this need. As indicated in Table 3-2, the Proposed Action would add 646 acres of skiable terrain, and Alternative A 213 acres. With base-area capacity increased to 13,120 under either the Proposed Action of Alternative A, densities would be 3.6 skiers/acre and 4.2 skiers/acre, respectively, maintaining the desired, low density and complying with S&G 11-9.

2. To balance the capacities and utilization of resort facilities.

The existing Rainbow chairlift is underutilized by beginner and low-intermediate skiers due to its lengthy ride time, the increasing steepness of the terrain as it climbs higher on the mountain, and the exposure of its upper portion to wind. It is also one of the oldest lifts on the mountain. In contrast, the Sunrise Express chairlift, which is intended to serve a similar type of skier, is over-utilized on busy days, resulting in excessive lift lines and less even distribution of skiers. A better balance in the utilization of these two chairlifts is needed to efficiently access the terrain they serve. Shortening the Rainbow lift alignment, installing the current Sunrise Express detachable quad lift in that shortened alignment, and replacing Sunrise Express with a higher-capacity detachable six-pack chairlift address this need.

The new MDP's analysis (Ecosign 2010) indicates that food service seating capacity is lower than the other key capacities assessed at the resort (e.g., lift, trail, and parking capacity). Consistent with that finding, the Sunrise Lodge is frequently overcrowded, even on off-peak days, due to its location near the first entrance to the resort, its more wind-sheltered eastern location, and the popularity of the Sunrise Express lift and terrain, especially among beginner and low intermediate skiers. A better balance between the lodge's capacity and demand for the services it provides is needed to improve the overall recreational experience available from the Sunrise base area. Proposed improvements to the Sunrise base area skier services address this need.

The Sunrise parking lot provides space for 760 cars (1,901 guests). This parking area often fills before the other parking lots because it is the first entrance to the resort and it is located on the more wind-protected east side of the mountain. Additional parking is needed at the Sunrise base area to maintain a balance with the lodge, lift, and trail capacity and to accommodate parking demand. The proposed parking lot expansion and access improvements address this need.

The West Village parking lot has space for 2,892 cars, 5 buses, and 10 RVs (7,344 guests). This lot provides parking for skiers, tubers, Nordic skiers, skier-services customers, sight-seers, and employees, and it fills to capacity on busy days. Additional capacity is needed to balance with peak demand for parking space. The proposed employee and overflow parking lot at West Village address this need.

The Junior Race Center base offers a third staging area for Mt. Bachelor. A total of 322 cars carrying 805 guests can park along the road here. Some guests in this area set up chairs and a seating area to enjoy the sun and outdoors when the weather is nice. From the road, skiers can slide down to the bottom terminal of the Skyliner lift to stage up the mountain.

Bob's Bungalow, a warming hut on the Nordic trail network, is currently under-sized and in need of repair, resulting in crowded, less than comfortable conditions at times. Additional space and refurbishing are needed to meet current demand. Proposed improvements to the warming hut address this need.

3. To segregate user groups and ability levels.

While most facilities for beginning skiers are currently located at and around the Sunrise base area, they are not segregated from lifts and trails used by more advanced skiers. Mixing these uses results in some safety and circulation issues. The proposed Sunrise Learning Center and Kids Adventure Zone address the need to provide separate beginner infrastructure.

Alpine races and race training take place on the Cliffhanger/West Village Getback terrain, which is located on the busiest part of the mountain. Racers must mix with other skiers of varying ability levels, which detracts from both training effectiveness and the enjoyment of the recreational skiers. These activities need to be separated in the interest of both. This need is addressed by the proposed construction of an Alpine Training Center with dedicated training terrain accessed by a shortened Red Chair lift.

Lower ability-level skiers at the Nordic Center have to navigate a more difficult trail to access low-gradient terrain. A suitable trail for lower level skiers to access the trail network would increase accessibility and use of this unique Nordic skiing opportunity. The proposed new trail addresses this need.

The tubing area is currently located on potential skiing terrain along the lower section of the Red Chair. The terrain has a low, inconsistent slope gradient and a short run-out by industry standards for tubing hills. A site away from the congested skier base area, with a more suitable slope gradient and run-out, would provide an improved recreational experience for skiers and tubers alike. The proposed relocation of the tubing hill and support infrastructure to the other side of the West Village parking lot addresses this need.

4. To update outdated resort facilities and infrastructure.

The existing ski patrol and clinic building is undersized and outdated. Updated facilities are needed to serve these critical functions. Removal of this building and expansion of remaining structures to better support these functions, as proposed, addresses this need.

The existing generator building is unsightly and outdated, and it is inappropriately located within view of the West Village base and adjacent ski terrain. A more aesthetically appropriate building for these utilities in an area that is further separated from the ski terrain is needed to provide these services. Removal of this building and developing new utilities infrastructure at a less central location, as proposed, addresses this need.

Mt. Bachelor currently generates emergency power with diesel generators. Heat is provided using propane, which is stored at a tank farm near the maintenance building. Together, these facilities require substantial investment in and storage of fuel. A more cost-efficient, environmentally compatible power and heat generation facility would better meet these needs. The proposed biomass co-generation facility addresses this need, as well as providing the Forest Service an attractive option for disposal of wood waste from forest management projects, a renewable energy source.

5. To maintain adequate snow coverage in specific high-traffic areas.

Early-season snow coverage is often inadequate on trails connecting the top of the Red Chair with Thunderbird trail¸ along skier access routes from the Pine Marten Express and Skyliner Express chairlifts onto the Olympian trail, and on core beginner terrain in the Sunshine Accelerator pod. Improved snow coverage is needed to alleviate these deficiencies. The proposed expansion of the existing snowmaking system addresses this need.

6. To provide additional summer recreational opportunities.

Despite Mt. Bachelor's unique natural setting and in-place infrastructure, summer recreational opportunities are limited, particularly in regard to hiking and lift-served, downhill mountain biking. The resort currently has only one dedicated hiking trail, from Sunrise base area to the summit, and one linear, cross-country mountain bike trail, separate from the rest of the Forest trail network, starting at the Sunrise base area and ending at the Nordic area. Increased hiking and biking facilities are needed to meet demand, increase year-round utilization of resort resources and infrastructure, and to provide managed, downhill mountain biking opportunities on the Forest. The proposed hiking trails, mountain bike park, interpretive areas, zipline course, and rock climbing structure address this need.

1.5 DECISIONS TO BE MADE

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

- Whether to authorize the Proposed Action or an alternative, including the required No-Action Alternative, all or in part;
- What design criteria and mitigation measures to require as a condition of the authorization; and
- What evaluation methods and documentation to require for monitoring project implementation and mitigation effectiveness.

The Responsible Official will document his decision and rationale in a Record of Decision (ROD). The Responsible Official is John Allen, the DNF Forest Supervisor.

1.6 RELATIONSHIP TO THE FOREST PLANS

As noted above (section 1.1), Forest LRMP, as amended, provides primary guidance for permit administration. The Forest LRMP indicates that Mt. Bachelor's SUP boundary lies within a single management areas (MA), MA 11 – Intensive Recreation, which is subject to specific Forest LRMP standards and guidelines as well as some Forest-wide standards and guidelines.

The SUP area is considered Administratively Withdrawn from the Northwest Forest Plan (NWFP; *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl,* Forest Service and Bureau of Land Management 1994, as amended). The provisions of the NWFP that remain applicable to this project include the Survey and Manage and the Aquatic Conservation Strategy (ACS) standards and guidelines.

Figure 1-2 shows the land management allocations assigned to the Mt. Bachelor SUP area and its surroundings by the Forest LRMP and the NWFP. Each resource-specific section of Chapter 3 includes an assessment of Forest LRMP and NWFP consistency, listing and addressing the key standards and guidelines and discussing compliance with each. The ROD will address Forest LRMP and NWFP consistency and make the definitive determination.

1.7 SCOPING AND IDENTIFICATION OF ISSUES

In March 2011, the DNF issued public and government-to-government scoping notices summarizing the Proposed Action and inviting comments regarding the scope of the associated NEPA and National Historic Preservation Act (NHPA) review.

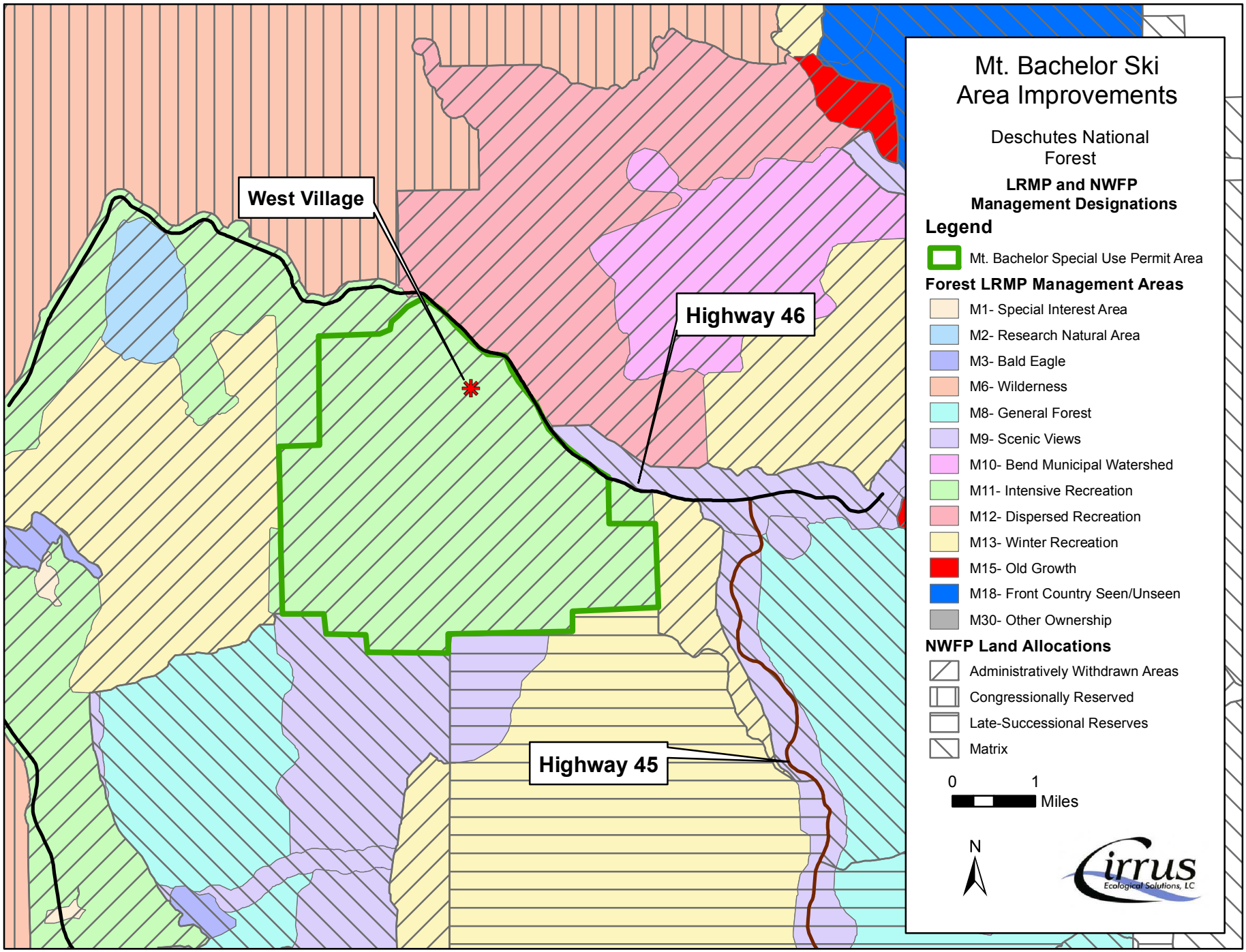

Figure 1-2. Land management allocations.

A public scoping notice was mailed to 180 agencies, organizations, and individuals on the DNF mailing list, and a separate notice providing more detail on NHPA review was mailed to 19 Tribal representatives. The notices were also posted on the DNF website at http://www.fs.fed.us/r6/centraloregon/projects/ and made available on CD or in hard-copy form to anyone requesting them.

The scoping period formally began on April 26, 2011, when the DNF's Notice of Intent to Prepare an EIS (NOI) appeared in the Federal Register, and closed on May 26, 2011. Comment letters were received from 2 agencies, 4 organizations, and 13 individuals. The scoping notice and comment letters are available in the Project Record.

A scoping report was prepared that assessed all comments received to determine which affected the scope of the analysis documented in this EIS. A copy of the report is included as Appendix A to this EIS. Concurrently, the DNF and contractor Interdisciplinary Team (ID Team) assembled to complete this EIS reviewed and discussed the Proposed Action to determine the scope of the analysis.

Collectively, public and government-to-government scoping and internal, interdisciplinary review identified the following issues to be addressed in this EIS. They begin with the physical environment, move to the biological environment, and conclude with the human environment.

The issues are variably addressed by analysis and disclosure of effects, development of project design criteria or mitigation measures, or alternative development. One issue, the potential effects of the proposed new catchline on PWA, was identified as a key, alternative-driving issue (section 2.5.2).

These issue statements introduce each resource-specific section in Chapter 3, where they are followed by the indicators used to assess them and the analysis area for direct, indirect, and cumulative effects.

Air Quality: Air quality may be affected by stack emissions from the proposed biomass cogeneration facility, tailpipe emissions from the additional vehicles accommodated through parking lot expansions, smoke from slash burning, new natural-gas fire pits, a new snow cat for trail grooming, additional grilling at the restaurants, and fugitive dust from construction activities.

Geology and Soils:

- Proposed construction may cause detrimental soil conditions that reduce long-term soil productivity.
- Volcanic features, such as lava tubes and caves, may be damaged by grading and excavation.

Water and Watershed Resources: The project area includes no live water, just a few ephemeral runoff channels that have no defined beds or banks and support no riparian vegetation, which limits the scope of this portion of the analysis.

- Proposed construction and snowmaking projects may disturb the surface-water flow regime, drainage channel characteristics, and groundwater recharge through physical, surface disturbance.
- Runoff from expanded parking lots and the proposed drain field expansion could lead to contamination of groundwater.

Vegetation:

- Proposed projects may result in disturbance, loss, and conversion of existing vegetation through clearing and grading.

- The proposed projects may impact special-status plants through direct, physical disturbance or alteration of habitat. Whitebark pine is addressed as it has recently been classified as a candidate for federal listing.
- The proposed projects may impact wetlands, if any are identified, through clearing and grading or through alteration of surface or subsurface hydrology.
- The proposed projects may increase the types and extent of noxious weed populations in the SUP area through clearing, grading, importing fill material, and accidental seed introduction.

Wildlife:

- The proposed projects may impact the abundance, distribution, structure, and function of habitat for wildlife species. The impacts of construction noise and human activity may also affect wildlife use of project-area habitats.
- Habitat effects may impact special-status wildlife species, including federally listed, Forest Service Sensitive, Management Indicator (MIS), Survey and Manage, and migratory bird species.

Fisheries: No potential direct, indirect, or cumulative fisheries impacts were identified due to the absence of live water in the project area and the lack of hydrological connectivity to fish-bearing water bodies outside the project area.

Riparian Reserves: No potential direct, indirect, or cumulative impacts on Riparian Reserves were identified because only ephemeral run-off channels, with no defined bed and banks and no riparian vegetation, occur in the project area.

Fire and Fuels: Issues associated with disposition of slash generated by proposed construction and creation of defensible space around proposed buildings are addressed through design criteria addressing fuel management in Chapter 2. No other fire or fuels issues were identified through internal, interdisciplinary review or public scoping.

Undeveloped Land:

- Development of the Eastside pod and lower catchline may directly affect the extent of Potential Wilderness Area (PWA), as it may occur in an unroaded and unlogged area contiguous with an Inventoried Roadless Area (IRA).
- Noise associated with construction and subsequent operation of proposed facilities may indirectly affect the experience of recreationists in adjacent Wilderness, IRAs, and other unroaded and undeveloped lands that would not be directly affected by changes in development or use. Noise impacts on inventoried PWA are addressed under the first issue.

Safety:

- The access provided by the Eastside Express lift may result in off-piste (off of developed trails) skiers going too far down the slope and becoming stranded, unable to ski back to the lift.
- Development of hiking and biking trails may create the potential for collisions between hikers and bikers.

Heritage Resources:

- Construction of the proposed projects may damage prehistoric or historic cultural resources.
- Construction, maintenance, operation, and use of the proposed projects may adversely affect Native American traditional cultural places (TCPs).

Recreation: As anticipated effects of the Proposed Action on alpine skiing, mountain biking, hiking within the SUP area, and snow play within the SUP area are well documented in the accepted MDP, this analysis focuses on potential effects on other forms of recreation.

- Relocation of the tubing hill and snow play area to the proposed site may adversely affect the experience of skiers using the Nordic Center.
- Removal of Snowmobile Trail No. 40 from the National Forest Trail System may adversely affect the recreational opportunities available to snowmobilers on the DNF.

Scenic Resources:

- The proposed on-mountain projects, particularly the Eastside pod and the mountain bike park, may adversely impact scenic resources in the middleground and background as viewed from sensitive viewpoints along Hwys. 45 and 46 (The Cascade Lakes National Scenic Byway).
- The proposed base area improvements and biomass cogeneration facility may adversely affect scenic resources in the foreground as viewed from sensitive viewpoints at Sunrise Village and West Village.

Transportation:

- Proposed improvements may generate traffic increases and parking demand that are beyond the capacity of Hwy. 46 and available parking at the ski area.

Socioeconomics: No socioeconomic issues were identified through internal, interdisciplinary review or public scoping. This results primarily from two aspects of the project: (1) the phasing of proposed developments over the next 10 years, which would limit construction-related jobs and spending; and (2) the fact that the skier-visitation numbers targeted by the MDP are those already experienced in the mid-2000s, so no major change in effects associated with ski area visitation or employment are anticipated.

Utilities: The issue of the capacity of the proposed site to accommodate the drain field expansion is addressed under Water and Watershed Resources. No other direct, indirect, or cumulative utilities issues were identified through internal, interdisciplinary review or public scoping.

Noise: The issue of noise impacts on Nordic skiers associated with the proposed relocation of the tubing hill area addressed under Recreation. No other direct, indirect, or cumulative noise issues were identified through internal, interdisciplinary review or public scoping. (Noise impacts on wildlife and on recreation in unroaded areas are addressed in the Wildlife and Undeveloped Lands sections.)

1.8 PROJECT RECORD

The project record contains the technical documentation used to support the analysis and conclusions in this EIS. The project record is available for review at the Bend-Ft. Rock Ranger District Office, 1230 NE 3rd, Suite A-262, Bend. OR, 97701.

1.9 REQUIRED PERMITS AND AUTHORIZATIONS

Table 1-1 lists the permits and authorizations, including DNF authorization, that may be required in order for Mt. Bachelor to implement the Proposed Action or an action alternative.

Table 1-1. Permits and approvals that may be required for implementation of the Proposed Action or an action alternative.

Agency	Type of Action	Description of Permit or Action
Federal		
Forest Service	Forest Service Decision (ROD). Approval of Construction Plans. Biological Assessment (BA) and ESA Section 7 Consultation.	The Forest Service decision regarding this proposal would authorize the Proposed Action, the No-Action Alternative, or another alternative. Prior to any construction on National Forest System lands, construction plans must be submitted to and approved by the DNF. In accordance with the Endangered Species Act, the Forest Service must complete a BA assessing the impact of the Proposed Action or selected alternative on federally listed Threatened and Endangered Species. If the BA determines that a listed species may be adversely affected, the Forest Service must complete the appropriate consultation process with the U.S. Fish and Wildlife Service (FWS) or other appropriate regulatory agency.
U.S. Army Corps of Engineers (COE)	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 if any such discharge is identified.
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, 452 U.S.C.A. Section 300F-300J-10 (PL 93-523).	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 Oregon for all four acts. The EPA may be involved in 404 permitting in association with the COE.

Table 1-1 (con't). Permits and approvals that may be required for implementation of the Proposed Action or an action alternative.

Agency	Type of Action	Description of Permit or Action
	Clean Water Act, Section 404 Permit.	
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 identified, the FWS will consult with the Forest Service 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 on federally listed species.
State of Oregon		
Department of Environmental Quality: Air Quality Division Water Quality Division	Review and comment. Air Contaminant Discharge Permit (ACDP). Issuance of Water Pollution Control Facility (WPCF) National Pollutant Discharge Elimination System (NPDES) permits.	The Air Quality Division's review ensures that state and federal air quality standards are not exceeded. ACDPs may are required for certain emissions sources such as the proposed biomass facility. The Water Quality Division's review ensures that state and federal water quality standards are not exceeded through issuance of various permits. A revised WPCF permit may be required for the proposed drain field expansion, and proposed parking lots and other facilities may require NPDES permits. With the Consolidated Appropriations Act (2012, § 429, Pub. L. No. 112-74, 125 Stat. 786 1046-1047), Congress has temporarily suspended the permitting requirement imposed by the Ninth Circuit Court of Appeals' decision in Northwest Environmental Defense Center (NEDC) v. Brown. In NEDC v. Brown, the court held that stormwater runoff associated with logging roads is not exempt from the National Pollution Discharge Elimination System (NPDES) permitting requirements of the Clean Water Act. At this time, it is uncertain whether any NPDES permitting requirements apply, or will apply in the future, to stormwater discharges from any logging roads associated with this project.
Department of Fish and Wildlife	Review and comment.	The Department of Fish and Wildlife is responsible for management and protection of state fish and wildlife resources and may comment accordingly.

Table 1-1 (con't). Permits and approvals that may be required for implementation of the Proposed Action or an action alternative.

Agency	Type of Action	Description of Permit or Action
Department of Water Resources	Review and comment.	The Division of Water Resources is responsible for determining adequacy of water supply and cumulative impacts on water supply and may comment accordingly.
Department of Transportation	State highway projects.	The Department must review and approve any state highway redesign or access improvement.
Parks and Recreation Department, Heritage Programs Division, State Historic Preservation Office	NHPA, Section 106 compliance process.	The SHPO is responsible for protection of cultural resources, entailing review and consultation on cultural resource reports.
Deschutes County		
Community Development Department, Building Division	Building permits.	The Building Division provides construction plan review, consultation, permitting to ensure compliance with state and federal building codes.

1.10 CHANGES BETWEEN DRAFT AND FINAL EIS

The Final EIS differs from the Draft EIS and incorporates comments received during the 45-day comment period, as well as any additional analysis that was needed as a result of updated survey results and changes to Forest policy. Those changes are summarized below in Table 1-2.

Table 1-2. Summary of changes between Draft and Final EIS.

Change	Location	Description
Purpose and Need	Section 1.4	S&Gs 11-1 and 11-10 were added to the list of standards and guidelines that are reflected by the Proposed Action.
Proposed Action Description	Section 2.2	The Proposed Action was revised to clarify that: • Snowmobile Trail No. 40 would be removed from the National Forest Trail System and the use of snowmobiles by the public within the Mt. Bachelor ski area boundary would be prohibited except as authorized under special use permit.

Table 1-2 (cont'd). Summary of changes between Draft and Final EIS.

Change	Location	Description
		• Potential fuel for the biomass plant would otherwise be left to decompose, be used for firewood, or be chipped to use in landscaping or other applications.
Site Rehabilitation Practices, Design Criteria, and Mitigation Measures	Section 2.2.6	Additions were made to this section to: • Outline Management of a site with a Category B Survey and Manage fungus species. • Protect mountain bike trails from damage associated with hard braking on steep turns. • Note that spot checks for northern spotted owls will be required in 2013 and 2014, in accordance with federal protocols.
Project Phasing	Section 2.2.7	Added description of the Proposed Action implementation schedule.
Identification of Agency's Preferred Alternative	Section 2.7	The Proposed Action was identified as the agency's preferred alternative.
Cumulative Actions	Section 3.3	The list of cumulative actions was updated to designate projects which have transitioned from reasonably foreseeable to ongoing projects since the DEIS was released.
Cumulative Effects Discussion	Sections 3.4 and 3.5	Added Alternative A – No New Catchline to the Cumulative Effects discussions.
Survey and Manage Species - Policy	Sections 3.4 and 3.7	The analysis was revised to reflect the change in Forest Policy to use the list of species in the 2011 Survey and Manage Settlement Agreement instead of the 2001 list of species.
Air Quality	Section 3.4.1.3.2	Discussion of the complexities considered in estimating greenhouse gas production was added.
Survey and Manage Species - Survey Results	Section 3.4.4.2.2	The affected environment discussion regarding Survey and Manage plant species was updated to include the 2012 survey results.
Survey and Manage Species - Direct, Indirect, and Cummulative Effects	Section 3.4.4.3	The discussion regarding direct, indirect, and cumulative effects on Survey and Manage plant species was updated following the discovery of a Category B fungus species.
Northern Spotted Owl Survey Results	Section 3.4.5.2.2	The affected environment discussion regarding northern spotted owls was updated to include the 2012 survey results.
Migratory Birds	Section 3.4.5.3.2	The direct and indirect effects of the Proposed Action on migratory birds was revised to make necessary disclosures.
Safety	Section 3.5.2.2.2	Existing roads that are used by bicyclists and thus may be subject to conflicts between pedestrians and bicyclists were identified.

Table 1-2 (cont'd). Summary of changes between Draft and Final EIS.

Change	Location	Description
Scenic Resources	Section 3.5.5.5	Add S&G 11-21 to the Forest Plan Compliance discussion.
Transportation	Section 3.5.6	Changes were made to this section to: • Revise the number of people per passenger vehicle, number of passengers on buses, the percentage of traffic coming from Sunriver, and volume capacity ratios for various road segments. • Incorporate drive-time monitoring data into the affected environment discussion. • Describe how the The Deschutes County Intelligent Transportation System (ITS) Plan may address transportation concerns on Hwy. 46 between Bend and Mt. Bachelor. • Revise the direct, indirect, and cumulative effects discussions for all alternatives based on changes in number of passengers per vehicle, drive time, ITS plan, etc.
Consultation and Coordination	Section 5.3	Section updated with information on notice and comment on the DEIS.

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CHAPTER 2: PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter details the Proposed Action, including associated design criteria and mitigation measures, then outlines the alternative formulation process, lists alternatives considered but not analyzed in depth, describes the alternatives considered in depth, then summarizes the environmental impacts of the Proposed Action and alternatives.

2.2 PROPOSED ACTION

The improvements comprised by the Proposed Action are described in detail below. Figure 2-1 illustrates on-mountain improvements. Figure 2-2 focuses on improvements in and around the Sunrise base area. Figure 2-3 shows improvements around the West Village base area and Nordic Center, and Figure 2-4 indicates the location of utility corridors. Section 3.2 provides additional detail on the projected disturbance associated with each project.

This information is drawn primarily from the MDP (Ecosign 2010) and discussions with Mt. Bachelor personnel. Details of the downhill mountain bike program are from a plan developed for the resort by Gravity Logic Inc. (2008).

2.2.1 EASTSIDE POD

2.2.1.1 Eastside Express Lift

The Eastside Express lift would be a detachable quad chairlift installed east of the Sunrise area (see Figures 2-1 and 2-2). The bottom terminal would be located approximately 3,100 feet east of the bottom of the Rainbow chair at an elevation of 6,260 feet, close to the existing Rescue Road. (Note: the Rescue Road is a snowcat track and is not passable for wheeled vehicles when snow free. Though it is technically not a road, the name is well established and is used in this analysis.) The top drive terminal would be located approximately 1,030 feet southeast of the top of the Rainbow chair, about 88 feet higher than the Rainbow top terminal at 7,693-feet elevation. The lift would have a total length of 6,822 feet and a ride time of about 6.8 minutes if operated at 1,000 feet per minute (fpm) or 6.2 minutes at 1,100 fpm. It would be installed with a rated capacity of 2,400 persons per hour (pph) to provide comfortable, efficient loading for the intended users. The top terminal would be located near the edge of the natural treeline and would be well protected from the weather. This location would provide for good skier distribution and skier access to the West Village via Getback skiway.

Lift installation would require clearing a corridor 60 feet wide, flush cutting stumps, and subsequently maintaining regrowth height at about 18 inches. Surface disturbance would only occur at tower locations, involving an average disturbance area of 625 square feet per tower. Tower locations inaccessible by existing roads would be excavated by hand or with a spider hoe down to the depth of bedrock. Terminal sites would be accessed via a combination of existing and new construction roads. Materials used to construct the 8-foot-by-8-foot tower footings, as well as the towers themselves, would be hauled to the site via the proposed access roads and cleared lift alignments or be flown in by helicopter. Construction at each terminal site would involve clearing, grading, and excavation within a maximum 0.5-acre polygon. Most of this area would remain in a disturbed condition due to ongoing activity at and around the terminals.

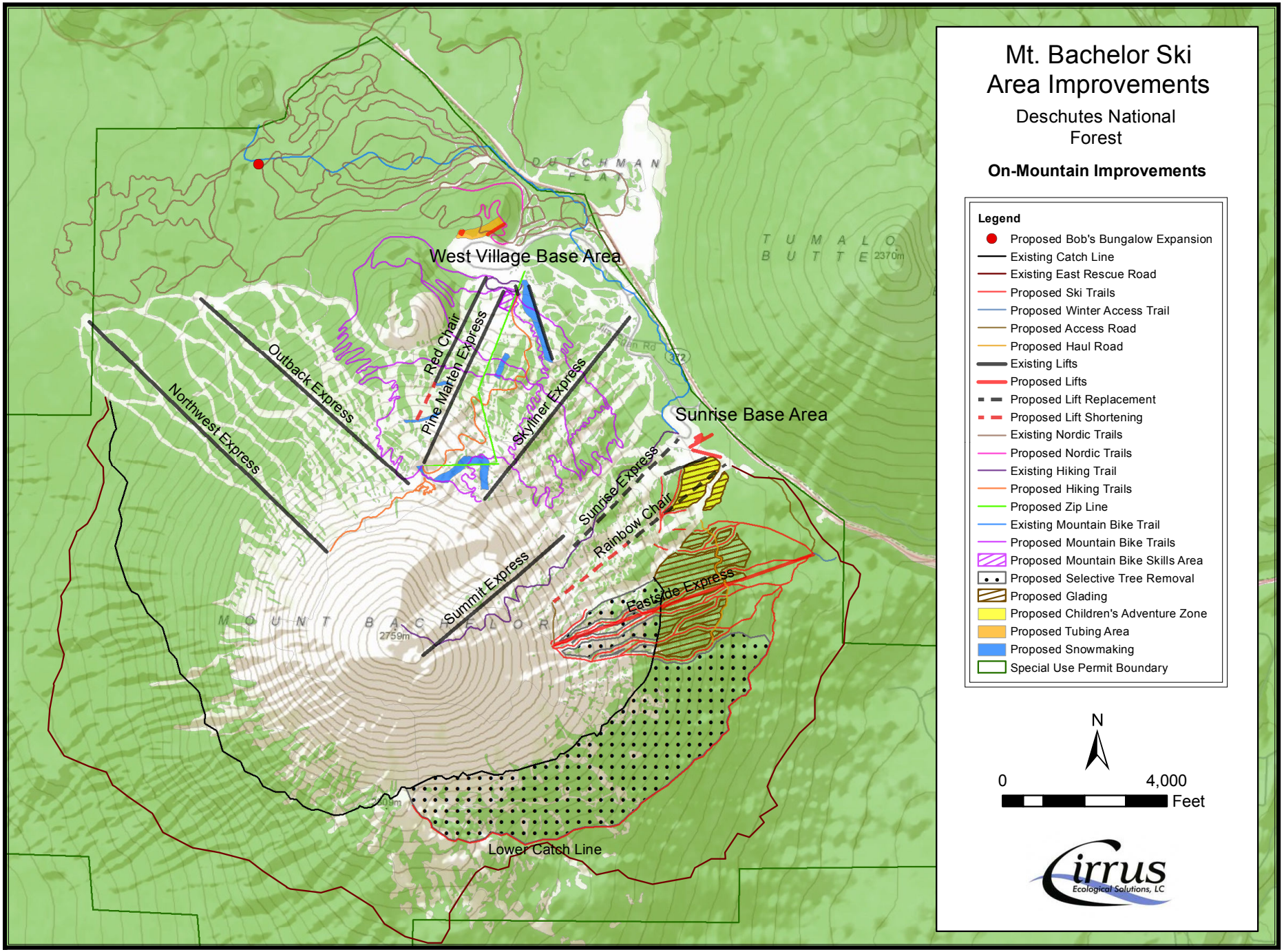

Figure 2-1. On-mountain improvements.

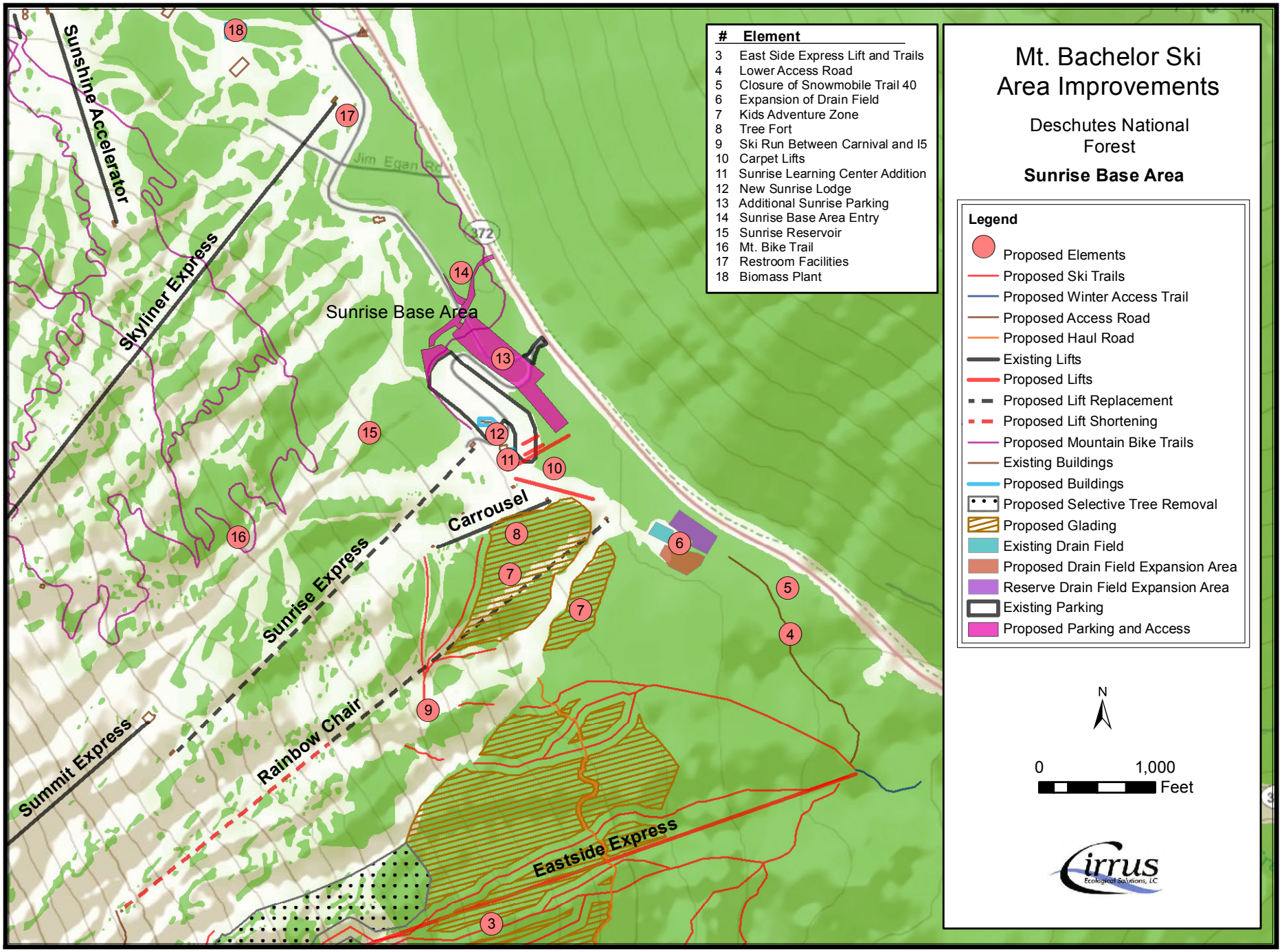

Figure 2-2. Sunrise base area improvements.

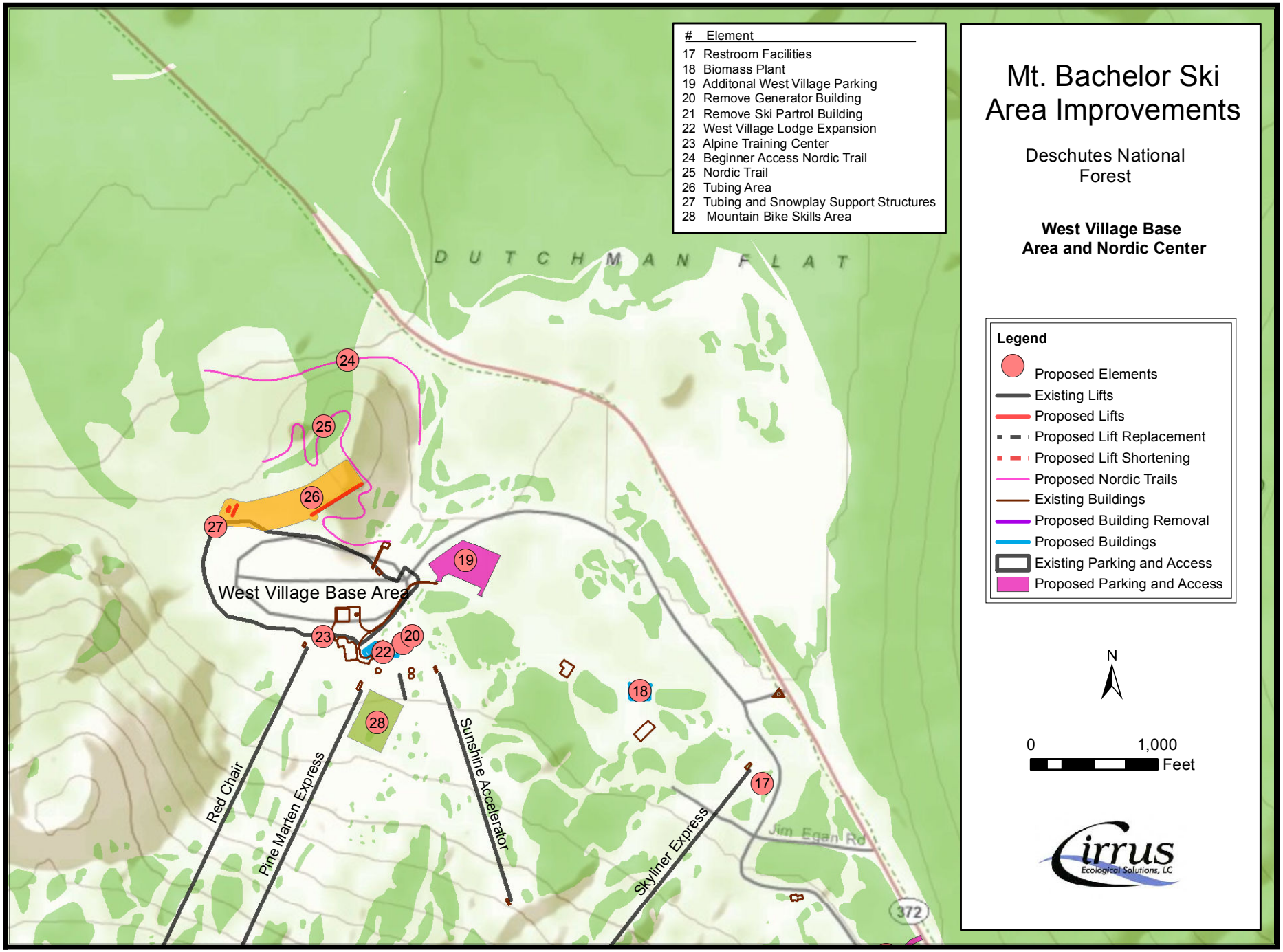

Figure 2-3. West Village base area improvements.

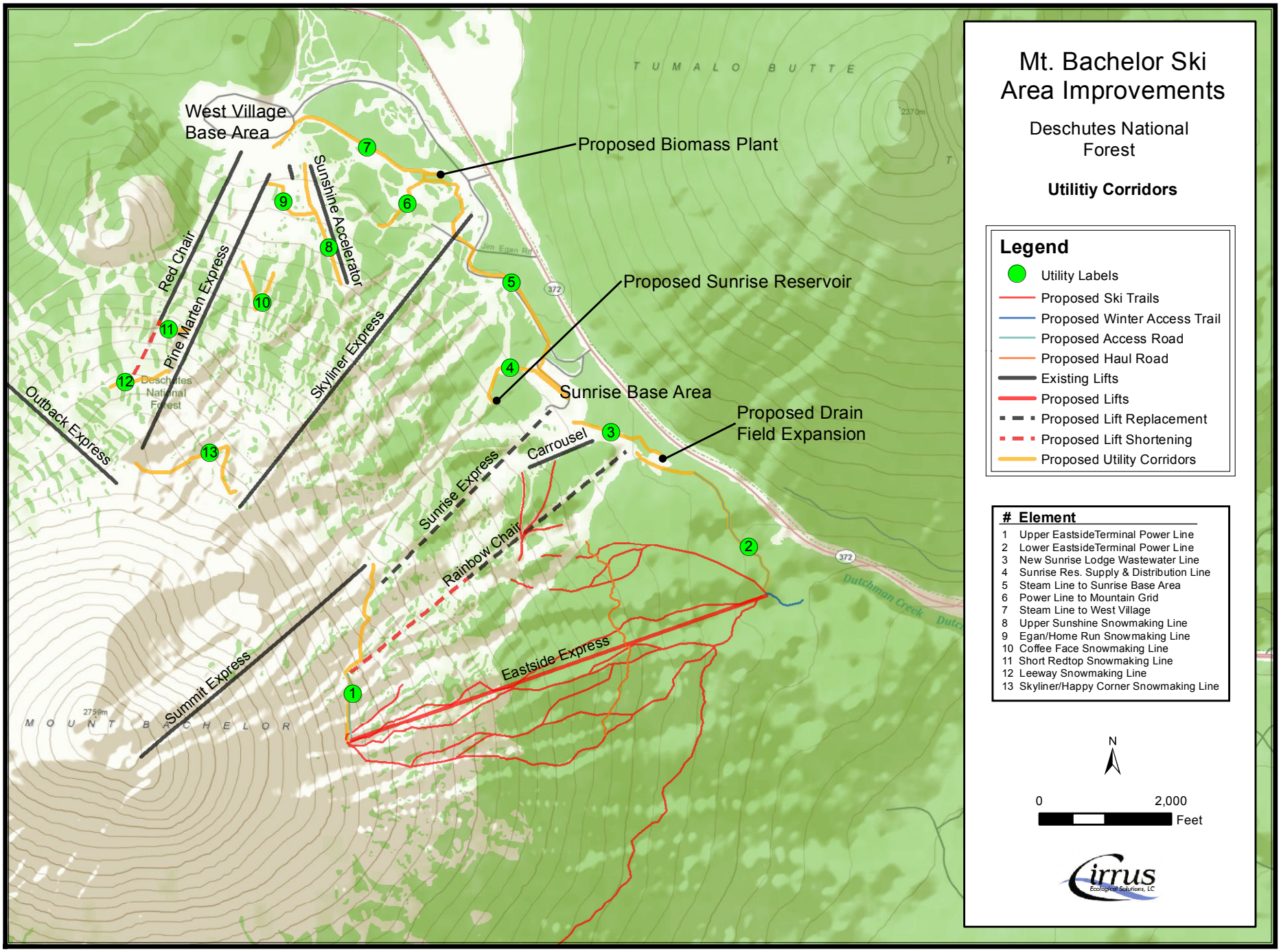

Figure 2-4. Utility Corridors.

Construction of the permanent access road to the upper terminal would entail extending the existing access road from the upper terminal of the Rainbow lift. A D9 caterpillar would be used, and the grade would be about 10 percent. The average finished width, including cut and fill slopes, would be about 16 feet. This road would also be a skiway from the top of the Eastside Express to the top of Rainbow lift and the corridor for the power line to the upper terminal, as described below. The lower terminal access road would be constructed using the same techniques, with new construction branching from the existing Rescue Road through a previously undisturbed area to the terminal site. A winter access route for snowcats connecting the Rescue Road with the lower terminal site directly would increase the efficiency of grooming.

To install the power lines to the upper and lower terminals, an excavator would dig a trench 30 inches wide and 3 feet deep, spooling in buriable electric cable, and backfilling the trench. The temporary disturbance corridor would be roughly 15 feet wide. The upper line would be installed in the existing access road to the top of Rainbow lift then in the proposed access road from that point to the upper terminal site. The line to the lower terminal would start at the existing Rainbow substation, near the bottom of Rainbow lift, then follow the Rescue Road and the new access road to the terminal site. Thus, the power lines would result in no additional disturbance area.

2.2.1.2 Eastside Trails

Several new ski trails would be associated with this lift (see Figures 2-1 and 2-2), and it would also provide access to trails currently served by the Rainbow lift. The new trails would wind through sparse trees in the upper third of the pod and through mostly natural openings in the middle third. They would be cut through the denser forest on the more gently sloped lower third.

New trails would be designed to respect the natural topography as much as is practical, as well as taking advantage of natural clearings in the trees. Tree skiing would also take place in the natural glades in the mid-mountain zone and in glades created or enhanced using selective tree removal in the denser forest of the lower mountain. In some areas, where the topography flattens substantially, proposed trail designs attempt to spur skier interest by creating several winding, narrower, “braided” routes through the forest. In other areas, simple collector trails would be built to bring skiers to the bottom terminal.

A lower catch-line skiway would be constructed on the east side of the mountain to collect skiers who wish to ski in the trees below the existing catchline and make their way back to the Eastside Express lift. The alignment for the proposed lower catchline that was displayed during scoping was modified as a result of subsequent, on-the-ground design work which shifted it roughly 1,000 feet downslope to avoid rock outcrops and take advantage of a natural break in the topography. The current alignment would reduce grading requirements, increase the amount of tree skiing provided, and decrease the temptation for skiers to continue beyond the catchline and become stranded.

Construction of the new catchline would first entail clearing the alignment of trees to an average width of 16 feet, then using a caterpillar to grade the road surface and construct cuts and fills. The grade would average 10 percent. This lower catchline would result in lift access to more than 300 additional acres of skiing, within the existing SUP area, using terrain that is naturally gladed. Some selective tree removal, as described below, may be employed to enhance skiing in this zone. If undertaken, it would be a very localized and low-intensity treatment. The Kwohl Gate, a signed opening in the closed boundary line on the existing East Catchline providing access to the Kwohl Butte area, would be moved downslope to a corresponding location on the new catchline.

Roughly the upper third of the new Eastside trails would be above timberline or in sparsely treed areas requiring no tree removal. From there down, trees would be cleared to achieve trails averaging about 75 feet wide (ranging from 50 to 150 feet). Width would vary according to topography and vegetation.

Clearing would begin from the bottom, at the lower catchline. Trees would be cut flush with the surface and stumps initially left in place, then limbed. Logs would be skidded down to the catchline and hauled for use as biofuel or sold, as market conditions allow. Tops and limbs would be hand or machine piled and burned. Alternatively, trees may be piled and burned or chipped on site and used as mulch for rehabilitation projects. A temporary haul road traversing midway down through the Eastside pod is proposed to facilitate timber removal. It would be abandoned and rehabilitated once timber removal was complete. No specified landings within the pod are anticipated, as existing or proposed open areas with road access (e.g., the area around the existing drain field and the new catchline, respectively) provide sufficient space for stacking and loading logs.

Over the course of 4 to 5 years, surface grading would occur on all new ski trails (i.e., 20 to 25 percent of the trails would be graded each season). This would entail using a caterpillar to remove stumps and grade trail surfaces to smooth the surface, cut and fill to achieve a consistent surface grade, and compact the finished surface. Water bars and other erosion control features would be constructed as necessary. Upon establishment of the final grade, the soil surface would be stabilized with mulch and seeded. This process facilitates winter grooming and skiing on minimal snow cover. Main trails would be the first-year priority for summer grooming.

In the tree islands between the formal ski trails, tree and glade skiing opportunities would be enhanced by removing trees to connect existing glades and natural openings. These efforts would focus on "choke points" where close tree spacing made skier passage difficult. Smaller trees would be removed and larger trees left in place. In the sparsely forested area above the existing catchline, selective tree removal (see Figure 2-1 and the definitions of disturbance types in section 3.2) would focus on scattered, individual trees or small clumps of hemlock saplings. In the thicker forest between the existing catchline and the transition to less steep slopes (about the 6,500-foot elevation), more intensive "glading" would be employed to achieve tree spacing of 15 to 25 feet between natural openings.

2.2.2 SUNRISE AREA

2.2.2.1 Rainbow Lift Shortening and Replacement

The Rainbow lift alignment would be shortened by moving the top terminal down the alignment to the 6,970-foot elevation, making the lift about 60 percent of its current length (about 3,221 feet long; see 2-1 and 2-2). Towers would be removed flush with the ground surface. The existing fixed-grip triple lift would be retired and replaced with the newer, detachable quad Sunrise Express lift (proposed for replacement with a higher capacity six-pack detachable lift, as discussed below). Sunrise is a top-drive lift, and power to the upper terminal would branch from the existing line and run through a previously disturbed area. Capacity would remain the same at 1,800 pph, but the detachable lift would be easier to load, more comfortable, faster, and more reliable. No additional utilities would be required. The alignment lies primarily in cleared ski trails. Where it passes through timber stands, it would be widened by about 5 feet, to achieve a width of about 60 feet. A hazard tree assessment would be completed, and any unsound trees adjacent to the alignment would also be removed. Existing towers may be reused, depending on final lift engineering. Any new towers would be built on the existing lift centerline. Dimensions and construction techniques would be as described above for the new Eastside Express.

In this configuration, the lift would service the low-intermediate Rooster Tail and lower I5 trails and the novice Carnival trail. This lift configuration would also provide a secondary lift access to the new Eastside Express lift if the Sunrise lift was too busy or not-operating. The existing Carousel lift would be retained to provide beginner/novice skiing as part of the Sunrise Learning Center.

A new trail would connect lower I5 with Carnival. This trail would be high enough that skiers could easily move from the upper part of the I5 trail into the Sunrise base area and also provide a low route from the Eastside Express lift to the Sunrise base. A bypass trail from I5 to Sunrise base (above Carrousel) would be constructed. The same dimensions, construction practices, and summer grooming schedule described above for the new Eastside pod trails would apply.

A new skiway/walkway would be established from the bottom of Rainbow to the bottom of Eastside Express lift. This route would be located on the existing Rescue Road, then on the new access route to the lower Eastside Express terminal. Thus, it would result in no additional disturbance. Snowmobile Trail No. 40 would be removed from the National Forest Trail System, from its intersection with Snowmobile Trail No. 4 to the Sunrise base area. This trail would provide skier access from the Sunrise base area to the Eastside Express lower terminal. It would be too flat to permit gliding to the terminal, but if skiers were willing to skate several hundred feet, they would not have to wait in line at the Sunrise lift or ride the Rainbow lift to get to the new Eastside Express lift on busy days.

2.2.2.2 Sunrise Express Lift Replacement

As noted above, the current Sunrise Express lift would be rebuilt in the Rainbow alignment and replaced with a new six-pack lift (see Figures 2-1 and 2-2). Operating at 2,400 pph, it would increase the capacity of the existing lift by one third and reduce waiting time proportionally. Rope speed would be about the same, so ride time would be unchanged. No new utilities would be required. The existing lift corridor would be widened about 5 feet to 60 feet width where it passed through timber stands, and hazard trees would be removed from areas adjacent to the alignment, as discussed above. Depending on final engineering, some lift towers would be reused. Any new towers required would be constructed using the same practices outlined above for the new Eastside Express and Rainbow lift replacement.

2.2.2.3 Sunrise Learning Center and Base Area Skier Services

The existing two-and-a-half-level Sunrise Lodge would be reconfigured to accommodate a new children's ski school program, the Sunrise Learning Center, including an expansion on the lower level for a new childcare facility. Existing space would be retained for skier services such as sack lunch seating, employee services, ticket sales, etc. (See Figure 2-2.)

A new day lodge would be built adjacent to the existing lodge. This facility would have 18,000 – 25,000 square feet of space and would primarily contain food service facilities on the main level with rentals, retail, restrooms, and lockers on the lower level and additional seating on a mezzanine level. Adequate utilities are available on site, with the exception of culinary water and wastewater disposal (see discussions concerning water system concrete reservoir and improvements to the wastewater system below).

The renovated base area and day lodge development would utilize the modified Cascadian architectural design themes and elements from *The Built Environment Image Guide for the National Forests and Grassland* (Forest Service 2001b), as would all new or remodeled buildings included in the Proposed Action. Base area buildings would be sited and oriented to optimize solar exposure and visitor comfort and capitalize on the natural elements of the site, such as mountain and forest views. To the extent feasible, renewable energy would be used at the redeveloped Sunrise base area.

Several beginner lifts (moving carpets) would be installed on the terrain at the east end of the parking lots and below the Sunrise Lodge, occupying part of the current parking area. These would be installed by grading a 2-to-3-foot-high earth berm, placing 2-by-3-foot concrete "ecoblocks" on top of the berm, and then installing the carpet lift on these blocks. Buried electrical power lines would supply electricity from the nearby Sunrise Lodge area.

As part of the new focus on children in the Sunrise base area, a forested "Kids Adventure Zone," including a tree fort and other constructed and natural features, would be built between the Rainbow lift and the Carrousel lift/Carnival trail and the area east of lower I5. Glading would be employed to create narrow, groomable trails with some wider openings. The tree fort would be constructed to fit into the forested setting visually, as would any other constructed features. The entire Kids Adventure Zone would entail minimal disturbance and would be designed to blend with the natural forest.

The learning terrain that would be used as part of the Sunrise Learning Center would be segregated from higher level skiers but would be directly accessible from either level of the day lodges. The Carrousel lift would remain in its current configuration to provide the next level of skier training (and chairlift familiarization) once students have graduated beyond the proposed moving carpet zone adjacent to the Sunrise Lodge.

A new, closed and mostly buried, 125,000-gallon concrete reservoir would be constructed above the Sunrise base area to supplement the existing water system. This would ensure adequate water supply for the expanded base area and for fire suppression. The 40-by-40-foot footprint (about 12 feet high) and 20-foot disturbance buffer around it would lie in a previously undisturbed area. The tank would be supplied by existing water lines from West Village. Constructing the feed line to the tank and the distribution line from the tank to the new lodge would involve installation of a new 10-to-12-inch pipe. The pipe would be laid in an excavated trench 30 inches wide and 4 feet deep. The corridor for the feed line would lie in an existing parking lot and other previously graded areas. The distribution line to the lodge would pass through previously graded ski trails.

The addition of a new lodge in the Sunrise base area would require roughly doubling the capacity of the existing wastewater treatment system. This would include the septic tank (replaced with 12,000-gallon tank at site previously disturbed for the existing tank), the conventional drain field, and associated plumbing and infrastructure. Preliminary engineering work and initial review by the Oregon Department of Environmental Quality (ODEQ) have been completed, and it appears that the area surrounding the existing drain field is suitable for the necessary expansion of the existing system as well as a reserve expansion area for use if existing and proposed drain fields fail (see Figure 2-2). Five new cells, or roughly 16,000 square feet, would be added to the current four-cell drain field. The reserve expansion area would accommodate six cells under the current configuration. A new 4-inch wastewater line from the lodge to the expanded drain field would be laid in a 30-inch-wide trench 4 feet deep in the same, previously disturbed corridor as the existing wastewater line. The temporary disturbance would be about 15 feet wide.

Basic restroom facilities, in the form of a manufactured two-hole vaulted outhouse, would be placed in the parking area 150 yards beyond the Junior Race Center building and above the Skyliner Express lower terminal. The vault would be periodically pumped and hauled to a licensed disposal facility. This structure would be accessible from both the snow front and parking lot. A garbage and recycling disposal station would also be provided at this restroom facility.

2.2.2.4 Sunrise Base Area Parking and Access

The Sunrise parking area would be increased from its current capacity of approximately 760 cars (2,660 skiers at 3.5 skiers per car) to approximately 1,638 cars or 5,733 skiers (see Figure 2-2). The two existing lots would be expanded to the west, and a new, asphalt-surfaced parking lot would be created between the existing lower lot and the highway.

Although the upper parking lot would be expanded westward, there would only be a small increase in its parking capacity (from 277 to 308 cars) because the new day lodge and drop-off loop would be built partially on the eastern end of the existing lot. The middle lot (currently the lower lot) would also be

expanded westward, increasing its capacity from 483 to 945 cars. The new (lowest) parking lot, with a capacity of 385 cars, would be located on a large flat area of lightly forested terrain just below the existing lower lot and would encompass much of the current access road. Existing trees and a natural lava outcropping would be retained as a buffer to the highway during construction of these parking lots, and trees may be planted to enhance the buffer.

As part of this parking lot reorganization, the entrance to the Sunrise base would be moved approximately 850 feet to the west. This new location would provide an easier, shorter, safer, and more intuitive entrance and exit for the parking area at Sunrise, while maintaining the existing access to the Junior Race Center/Skyliner parking area. The existing entrance would be retained for a second egress point if required on busy days.

2.2.3 WEST VILLAGE AREA

2.2.3.1 Red Chair Shortening

The Red Chair lift would be shortened to facilitate use of the lift for race training purposed, in conjunction with the proposed Alpine Training Center (described below under West Village Buildings; see Figure 2-3). The top terminal would be moved down the lift line to the 7,185-foot elevation, just above Tower 15, making the lift approximately 2,990 feet long. Towers would be removed flush with the ground surface. In all other respects, the lift would be unchanged. Several trails (e.g., Shorty, Leeway, and Midway) served by the Red Chair would be closed to public use when race training activities were underway.

2.2.3.2 Snowmaking Expansion

Snowmaking coverage would be expanded, connecting the existing snowmaking system from the Pine Marten pod. Added coverage would include (see Figure 2-4):

- Leeway, a route from the current upper terminal of the Red Chair to Thunderbird trail.
- Short Redtop, a route from the proposed upper terminal of the shortened Red Chair to Thunderbird Trail.
- Skyliner/Happy Corner, providing access from the upper terminals of both Pine Marten Express and Skyliner Express onto Olympian trail.
- Coffee Face, covering Coffee Face and Little Canyon, two steep, heavily used trails off Pine Marten Express.
- Upper Sunshine, covering the main trail off Sunshine Accelerator lift.
- Egan/Home Run, a route to the base of Pine Marten Express from Home Run.

This expansion would provide snowmaking on an additional 25.4 acres. This addition could require an additional 2 to 3 million gallons of water to maintain coverage to a depth of 2 feet, assuming an industry average conversion factor of 0.55 cubic feet of water to produce 1.0 cubic foot of snow. This would bring the maximum, total snowmaking water demand to 9.1 million gallons per season.

Snowmaking lines (buriable electrical cable and 2-to-8-inch water lines) would be installed in an excavated trench about 30 inches wide and 4 feet deep. The temporary disturbance corridors would be about 15 feet wide. All the lines, with the exception of about 200 feet at the east end of the Short Red spur, would be on existing graded ski trails or access roads.

Mt. Bachelor's existing water wells (one at 700 feet deep and one at 1,100 feet deep) have a combined capacity of about 1,500 gallons per minute (gpm). With existing and proposed storage facilities, they provide adequate capacity to meet all needs under the proposed expansion. Such use is consistent with the ski area's current water rights.

2.2.3.3 West Village Base Area Buildings

The Proposed Action includes relatively small additions to the West Village Lodge, about 3,500 square feet on each of two levels (see Figure 2-3). The additions would be located at either end of the building and designed to enhance the appearance of the lodge. Consistent with the resort's modified Cascadian architectural theme, the façades of both the West Village Lodge and the Bachelor Ski and Sport building would be renovated with wood panels and beams and stone veneers. The expanded lodge building would accommodate the current ski patrol, mountain clinic, and administration functions, allowing removal of the existing ski patrol building. The adjacent generator building would also be removed.

A two-story building would be built on a graded ski trail near the base of the Red Chair to house the Alpine Training Center. The building would be located at the bottom of the training area and have a footprint in the range of 2,500 – 3,000 square feet. In addition, small start and finish huts would be installed at appropriate locations on the training runs, along with the associated power and communications lines. These would be temporary, portable installations. The Alpine Training Center would be built and funded in cooperation with the local ski education foundation with operation and maintenance provided by the resort. Adequate utilities are currently available on site. Tie-ins to these utilities would be located in the existing parking lot and roads.

The proposed additions to the West Village Lodge and removal of the generator and ski patrol buildings are contingent upon securing approval and funding for a 1 – 2 megawatt biomass co-generation plant, which would produce electrical power in the summer and steam heat in the winter at a location near the existing maintenance shop. This facility would consist of a building housing the burner and generator, an underground supply distribution network, and a fuel storage facility. Fuel would consist of low-grade logs and slash from timber sales, salvage cuts, thinning projects, and other public and private land projects in the region. Slash generated by the Proposed Action may also be used, all or in part, as fuel. This material would otherwise be left to decompose, used for firewood, or chipped for landscaping or other purposes.

The biomass generator has not been designed. However, it would occupy an area approximately 250 feet by 100 feet in a primarily undisturbed area. A 50-foot stack height is assumed for purposes of this analysis. Electrical power would be conveyed into and out of the facility via a buried line tying into the resort's existing grid. This line would be laid in a 30-inch-wide excavated trench 4 feet deep, traversing previously graded areas including roads, parking lots, and ski trails. Steam would be piped to the Sunrise and West Village base areas via buried, approximately 10-inch pipes installed in previously graded roads, parking lots, and ski trails. Temporary disturbance corridors for these lines would be about 15 feet wide.

2.2.3.4 Tubing Area

The tubing and snow play area would be moved to Old Maid knoll directly across the parking lot from the West Village skier services building (see Figure 2-3). The new tube park and snow play center would consists of multiple tubing lanes, a surface lift providing 80 – 110 feet of vertical, and a large, mostly flat area for snow play activities and staging at the far western corner of the West Village parking lot. Minimal grading would be required to establish the start zone and the tubing lanes, while the run-out zone would demand significant grading. The ground profile in this location is well suited for tubing and has a moderately steep slope followed by a flat run-out.

Three small staging structures would be included in this area. They would be non-permanent pull-on or yurt-type structures with minimal surface disturbance. A building for tubing storage would be located next to the bottom of the tubing lanes. Another would be located in the snow play area to accept tickets and to store and distribute children's ski, snowboard and tubing equipment. The largest structure (likely 700 – 900 square feet) in the tubing area would be used for ticket sales, hot chocolate and snack sales, accessory retail, and restrooms, and would have an outdoor deck or on-snow area for "brown bag" food service seating. Utility tie-ins for these facilities would be located in the existing parking lot.

2.2.3.5 West Village Base Area Parking

The Proposed Action would increase the capacity of the West Village parking area by creating a new 2.5-acre, asphalt surfaced, overflow/employee lot east of the existing parking area, in a generally undisturbed area (see Figure 2-3). This lot would accommodate an additional 350 cars.

2.2.4 NORDIC CENTER

2.2.4.1 New Trails

A new, easier trail appropriate for lower ability-level skiers would be developed to help them access the existing trail network from the Nordic Lodge and learning area. The new trail would be routed around the north side of the Old Maid, at a fairly constant grade, and would have less grade change than the existing trail. Blue Jay's Way, a Nordic trail that cuts across the proposed tubing area, would be realigned to maintain connectivity to the Nordic trail system once the tubing area is moved to the new location. The new Nordic trails would be constructed by clearing the alignments then using a caterpillar to grade a trail surface about 16 feet wide, balanced with cut and fill. The proposed trail alignments are in generally undisturbed areas. (See Figure 2-3.)

2.2.4.2 Bob's Bungalow Improvements

Bob's Bungalow (see Figure 2-1) would be refurbished, with a finished size of about 24 feet by 30 feet. An 8-foot deck would be added around the structure to provide additional seating, and space for benches and a wood-burning fire pit would be provided outside. The building would be refurbished consistent with the resort's updated architectural theme. No additional utilities would be required. The site has been disturbed by construction of the building and the adjacent ski trail.

2.2.5 SUMMER ACTIVITIES

Mt. Bachelor would expand their summer recreation program. New proposed activities generally involve the use of existing lift, trail, and lodge infrastructure and include the following.

2.2.5.1 New Hiking Trails

The following hiking trails would be developed to create a trail system centering on Pine Marten Lodge (see Figure 2-1):

- A new trail connecting Pine Marten Lodge to West Village.
- Use of the existing access road from Pine Marten Lodge to top of Northwest Express as a hiking trail.
- Creation of an interpretive geologic loop trail above Pine Marten Lodge.
- Development of vista/view/photo points at designated intervals along hiking trails.

The new hiking trail and interpretive loop would be constructed by hand, though a small excavator (3-ton or smaller) may be used to remove some stumps, roots, and rocks if necessary to achieve a smooth and consistent surface. The finished tread would average 3 feet wide, and the maximum grade would be 6 percent. Viewpoints would simply be cleared turn-outs from the trails, with interpretive signage where appropriate. Trail design criteria listed below (see Design Criteria and Disturbed Site Rehabilitation Practices) would be employed. No improvements to the Northwest Express access road other than signage are proposed.

2.2.5.2 Mountain Bike Park

The proposed mountain bike park (see Figure 2-1) was developed to take advantage of the unique opportunities Mt. Bachelor offers for this activity (e.g., in-place lift infrastructure and base facilities, excellent views, varied volcanic topography, and old-growth hemlock forest patches at lower elevations) while avoiding inherent limitations (e.g., shallow, sandy soils with low organic matter and cohesion, lava fields, and cinder deposits). The bike park would include a basic skills area just east of the Pine Marten Express lower terminal and a system of mountain bike trails starting from the top of Pine Marten Express.

The trail system would be accessed from the Pine Marten Lodge area and end at the lift's lower terminal area. It would include a mix of single-track and excavated trails ranging from beginner (green), through expert (double black). Single-track trails would average 3 feet wide, constructed by hand and using a small excavator but mimicking natural forest trails. They would rely primarily on existing terrain features such as ridges, swales, and gullies to provide user excitement, but man-made Technical Terrain Features (TTFs) such as boardwalks, jumps, table-tops, and rails appropriate to the trail's difficulty level would also be used. Single-track trails would span the difficulty range from green to black.

Excavated trails would be more engineered, traditional "jump-type" trails. They would average 3 to 5 feet in width and include more constructed TTFs. Excavator use to modify natural terrain, create cuts and fills, install culverts, etc., would be more extensive. Excavated trails in the black and double black category are not proposed in consideration of the inherent erodibility of the site's soils. Other adjustments to the natural setting might include boardwalks across lava fields, lava retaining walls where trails cross through cinder deposits, hardening of trail surfaces with lava rock and other appropriate natural and composite materials through sandy areas, and limited development of excavated as opposed to wood-constructed TTFs.

The skills area would provide riders an introduction to the sport and a place to practice the basic skills required in a controlled, gently sloped, less difficult setting. It would include basic natural and constructed TTFs.

Trail design criteria listed below (see Design Criteria and Disturbed Site Rehabilitation Practices) would be employed in the development and maintenance of the bike park.

2.2.5.3 Canopy Tour Zipline Course

A zipline is a pulley on an inclined cable which allows the rider, suspended from the pulley in a harness, to traverse the length of the cable at speed. They provide an opportunity to experience the forest canopy while having an exciting ride at the same time. The proposed zipline descends from Pine Marten Lodge to West Village in three segments, with short hiking trails connecting the landing and launch points (see Figure 2-1). Interpretive sites and signage, including a small cinder cone, would be developed along the trails. The first section of the zipline would be shortest and flattest, allowing riders to see if they enjoy the experience before taking on the whole experience.

Installation would require a 30-foot cleared corridor, but most of the alignment would lie above timberline, in natural openings, or along previously cleared ski trails. Only launch and landing towers

would be required, as the cable between them would be a free, unsupported span. The steel towers would be roughly 25 feet high, and the cable height would range up to 75 feet, depending on the ground contour. Construction of the tower foundations would disturb about 625 square feet. The cable would be removed in winter to prevent ice damage.

2.2.5.4 Rock Climbing Structure

This feature would be located at Pine Marten Lodge, at the top of Pine Marten Express, and two options for this climbing wall are possible: a modular, free-standing climbing structure or a structure affixed to the wall of the lodge. Either could be used year round.

2.2.6 Disturbed Site Rehabilitation Practices, Design Criteria, and Mitigation Measures

Under the Proposed Action or Alternative A, disturbed site rehabilitation would be guided by a site-specific erosion control and rehabilitation plan prepared for each project or group of similar projects in close proximity that are to be completed in the same timeframe. These plans would reflect Best Management Practices (BMPs), including those described in *Ski Area BMPs: Guidelines for Planning, Erosion Control, and Reclamation* (Forest Service 2001a) and would be approved prior to project implementation by the DNF. Since there is no live water within the permit area, with the exception of Todd Creek which is up gradient from any project-related disturbance, design criteria and rehabilitation practices specific to stream hydrology and water quality are limited.

The following design criteria and mitigation measures would be employed to create a sustainable program and minimize impacts on soil, vegetation, and wildlife during construction and maintenance of the proposed hiking and mountain bike park infrastructure:

- Forest clearing in the proposed trail corridors will be reduced to the extent practical through careful trail layout and design.
- All trails will be designed to avoid the cutting of trees with a diameter at breast height (dbh) greater than 8 inches to reduce impacts on upland forest, including whitebark pine. Trails will be routed around large trees and, where possible, around the roots of large trees to prevent root damage.
- A review of proposed hazard tree or down wood removal along the trails will be conducted by Mt. Bachelor 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 fuel management objectives. For example, if a tree is felled across a trail or down wood crosses a trail, a section of the log will be cut out to allow riders to proceed along the trail, leaving the rest of the log in place for the ecological/ecosystem functions it provides and to confine riders to the trail.
- Trail corridors will be grubbed (cleared of organic materials) in order for the trail surface to consist solely of quality mineral soil. Grubbed organics (moss/heather) will be used to re-vegetate off-trail disturbed areas.
- 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.
- Culverts (minimum 12 inches) or bridges will be used to cross channels where seasonal flow is expected, (site specific). In crossing any channels where water is not expected but possible, culverts (minimum 6 inches) will be used.

- 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 would be no less than 50 feet to minimize extension of the drainage network and to minimize sediment delivery to channels.
- 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.
- Disturbed-site rehabilitation may include topsoil replacement, planting, seeding, and fertilization where appropriate.
- 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.
- Bike park staff will continuously monitor the park to ensure that rehabilitated areas are not disturbed or to remedy disturbance to rehabilitated areas.
- Bike park staff will continuously monitor trail conditions in the park 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.
- Bike park staff will inspect the park trails each day to locate wet soil areas or mud puddles. If such problems persist, affected trails will be closed until conditions change or 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 park will be closed.
- Bike park staff will continuously monitor the park to ensure that unauthorized trails or terrain features are not created by riders.
- Bike park trails will be closed to hikers and other users and will be continuously monitored by bike park staff to ensure compliance.

If conflicts between hikers and cross-country bikers on trails outside the mountain bike park becomes an issue, Mt. Bachelor will implement measures to better separate user groups, including designation of hiking and bike lanes on access roads and designation of hiker-only and mountain biker-only routes.

The following design criteria and mitigation measures will be employed to minimize the visual impact of the proposed improvements and develop a consistent architectural theme for resort buildings:

- Overall development will be guided by the Forest Service's *Landscape Aesthetics, A Handbook for Scenery Management* (Forest Service 1995).
- Building construction will be consistent with guidance in *The Built Environment Image Guide for the National Forests and Grasslands* (Forest Service 2001b).
- Forest clearing in the proposed trail corridors will be minimal with care to preserve landscape character, scenic quality, and aesthetics through careful trail layout and design.

The following design criteria and mitigation measures will be employed to minimize the impacts of the proposed improvements on wildland fire potential and fuel loading:

- Slash created by the construction or expansion of parking areas and construction or relocation of buildings, chairlifts, ski trails, and the catchline will be disposed of either through utilization, burning, chipping, mastication, or removal from the site within a specified timeframe.
- Areas surrounding structures, including the biomass plant and biofuel storage area, will be treated to create a defensible space and reduce ladder fuels that support the spread of wildland fires. Defensible space is defined as an area, either natural or man-made, where material capable of allowing a fire to spread unchecked has been treated, cleared, or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur. Ladder fuels are living or dead vegetation that allow a fire to climb from the forest floor to the tree canopy.
- Treatments for naturally occurring and activity-generated fuels may include a combination of ladder fuel reduction, mechanical shrub treatment, and hand or machine piling of slash. Any proposed operations that include the burning of slash will be coordinated with DNF Fire Management personnel.

The following design criteria and mitigation measures will be employed to minimize impact on forest habitats, particularly old growth and whitebark pine:

- In areas subject to selective tree removal, trees greater the 8 inches dbh, regardless of species, will not be removed unless they are hazard trees.
- In areas subject to glading, trees greater the 21 inches dbh, regardless of species, will not be removed unless they are hazard trees.
- In areas subject to selective tree removal or glading, whitebark pine trees will not be removed unless they are hazard trees.
- The DNF may collaborate with Mt. Bachelor to plant rust-resistant whitebark pine seedlings in stands affected by insects or disease that are outside areas of proposed development.

The following design criteria and mitigation measures will be employed to minimize the potential for the proposed improvements to result in the introduction or spread of noxious weeds:

- Pre-construction inventories will be conducted to determine if invasive plants exist within the project area, including roads within the project boundary.
- The Proposed Action will be implemented in coordination with the District invasive plant specialist to plan for the long-term management of known infestations of invasive plants and to prevent the spread of infestations.
- All construction equipment and vehicles used will be cleaned and certified free of noxious weeds and their seeds prior to entrance onto the DNF. 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.
- Contractor will furnish proof to the DNF that equipment is weed free.
- When any non-passenger vehicle (vans or pickups) or equipment leaves the project area, it will be cleaned and re-certified before it re-enters the DNF.
- Soil disturbance will be minimized, and existing topsoil will be conserved for replacement.
- Where possible, native vegetation will be retained.

- Native plant materials will be used in revegetation efforts.
- Skid trails will be avoided or minimized, and no landings will be created (existing or proposed openings with road access will be used).
- 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 DNF.
- Any straw bales, chips, or other imported mulch used in conjunction with the Proposed Action will come from a certified weed-free source.
- Native plant materials and site design principles for aesthetics will be used in revegetation efforts.

The following design criteria and mitigation measures will be employed to minimize the potential for adverse impacts on northern spotted owls:

- Activities involving chainsaws, heavy equipment, aircraft, or blasting within specified distances (see Table 38, Programmatic BA, Forest Service 2010b) of any existing or newly identified northern spotted owl activity centers (i.e. home ranges) will be postponed until after the breeding season (March 1 to September 30).
- Northern spotted owl spot check surveys will be completed in 2013 and 2014 as per the 2012 FWS revision to the 2011 northern spotted owl survey protocol (FWS 2012).

The following design criteria and mitigation measures will be employed to minimize the potential for adverse impacts on any previously undiscovered cultural resources due to the proposed improvements:

- If any previously unidentified prehistoric or historic cultural resources are identified or encountered at any time during the implementation of the MDP, efforts shall be made to protect the resource(s) until the Forest Archaeologist 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. If unmarked human remains are encountered at any time during implementation of the MDP, all work in the vicinity of the find shall cease, with the remains covered and protected in place, and the Forest Archaeologist notified immediately to begin proper notification and consultation procedures with the Oregon State Archaeologist, 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, as detailed in the Forest LRMP CR-8.
- If any previously unidentified Traditional Cultural Places or sacred sites are identified or encountered at any time during the implementation of the MDP, efforts shall be made to protect the resource until the Forest Archaeologist 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.

The following design criteria and mitigation measures will be employed to manage the site on the proposed Eastside lift lower terminal access road where a Category B Survey and Manage fungus species was located during 2012 surveys:

- The fungus location will be protected with a 150-foot-radius buffer. (The term “site” will be considered the actual location plus this buffer.)

- All but the easternmost end of the proposed access route which crosses the site will be developed and maintained as a winter snowcat access and skiway only, with a maximum width of 30 feet.
- The summer access road for lift construction, maintenance, and powerline installation will be shifted east, connecting the existing Rescue Road and the lower terminal site. The road corridor will be a maximum of 36 feet wide. This road will overlap the eastern end of the winter access route, beyond the fungus site.
- Along the 300-foot section of the winter access route crossing the site, snowcats or other similar, low ground pressure, over-the-snow equipment will be the only machinery allowed. A minimum of 12 inches of compacted snow on the access route across the site will be required before this machinery can cross. Snow may be hauled in to achieve this depth.
- Trees removed to create the access route across the site will be hand felled. If heavy equipment is needed, it will be used only when there is a minimum of 12 inches of compacted snow over the site. Trees felled over the entire alignment will be left on site. Trees may be moved out of the access route prism. This will occur in such a manner that no soil disruption or compaction occurs.
- Small trees felled to create the alignment will be hand placed and retained over the site in order to further protect and enhance it. This will occur in such a manner that no soil disruption or compaction occurs. No heavy machinery will be used for this task.
- There will be no grubbing of stumps from the site. Flush-cutting the stumps in the spring (i.e., snow-free conditions) by hand will be allowed.
- Snowcats will not be allowed to cross the site until the Forest Service approves it annually, prior to the first use of the season.
- Mt. Bachelor will monitor the site at least once each summer to determine if disturbance is occurring to the site, and will send a status report (an email is sufficient) by August 31 to the District's special uses coordinator and botanist.

2.2.7 PHASING

Implementation is scheduled to begin in the summer of 2013 and be completed within 10 years. Mt. Bachelor's MDP breaks this planning horizon into two phases, the short-term (1 – 4 years) and the medium term (4 – 10 years). The main short-term priority projects are development of the Eastside pod and associated infrastructure, relocating the tubing hill, and starting development of projects associated with summer activities, including the mountain bike park. Medium-term priorities are base-area improvements at both Sunrise and West Village, snowmaking improvements, and development of the Alpine Training Center and associated facilities. The biomass plant project may be scheduled in either the short- or medium-term depending on the outcome of ongoing feasibility analyses and financing discussions. The actual phasing of specific projects is subject to change on the basis of funding availability, changes in skier market preferences, and other unforeseeable variables.

2.3 ALTERNATIVE FORMULATION

NEPA mandates that an EIS address a reasonable range of alternatives to the Proposed Action. These alternatives should achieve the same or similar purposes and needs, and they should include alternatives that address issues raised and avoid or otherwise mitigate adverse environmental effects associated with the Proposed Action. Alternatives that would not be reasonable, either because they would not be consistent with purpose and need or because of other considerations, need not be analyzed in depth, but the rationale for not analyzing them should be explained. An EIS must also address the No-Action

Alternative, disclosing the outcome of not undertaking the federal action comprised by the Proposed Action and action alternatives. The following sections discuss alternatives considered but not analyzed in depth, the required No–Action Alternative, and the action alternatives.

An EIS must address the alternative of no action (40 CFR 1502.14 [d]) to provide a benchmark for comparison of the magnitude of environmental effects of the Proposed Action and action alternatives. In this case, the No-Action Alternative is defined as maintaining the *status quo* in terms of infrastructural development at Mt. Bachelor. Under this alternative, no further development would occur, with the minor exceptions described in section 2.5.1.

The process of formulating action alternatives began with the scoping exercise described in Chapter 1. Scoping commenters suggested nine alternatives stemming from concerns regarding fragmentation of undeveloped areas, recreational conflicts, and alternative forms of recreation or recreational amenities.

As the next step in alternative formulation, the Forest Service ID team evaluated these issues as well as the full range of potential resource impacts associated with the Proposed Action in order to determine which could be mitigated and which, if any, were more effectively addressed with an alternative. Based on the ID team's recommendations, the Responsible Official decided to carry just one action alternative into detailed analysis, i.e., eliminating the proposed new catchline to avoid further fragmentation of undeveloped areas east of the developed resort that might be considered as PWA (section 2.5.2). The other alternatives suggested by scoping commenters were dropped from detailed analysis for the reasons discussed in section 2.4.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DEPTH

Public scoping and internal, interdisciplinary review identified the following alternatives, which were not carried into in-depth analysis for the reasons noted.

2.4.1 HIGHER ELEVATION CATCHLINE

An alternative that would shift the proposed new catchline on the east side of the mountain further up the mountain was considered as a means of reducing fragmentation of undeveloped areas that might meet the Forest Service inventory criteria for potential wilderness. However, the location of the catchline under the Proposed Action was based on the topography and gradient that would adequately serve the purpose of ensuring safe access to the Eastside Express lift terminal for skiers using the tree skiing terrain between the existing and proposed catchlines. Moving it further upslope onto steeper terrain would require more grading and soil disturbance to construct it. Furthermore, some skiers would continue down the slope beyond the lower catchline to access the additional terrain. This would result in informal, user-created traverse routes back to the lift and increased potential for skier stranding. Therefore, this alternative was not considered reasonable and was not carried into in-depth analysis.

To provide a basis for comparison of the effects of the Proposed Action on PWA, this EIS does address the alternative of providing no new catchline (see section 2.5.2).

2.4.2 ALTERNATIVE SITE FOR TUBING HILL RELOCATION

An alternative location for the relocated tubing hill was considered as a means of reducing potential impacts on cross-country skiers using Nordic Center facilities. However, a viable tubing hill site has certain criteria that must either occur naturally or be developed through excavation and grading. These criteria include close proximity to parking and base-area facilities as visitors are not generally equipped to

travel significant distances on foot. The criteria also bear on the length and angle of the slope and the run-out zone.

During their MDP process, Mt. Bachelor, Inc., considered alternative locations and found only one that met these criteria (Lomax 2011). That site was at the base of the Cone, south of the proposed site and somewhat further from Nordic Center facilities. While it met the basic access and slope criteria, the following factors made it significantly less desirable:

- Shorter run (650 feet v. more than 800 at existing site).
- No bench at top for lift unloading and starting zone.
- Would block skiers descending the Cone.
- More densely forested.

As this site would result in greater impact on natural resources and create a new set of impacts on other recreationists that would be more difficult to mitigate, the DNF determined that this alternative was not reasonable, and it was not carried into in-depth analysis.

Following this effort to identify an alternative site, Mt. Bachelor invited two of the Nordic skiers who had raised concerns regarding the relocation during scoping to tour the proposed site and discuss the project. This occurred on April 3, 2012. According to Mt. Bachelor's report, the Nordic skiers' concerns were allayed as follows:

- The relocation site is smaller than they had envisioned and does not extend as far west, reducing potential impacts on the Nordic trail system.
- Provision of parking, restrooms, a ticket office, and other services at the site reduced concerns about use of the Nordic Lodge by tubing hill visitors.
- The realignment of Blue Jay's Way trail was viewed as a positive, resulting in a more interesting alignment with improved views.
- Knowing that music would not be routinely played at the tubing hill reduced noise-related concerns.

Overall, this site visit reduced the impetus to consider an alternative to the proposed tubing hill relocation.

2.4.3 Other Suggested Improvements

Scoping commenters suggested several other improvements not included in the MDP, including the following:

- Nordic Lodge remodel.
- Night skiing.
- Recreational facilities outside the SUP boundary.
- Restrooms at Eastside Express, Outback Express, and Northwest Express lifts.
- Second Nordic Center at Sunrise base area.
- Mountain bike use of Rescue Road or catchline.
- RV facilities at West Village.

As discussed above (section 1.1), the MDP accepted by the DNF resulted from comprehensive analysis of the current resources and management opportunities and constraints at the ski area. None of these improvements was identified as a priority over the next 10 years in the MDP. Beyond that, while some of these suggestions were consistent with the purposes addressed by the Proposed Action (section 1.3), they do not align with the identified needs. Based on these considerations, these suggestions were determined not to be consistent with the purpose and need for the Proposed Action and were not carried into in-depth analysis.

2.5 ALTERNATIVES ANALYZED IN DEPTH

2.5.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no further infrastructural development would take place at Mt. Bachelor. Winter and summer recreational facilities and opportunities would remain as they are today. Exceptions would be expanding the ground-level deck at Sunrise Lodge, remodeling of the West Village guest services building, and replacing the adjacent sprung steel administration structure with a new two-story building. These projects were approved in September 2011. The existing ground-level deck at Sunrise Lodge was expanded by 1,600 square feet in October 2011, so that project is considered part of the affected environment and its effects are not addressed in this EIS. The two remaining projects are slated for completion in the next 2 – 3 years.

The existing West Village guest services building would be remodeled inside to provide space for employee lockers, meeting rooms, and offices. The public restrooms would remain in their present location but will be accessible from the exterior entrance only. The exterior of the building would be upgraded to reflect the modified Cascadian architectural style being implemented at the ski area. A new two-story administration building would be constructed east of the guest services building in the same style. The temporary administration building would be removed from the site. These buildings are in the West Village parking lot, so the project would not entail any new ground disturbance.

2.5.2 ALTERNATIVE A - NO NEW CATCHLINE

Reflecting concern over fragmentation of undeveloped areas resulting in possible impact on areas that meet Forest Service criteria for potential wilderness, the alternative of a higher elevation catchline was considered but not carried into in-depth analysis because of factors associated with slope and topography (section 2.4.1). This alternative would eliminate the proposed lower catchline on the east side of Mt. Bachelor entirely to provide a basis for comparing the impacts of the Proposed Action on PWA. Selective tree removal to improve tree skiing between the catchlines would also not occur. (see Figure 2-1.)

As discussed in section 2.2.1.2, the lower catchline would facilitate tree skiing on the eastern flank of the mountain by providing access back to the lower terminal of the proposed Eastside Express lift on a defined and properly graded skiway. Without the lower catchline, return access would be via skier-defined routes through the trees, and the Rescue Road at the base of the slope would be the only clearly demarcated limit to the skiing terrain. The Rescue Road is not graded to allow skiers to glide back to the Sunrise base area.

Action alternatives must address the same stated purpose and need as a proposed action. Alternative A would not address one need in the same manner as this Proposed Action. That need, as described above in section 1.4, is as follows:

1. To improve the skiing experience during windy conditions.

> Wind causes routine closure of the high-elevation lift and frequent closure of the northwest-facing lifts at Mt. Bachelor…Additional lift-served terrain on the more wind-protected, east-facing slopes of Mt. Bachelor is needed to alleviate this constraint. Development of the proposed Eastside pod, *the lower catchline, and the tree skiing opportunity between the two catchlines address this need*. (Emphasis added.)

Elimination of the lower catchline would likely increase the risk of skier stranding and the ski area's resulting rescue efforts, as discussed below in section 3.5.2. It could also reduce the numbers of skiers using the naturally gladed terrain below the existing catchline, thus limiting Alternative A's responsiveness to this specific need. However, development of the Eastside pod's lift and trails is the main element addressing this need, and the new lift access would undoubtedly increase tree skiing east of the developed pod even without the new catchline. Coupled with the fact that Alternative A would effectively address all other elements of purpose and need, this incremental change was determined to not substantively affect the alternative's responsiveness to the stated purpose and need for action.

2.6 SUMMARY AND COMPARISON OF ENVIRONMENTAL EFFECTS

Table 2-1 summarizes and compares the environmental effects of the Proposed Action and alternatives. The table incorporates the issues listed in section 1.7, and it starts with the No-Action Alternative as a basis for comparison.

2.7 AGENCY'S PREFERRED ALTERNATIVE

The agency's preferred alternative is the Proposed Action. The Proposed Action would fulfill the DNF statutory mission and responsibilities, and is consistent with economic, environmental, technical, and other factors. The Proposed Action also best meets the purposes and needs identified above (section 1.4).

Table 2-1. Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Air Quality	No notable increase in pollutant emissions associated with the ski area associated with two projects under No-Action Alternative (new administration building and remodeling of guest services building).	Construction emissions transitory, with minimal direct or long-term impacts with standard mitigation in place. Biomass plant's highest modeled NO_2 concentration well below the standard. CO_2 emissions offset by replacement of current propane burners. Tailpipe emissions not projected to exceed levels recorded in 2005/06. Overall, exceedance of the NAAQS or violation of PSD maximum allowable increases unlikely.	Same as Proposed Action.
Geology and Soils: - Soil Productivity	No change in percentage of project area in detrimental soil quality condition, as both buildings in West Village parking lot.	Additional 34 acres in permanent detrimental soil condition; potential for 275 more acres depending on success of site rehabilitation efforts.	Similar to Proposed Action, but acreage of potential detrimental soil condition reduced to 264.
- Volcanic features	No damage to lava tubes and caves.	Minor, mitigable potential for damage to lava tubes and caves.	Same potential for damage to lava tubes and caves as Proposed Action.
Water and Watershed Resources: - Hydrology	No change from current conditions, as both buildings in West Village parking lot.	Impact limited and localized by lack of live water in project area or surface hydrologic connectivity outside of area. Total disturbance acreage 717 in Dutchman Creek watershed, 39 in Soda Creek watershed. New snowmaking using 2 – 3 million gallons/year in Soda Creek watershed. Standard mitigation stipulations projected to preclude notable effects on hydrology.	Similar to Proposed Action, but disturbance reduced to 315 acres in Dutchman Creek watershed.

Table 2-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
- Groundwater Quality	No change from current conditions, as both buildings in West Village parking lot.	Ten acres of new parking lots at Sunrise and West Village bases. Drain field expansion on 1.4 acres; reserve expansion area 1.7 acres. Standard mitigation stipulations projected to preclude notable effects on groundwater quality.	Same as Proposed Action.
Vegetation: - Vegetation Disturbance	Only the developed cover type would be disturbed by construction of the West Village administration building. No physical disturbance, loss, or conversion of existing vegetation.	Disturbance of 746 acres of vegetated cover types, some leading to permanent type change (e.g., to ski run vegetation), remainder returning to pre-project condition following site rehabilitation. Disturbance would include 64 acres of old growth forest, or 6% of total in SUP area.	Similar to Proposed Action, but disturbance of vegetated cover types reduced to 204 acres. Old growth impact reduced by 1 acre.
- Special Status Plant Species	No impact on plants, including federally listed, Forest Service Sensitive, and Survey and Manage species.	Whitebark pine, a candidate for federal listing: About 6 acres of occupied habitat subject to clearing and grading. Proposed Action would impact individuals but not contribute toward a trend toward federal listing. *Ramaria rubrievanescens,* a Survey and Manage fungus species: An individual identified in proposed Eastside lift lower terminal access road; site would be managed through design criteria and mitigation measures to protect this fungus.	Same as Proposed Action; same amount of clearing and grading in potential whitebark pine habitat, and same protection provided for the Survey and Manage fungus species.
- Wetlands	No wetlands present or affected.	Same as No-Action Alternative.	Same as No-Action Alternative.
- Noxious Weeds	Construction in developed cover type would not affect introduction or spread of noxious weeds.	Disturbance of 746 acres of vegetated cover types could introduce or spread noxious weeds. Mitigation anticipated to effectively avoid notable impact.	Same as Proposed Action.

Table 2-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Wildlife:			
- Habitat Disturbance	No disturbance of habitats other than developed cover type.	No effect on northern spotted owl nesting/ roosting/foraging habitat or designated critical habitat units. Convert or degrade 143.2 acres of northern spotted owl dispersal habitat. No effect on elk/mule deer calving/fawning habitat. 147 acres or clearing, grading, or excavation in forest stands containing dead wood habitat. Reduced connectivity due to conversion of mountain hemlock stands (212 acres) and mixed conifer stands (44 acres) to non-forest cover types. Increased noise and human activity during construction and operation phases, both summer and winter.	Similar to Proposed Action, but noise and activity of summer construction and winter skiing reduced on 403 acres between existing and proposed catchlines.
- Special Status Wildlife Species	No direct or indirect effect on any special status wildlife species.	May affect, not likely to adversely affect northern spotted owl. May impact wolverine, Pacific fisher, or Townsend's big-eared bat individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability to the population or species; no impact on Oregon spotted frog or American peregrine falcon. Would not affect any Survey and Manage wildlife species. Would have a small negative effect (<0.01 – 0.05 percent of Forest-wide potential reproductive habitat) on eight Management Indicator Species (MIS); no effect on four MIS. Would have small negative impact on Clark's nutcracker and blue grouse; no impact on other Landbird Focal Species, Birds of Conservation Concern, or High Priority Shorebirds.	Similar to Proposed Action, but noise and activity of summer construction and winter skiing reduced on 403 acres between existing and proposed catchlines.
Fisheries	No effect due to the absence of live water in the project area and the lack of hydrological	Same as No-Action Alternative.	Same as No-Action Alternative.

Table 2-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
	connectivity to fish-bearing water bodies.		
Riparian Reserves	No effect due to absence of Riparian Reserves in project area.	Same as No-Action Alternative.	Same as No-Action Alternative.
Fire and Fuels	No change from current conditions.	No effect; addressed through design criteria.	Same as Proposed Action.
Undeveloped Land: - PWA Area	No effect: 7 polygons of PWA totaling 13,310 ac.; three polygons of other undeveloped land totaling 58 ac.; most unroaded resources and features largely intact.	PWA fragmented into nine polygons, with a loss of 447 acres due to development of Eastside pod and new catchline, and equating to approximately 3.3 percent of the PWA in the analysis area and 0.3 percent of the area incorporating adjacent PWA, IRA, and wilderness. Four polygons of other unroaded land totaling 96 acres. Increased winter recreational use of PWA polygons between existing and proposed catchlines.	PWA polygons remain at seven but with a loss of 280 acres due to development of Eastside pod, and equating to approximately 2.1 percent of PWA within the analysis area and 0.2 percent of the area incorporating adjacent PWA, IRA, and wilderness. Other unroaded land same as Proposed Action. Unroaded resources and features otherwise the same as No-Action Alternative.
- IRA and Wilderness	No change from current conditions. Current sounds of year-round operations and maintenance would continue to be perceptible from the southern-most limits of the Three Sisters Wilderness and Bend Watershed and West-South Bachelor IRAs.	Addition of formal summer operation in the West Village would increase the level of activity and noise that may be perceptible from the Wilderness and adjacent IRA. Construction and operation of Eastside pod would not be perceptible from the Wilderness or other unroaded and undeveloped areas due to topography and distance (at least 3 miles) but would be audible in adjacent portions of IRAs. Hwy. 46 would continue to provide the most consistent source of noise. Any summer traffic increase associated would culminate at the West Village entrance, approximately 1.5 miles from the Wilderness but closer to the adjacent IRA.	Similar to Proposed Action, except West-South Bachelor IRA not affected by construction or maintenance of lower catchline.
Safety: - Skier Stranding	No effect; skiers using Eastside area would create traverse to Sunrise area,	Would provide easy egress for skiers descending below existing catchline on eastern slope of Mt. Bachelor.	Elimination of lower catchline would increase risk of skier stranding.

Table 2-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
	walk out on Rescue Road, or be stranded.		
- Hiker/Biker Collisions	No effect; mountain bike use would remain minimal and not be allowed on hiking trail.	Would avoid collisions by designating separate uses of trails and patrolling to enforce designations.	Same as Proposed Action.
Heritage Resources:			
- Prehistoric and Historic Resources	No effect; no eligible prehistoric or historic resources located in area of potential disturbance.	Same as No-Action Alternative.	Same as No-Action Alternative.
- Native American Traditional Cultural Places	No effect; no TCPs located in area of potential disturbance.	Same as No-Action Alternative.	Same as No-Action Alternative.
Recreation:			
- Tubing hill relocation	No effect; tubing hill and snowplay area would not be relocated, so no change in effect on Nordic Center users.	Relocation of the tubing and snowplay area would add to the noise level in the vicinity of the Nordic Lodge and on the re-aligned portion of Blue Jay's way; added noise would be similar to that currently experienced on Blue Jay's Way but louder due to proximity. No music or increased use of Nordic Lodge anticipated.	Same as Proposed Action.
- Removal of Snowmobile Trail No. 40 from the National Forest Trail System	No change from existing conditions; trail would be open to public snowmobile use, and existing use conflicts and safety issues would continue.	Trail would be removed from the trail system, avoiding worsening safety issues as overall use increases. Snowmobilers would lose access to 2.8 miles of dead-end trail and to the amenities at Sunrise Lodge.	Same as Proposed Action.

Table 2-1 (cont'd). Summary and comparison of the environmental effects of the Proposed Action and alternatives.

Environmental Issue	No-Action Alternative	Proposed Action	Alternative A – No New Catchline
Scenic Resources:			
- On-mountain Improvements	No change from existing conditions; views would continue to meet Visual Quality Objective (VQO) of Partial Retention and Scenic Integrity Level (SIL) of Moderate.	Eastside pod and new catchline would be visible from some nearby viewpoints on Hwy. 46, but views would conform to assigned VQO and SIL.	Same as Proposed Action, except no new catchline would be visible from the viewpoint at the junction of Hwys. 45 and 46.
- Base Area Improvements	New Cascadian façade on the guest services building and the new administrative building, would better adhere to the Built Environment Image Guide (BEIG) but would also highlight the divergence of the remaining buildings from the BEIG.	Building removals, remodels of existing buildings, and construction of new buildings would make Sunrise and West villages more consistent with BEIG. Scrubbers and other required technologies would preclude noticeable emissions from biomass plant as viewed from base areas.	Same as Proposed Action.
Transportation	Ski area-related traffic within capacity of Hwy. 46. Drive time from Bend less than an hour. Parking adequate on all but peak days.	Same as No-Action Alternative, except parking increased by 1,228 cars, meeting targeted visitation of about 12,000 per day.	Same as Proposed Action.

CHAPTER 3: EFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter discloses the environmental consequences of the Proposed Action and alternatives. It is organized by resource area, beginning with the physical and biological environment, shifting to the human environment, and then to other required disclosures. The information under each resource-specific heading begins with a summary of the scope of the analysis (i.e., the environmental issues addressed, indicators employed, and analysis area). The affected environment for each issue is then described to provide context for the environmental consequences discussion that follows. That discussion focuses first on direct and indirect effects of the No-Action Alternative to establish a baseline, then addresses the Proposed Action and the action alternative. The effects analysis includes application of the design criteria and mitigation measures introduced in section 2.2.6. Each resource-specific section ends with a discussion of cumulative effects an assessment of Forest Plan compliance.

Information on two topics is relevant to some or all of the resource-specific analyses in this chapter. It is presented here to avoid duplication in those sections, and it includes the following:

- Disturbance Types and Areas
- Cumulative Actions

3.2 DISTURBANCE TYPES AND AREAS

Table 3-1 provides basic dimensions of clearing and grading associated with various categories of projects. These dimensions were used in calculating the project-specific disturbance areas shown in Table 3-2, which also indicates the type of disturbance and the land cover affected. Note that projects creating no additional disturbance of soil or vegetation are not included in Table 3-2 (e.g., the power line and skiway from Sunrise base to the lower terminal of Eastside Express lift, which are within the alignment of the access road, or hiking on the existing access road from Pine Marten Lodge to the upper Northwest Express lift terminal.) Projects that would disturb less than 0.1 acre (e.g., the zipline and climbing wall) are also not included. Table 3-3 summarizes acres of disturbance by disturbance type and land cover type for the Proposed Action, Table 3-4 for Alternative A. As the minor disturbance under the No-Action Alternative would take place in a parking lot, this analysis assumes there would be no surface disturbance. Disturbance types, from least intensive to most intensive, are as follows:

- Selective tree removal – removal of single, scattered trees 8 inches or less in diameter or small clumps of saplings using hand tools, including chainsaws. Trees limbed, bucked, scattered, and left in place unless scenic, habitat, fuel management, or other concerns dictate alternative forms of disposal. Intent is to reduce discreet choke points in terrain that is naturally open enough for tree and glade skiing without altering the structure and habitat value of the stand.
- Glading – removal of smaller trees (leaving trees greater than 21 inches in diameter in place) to achieve a target spacing of 15 – 25 feet. May involve hand tools or equipment such as feller-bunchers. Trees chipped or stacked and burned on site or collected for use as biofuel or sale, according to market conditions and fuel management objectives. 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 or skidded down trails and hauled for use as biofuel or sale, as market conditions and fuel management objectives dictate.
- 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 foundations.

Noise generation associated with various elements of the Proposed Action and the setting is described below in the wildlife analysis, section 3.4.5.2.1.

Table 3-1. Typical disturbance dimensions by project type.

Project Type	Disturbance Dimensions[1]	Disturbance Type
Chairlifts:		
Alignment Clearing	60-foot width	Clearing
Terminals	100 x 200 feet	Excavation
Towers	25 x 25 feet	Excavation
Carpet Lifts	25-foot width	Grading
Ski Trails	150-foot maximum width	Grading
Tree and Glade Skiing	Actual acreage	Selective Tree Removal or Glading
Nordic Trails (tread width + 20 ft)	36-foot width	Grading
Hiking Trails (1.5 x tread width)	4.5-foot width	Grading
Mountain Bike Trails (1.5 x tread width):		
Single Track	4.5-foot width	Grading
Excavated	7.5-foot width	Grading
Zipline:		
Alignment Clearing	30-foot width	Selective Tree Removal
Towers	25 x 25 feet	Excavation
Access Roads (tread width + 20 ft)	36-foot width	Grading
Buried Utility Lines	15-foot width	Excavation
Buildings and Other Infrastructure	Footprint size plus 50-foot construction buffer	Excavation

[1]These are the dimensions of construction-related disturbance, not the finished dimensions of projects.

Table 3-2. Disturbance area, type, and land cover by project.

	Width (ft)	Length (ft)	Area[1] (ac)	Disturbance Type[2]	Land Cover Type (ac)
Eastside Express Lift					
Lift corridor	60	6,725	9.3	Clearing	Mountain. Hemlock 5.5 Natural Non-Forested 3.3 Mixed Conifer 0.4 Lava 0.1
Upper Terminal	100	200	0.5	Excavation	Natural Non-Forested 0.4 Lava 0.1
Lower Terminal	100	200	0.5	Excavation	Mountain Hemlock 0.5
Towers (est. 25)	25	25	0.4	Excavation	Mountain Hemlock 0.3 Natural Non-Forested 0.1
Lower access road	36	2,260	1.9	Grading	Mountain Hemlock 1.9
Upper access road	36	1,075	0.9	Grading	Natural Non-Forested 0.8 Lava 0.1
Eastside Express Trails					
Ski trails (50 – 150 ft; avg. 75 ft)	150	42,918	139.5	Grading	Mountain Hemlock 75.4 Natural Non-Forested 32.6 Mixed Conifer 20.1 Lava 3.4 Ski Trail 8.0
Tree skiing: Sparsely forested areas	-	-	433.3	Selective Tree Removal	Mountain Hemlock 318.2 Natural Non-Forested 112.3 Mixed Conifer 1.9 Ski Trail 0.9
More heavily forested areas	-	-	73.1	Glading	Mountain Hemlock 68.6 Mixed Conifer 3.7 Natural Non-Forested 0.5 Ski Trail 0.3
Lower catchline	36	13,440	10.8	Grading	Mountain Hemlock 7.8 Natural Non-Forested 1.9 Mixed Conifer 1.1
Haul Road	36	3,750	3.4	Grading	Mountain Hemlock 2.3 Mixed Conifer 1.0 Ski Trail 0.1
Snowcat cutoff trail	30	645	0.4	Clearing	Mountain Hemlock 0.4

Table 3-2 (cont'd). Disturbance area, type, and land cover by project.

	Width (ft)	Length (ft)	Area[1] (ac)	Disturbance Type[2]	Land Cover Type (ac)
Rainbow Lift Shortening					
Lower Terminal	100	200	0.5	Excavation	Ski Trail 0.5
Upper Terminal	100	200	0.5	Excavation	Ski Trail 0.5
Towers (max. 5)	25	25	0.1	Excavation	Ski Trail 0.1
Sunrise Lift Replacement					
Lower Terminal	100	200	0.5	Excavation	Developed 0.5
Upper Terminal	100	200	0.5	Excavation	Natural Non-Forested 0.5
Towers (max. 5)	25	25	0.1	Excavation	Ski Trail 0.1
Sunrise Base Area					
Expand existing lodge	-	-	0.1	Excavation	Developed 0.1
New lodge	-	-	1.4	Excavation	Developed 1.4
Moving carpet 12a	25	690	0.6	Grading	Ski Trail 0.4 Developed 0.1 Mountain Hemlock 0.1
Moving carpet 12b	25	600	0.2	Grading	Developed 0.1 Mountain Hemlock 0.1
Moving carpet s1	25	150	0.1	Grading	Developed 0.1
Moving carpet s2	25	185	0.1	Grading	Developed 0.1
Kids Adventure Zone	-	-	23.0	Glading	Mountain Hemlock 19.5 Ski Trail 3.5
Sunrise reservoir	80	80	0.1	Excavation	Mountain Hemlock 0.1
Drain field expansion	-	-	1.4	Excavation	Mountain Hemlock 1.1 Developed 0.3
Reserve drain field expansion	-	-	1.7	Excavation	Mountain Hemlock 1.6 Developed 0.1
Restrooms at base of Skyliner	-	-	0.1	Excavation	Developed 0.1
Sunrise Base Parking Expansion					
Existing parking lot expansion	-	-	0.8	Grading	Mountain Hemlock 0.7 Ski Trail0.1
New parking lot	-	-	6.2	Grading	Developed 0.9 Mountain Hemlock 5.3

Table 3-2 (cont'd). Disturbance area, type, and land cover by project.

	Width (ft)	Length (ft)	Area[1] (ac)	Disturbance Type[2]	Land Cover Type (ac)
New road access	-	-	1.3	Grading	Mountain Hemlock 1.1 Developed 0.2
Red Chair Shortening					
Terminal (1)	100	200	0.5	Excavation	Natural Non-Forested 0.5
Snowmaking					
Leeway snowmaking Line	15	960	0.3	Excavation	Natural Non-Forested 0.2 Ski Trail 0.1
Short Redtop Snowmaking line	15	500	0.2	Excavation	Ski Trail 0.1 Mountain Hemlock 0.1
Skyliner/Happy Corner snowmaking line	15	2,365	0.8	Excavation	Natural Non-Forested 0.7 Mountain Hemlock 0.1
Coffee Face snowmaking line	15	1,380	0.5	Excavation	Ski Trail 0.5
Upper Sunshine snowmaking line	15	1,150	0.4	Excavation	Ski Trail 0.4
Egan/Home Run snowmaking line	15	1,840	0.6	Excavation	Ski Trail 0.6
West Village					
Lodge expansion	-	-	0.8	Excavation	Developed 0.8
Alpine Training Center	-	-	0.6	Excavation	Developed 0.5 Ski Trail 0.1
Biomass plant	100	250	0.6	Excavation	Mountain Hemlock 0.6
Tubing area	-	-	6.3	Grading	Mountain Hemlock 5.0 Developed 1.3
Tubing area moving carpet	25	470	0.3	Grading	(Included in tubing area)
New parking lot	-	-	3.0	Grading	Mountain Hemlock 2.9 Developed 0.1
Nordic Skiing					
Access trail	36	2,295	2.0	Grading	Mountain Hemlock 1.4 Developed 0.5 Lodgepole 0.1

Table 3-2 (cont'd). Disturbance area, type, and land cover by project.

	Width (ft)	Length (ft)	Area[1] (ac)	Disturbance Type[2]	Land Cover Type (ac)
Blue Jay's Way reroute	36	3,340	2.8	Grading	Mountain Hemlock 2.3 Developed 0.5
Bob's Bungalow	40	46	0.1	Excavation	Mountain Hemlock 0.1
Hiking Trails					
Pine Marten to West Village	4.5	8,065	1.1	Grading	Natural Non-Forested 0.5 Ski Trail 0.4 Mountain Hemlock 0.1 Lava 0.1
Geologic interpretive trail above Pine Marten Lodge	4.58	2,100	0.2	Grading	Natural Non-Forested 0.2
Mountain Bike Trails					
Beginning excavated	7.5	20,588	3.6	Grading	Mountain Hemlock 1.4 Natural Non-Forested 1.0 Ski Trail 1.0 Lava 0.2
Intermediate excavated	7.5	22,638	4.1	Grading	Mountain Hemlock 2.4 Ski Trail 1.3 Natural Non-Forested 0.2 Developed 0.1 Lava 0.1
Intermediate single track	4.5	7,915	0.8	Grading	Mountain Hemlock 0.5 Ski Trail 0.3
Expert single track	4.5	15,191	1.6	Grading	Mountain Hemlock 1.0 Ski Trail 0.5 Natural Non-Forested 0.1
Mountain bike skills area	294	415	2.9	Excavation	Ski Trail 2.6 Mountain Hemlock 0.3
Zipline					
Corridor	30	6,650	4.6	Selective Tree Removal	Ski Trail 2.5 Natural Non-Forested 1.4 Mountain Hemlock 0.7
Towers (6)	25	25	0.1	Excavation	Mix of Ski Trail, Natural Non-Forested, and Mountain Hemlock

Table 3-2 (cont'd). Disturbance area, type, and land cover by project.

	Width (ft)	Length (ft)	Area[1] (ac)	Disturbance Type[2]	Land Cover Type (ac)
Utility Lines					
Sunrise Reservoir supply and distribution line	15	1,790	0.6	Excavation	Developed 0.2 Ski Trail 0.3 Mountain Hemlock 0.1
New Sunrise Lodge wastewater line	15	1,480	0.5	Excavation	Mountain Hemlock 0.2 Ski Trail 0.2 Developed 0.1
Biomass plant steam line	15	7,365	2.5	Excavation	Developed 1.9 Mountain Hemlock 0.4 Ski Trail 0.2
Biomass plant tie-in to mountain water system	15	1,135	0.4	Excavation	Developed 0.2 Mountain Hemlock 0.1 Ski Trail 0.1
Lower terminal power supply (in lower access road)	15	6,535	1.1	Excavation	Mountain Hemlock 0.9 Developed 0.1 Ski Trail 0.1

[1]Areas were determined by using GIS to calculate disturbance by land cover type then rounding and summing those acreages. As a result, they do not match the results of multiplying width by length of disturbance. This results in a larger disturbance area and thus a more conservative analysis.

[2]This term describes the highest level of disturbance associated with a given project, and lower levels may also be applicable. For example, under "selected tree removal," only that level of disturbance would occur, but under "excavation," "clearing" and "grading" would also occur prior to excavation.

Table 3-3. Acres of disturbance by disturbance type and land cover type, Proposed Action.

	Selective Tree Removal	Glading	Clearing	Grading	Excavation	Total
Mountain Hemlock	318.9	88.1	6.0	111.7	6.0	530.7
Natural Non-Forested	113.8	0.5	3.3	37.1	3.2	157.9
Mixed Conifer	1.9	3.7	0.4	22.1	0	28.1
Ski Trail	3.4	3.9	0	11.9	6.0	25.2
Developed	0	0	0	3.8	6.2	10.0
Lava	0	0	0.1	3.7	0.4	4.2
Lodge Pole Pine	0	0	0	0.1	0	0.1
Total	438.0	96.2	9.8	190.4	21.8	756.2

Table 3-4. Acres of disturbance by disturbance type and land cover type, Alternative A – No New Catchline.

	Selective Tree Removal	Glading	Clearing	Grading	Excavation	Total
Mountain Hemlock	16.5	88.1	6.0	103.8	6.0	220.4
Natural Non-Forested	26.3	0.5	3.3	35.2	3.2	68.5
Mixed Conifer	0	3.7	0.4	21.0	0	25.1
Ski Trail	3.4	3.9	0	11.9	6.0	25.2
Developed	0	0	0	3.8	6.2	10.0
Lava	0	0	0.1	3.7	0.4	4.2
Lodge Pole Pine	0	0	0	0.1	0	0.1
Total	46.2	96.2	9.8	179.5	21.8	353.5

3.3 CUMULATIVE ACTIONS

The cumulative effects discussions under each of the following resource headings address, as appropriate, the cumulative actions described in Table 3-5. Figure 3-1 illustrates the location of these cumulative actions within the analysis area, defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

Table 3-5. Cumulative actions.

Project Name	Project Description and Scale
Past Projects	
1. Sparky Vegetation Management Project	Location: Hwy. 46 corridor. Description: Hazardous tree were removed along 14 miles of the corridor. Commercial thinning occurred on approximately 1,352 acres, and pre-commercial thinning was done on approximately 542 acres. The project was completed in 2011. Subsequently, public firewood areas have been opened or are planned for much of this area, authorizing collection of the down wood.
Ongoing Projects	
2. Existing Winter and Summer Trail Systems	Location: Throughout analysis area. Description: An extensive system of winter, summer, and dual use recreational trails has been developed in the area accessed by the scenic byway. In addition to recreational use, these trails are periodically groomed, brushed, and cleared of hazard trees.

Table 3-5 (cont'd). Cumulative actions.

Project Name	Project Description and Scale
3. Existing Summer Recreation Sites	Location: Throughout analysis area. Description: A system of campgrounds, day-use areas, picnic sites, boating sites, horse camps, and a lodge has been developed in the analysis area. In addition to recreational use, these facilities are maintained throughout the summer season (e.g., vegetation maintenance, garbage removal, and restroom maintenance).
4. Existing Sno-parks	Location: Hwy. 46 corridor. Description: A network of sno-parks providing parking and access to snow play areas and winter trails has been established along the scenic byway.
5. County Road Maintenance	Location: Hwy. 45 and Hwy. 46 south of Mt. Bachelor. Description: Hazard tree removal occurs on an as-needed basis. Snow removal occurs on Hwy. 45 but not the County section of Hwy. 46. Hwy. 46 will be resurfaced in 2012, and the road shoulders will be widened slightly.
6. Alternative Transporta-tion Planning	Location: Hwy. 46. Description: In coordination with local and regional transportation services, the DNF seeks to identify alternative sources for transportation of recreation users to the Forest. Cascades East Transit (CET) received grant funding to purchase buses that will transport the public from Bend to Mt. Bachelor Ski Area. Beginning with the 2011/2012 ski season, CET will initiate this new route, and Mt. Bachelor Inc. will no longer provide a bus service between Bend and Mt. Bachelor.
7. Travel Management Plan	Location: Throughout analysis area. Description: The Travel Management Plan proposes to prohibit motorized travel off of existing designated routes and continue to provide motorized access for dispersed camping. Winter, over-the-snow travel would not be affected. A Notice of Intent (NOI) to prepare an EIS on the plan update was published in September 2011.
8. Invasive Plant Treatments	Location: Throughout analysis area. Description: Site-specific treatment of invasive plants on approximately 17,000 acres on the Ochoco and Deschutes NF and Crooked River National Grassland has been proposed. The purpose of this project is to reverse the negative impacts of invasive plants and to restore ecological functions in a cost-effective manner. The project would utilize the new tools and management direction in *Pacific Northwest Region Invasive Plant Program - Preventing and Managing Invasive Plants* ROD and Final EIS.
Reasonably Foreseeable Future Projects	
9. Kapka Butte Sno-park	Location: Hwy. 46, in Dutchman subwatershed. Description: A new sno-park near Kapka Butte providing more high-elevation parking for winter recreationists has been proposed, including approximately 70 slots for trailers and 40 for non-trailer vehicles. The site links to existing trails and new trail construction. A Final EIS was completed and the ROD was signed in September of 2012. Implementation is anticipated in 2013 or 2014.
10. Fish Passage Improvements	Location: Soda and Goose Creeks. Description: The culvert at Goose Creek is proposed to be replaced with a larger diameter culvert pipe; the culvert at Soda Creek with a bridge or pre-fabricated box culvert. Bankfull channel widths would be exceeded at both sites, improving the passage of large wood and debris. NEPA review of the proposal is underway.

Table 3-5 (cont'd). Cumulative actions.	
Project Name	**Project Description and Scale**
11. Nordic Center Hazard Tree Removal	Location: Mt. Bachelor Nordic Center. Description: Beetle-killed lodgepole pines adjacent to Nordic trails, particularly in the northeastern portion of the trail system, pose a potential hazard to trail users. A timber sale will be completed to remove these hazard trees, using standard, mechanized practices. The sale has not been scheduled but is anticipated to occur within 5 years.
12. Dutchman Cinder Pit Expansion	Location: East side of Hwy. 45 in Dutchman Creek watershed. Description: The existing, 13-acre pit will be expanded by 4.5 acres to provide road maintenance material for the next 5 – 10 years. The site will be cleared of vegetation, including trees, prior to excavation. Site preparation will likely begin in the fall of 2012.

3.4 PHYSICAL AND BIOLOGICAL ENVIRONMENT

3.4.1 AIR QUALITY

3.4.1.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

***Issue*:** Air quality may be affected by stack emissions from the proposed biomass cogeneration facility, tailpipe emissions from the additional vehicles accommodated through parking lot expansions, smoke from slash burning, new natural-gas fire pits, a new snow cat for trail grooming, additional grilling at the restaurants, and fugitive dust from construction activities.

Indicators:

- Burner type, fuel type, and generation capacity of the proposed biomass facility (to allow estimation of emissions, since the facility has not been designed).
- Number of additional parking spaces added.
- Quantity and timing of any slash burning.
- Number of acres of soil surface disturbance during a given season.
- Number of new snow cats for trail grooming.
- Number of new natural-gas fire pits.
- Analysis based on compliance with National Ambient Air Quality Standards (NAAQS); Greenhouse Gas (GHG) generation; General Conformity; and Air Quality Related Values (AQRVs). Depending on the quantity and type of pollutant increase, qualitative analysis may suffice. Otherwise, a screening analysis or more specific air quality modeling may be necessary.

Analysis Area: Analysis of the direct impacts focuses on the Mt. Bachelor airshed. Indirect effects are addressed for surrounding, sensitive airsheds including Three Sisters Wilderness and Bend. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

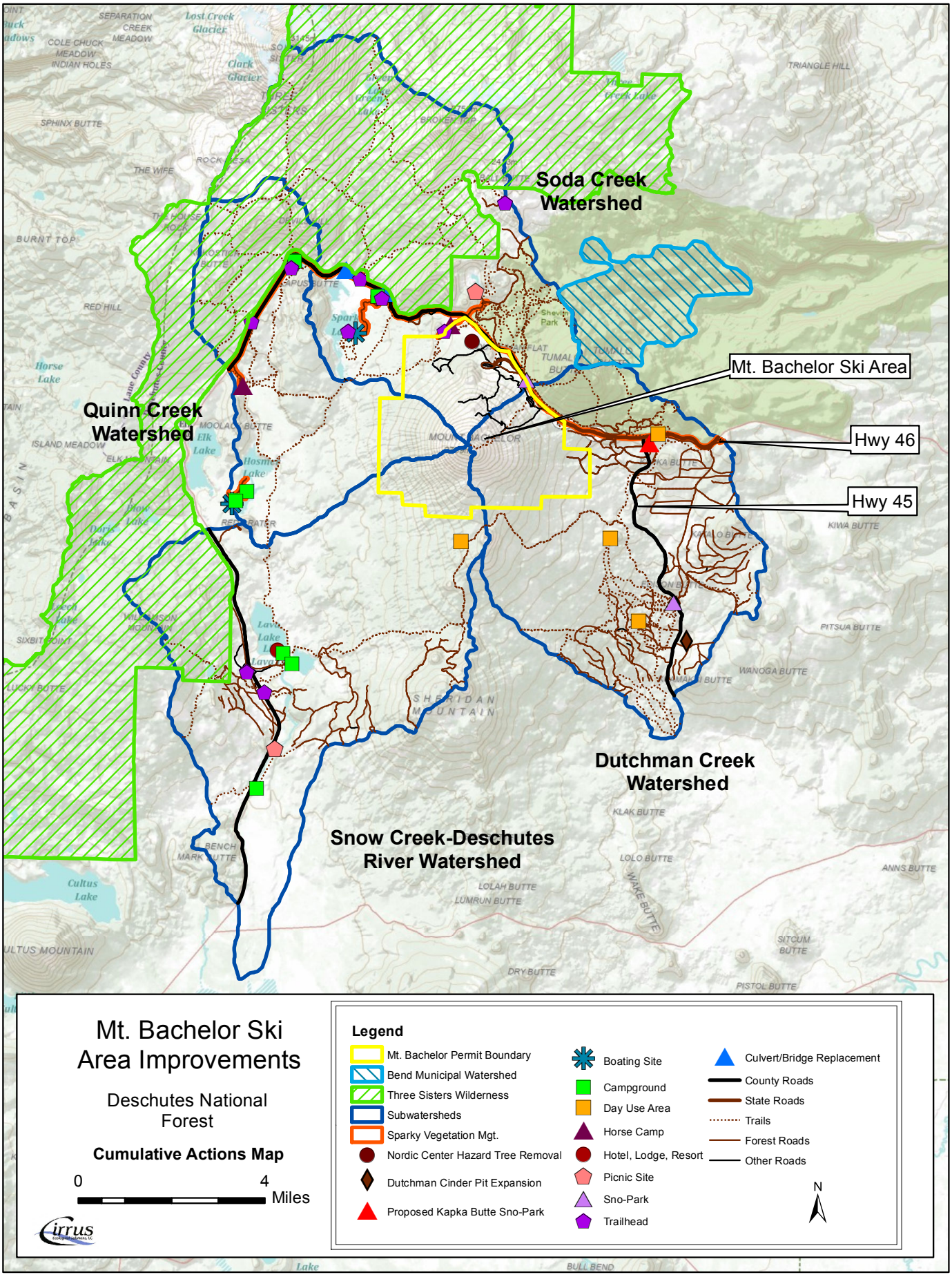

Figure 3-1. Location of cumulative actions.

3.4.1.2 Affected Environment

3.4.1.2.1 Class I and Class II Areas

Clean air designations were established under the federal Clean Air Act (CAA) Title I, Part C, Prevention of Significant Deterioration of Air Quality. Generally, the Class I air quality and land-use classification is the designation for clean, pristine airsheds and permits little or no development, and the Class II designation is applied to all other clean airsheds (in attainment of the NAAQS) where development is permitted under state authority. Class I areas include National Parks larger than 6,000 acres, Wildernesses larger than 5,000 acres, and International Parks and National Memorial Parks larger than 5,000 acres. Except for fires and wind erosion, the only potential for adverse air quality impacts in Class I areas is from anthropogenic pollutants transported into these areas by large-scale winds, local winds, or both. Areas in the U.S. that have ambient air quality concentrations greater than those specified in the NAAQS are designated as nonattainment areas; the remainder of the country is designated Class II.

Oregon has 12 Class 1 areas, one National Park and 11 Wildernesses. These areas include: Mt Hood, Mt Jefferson, Mt. Washington, Three Sisters, Diamond Peak, Crater Lake National Park, Eagle Cap, Hells Canyon, Strawberry Mountain, Gearhart Mountain, and Mountain Lakes (ODEQ 2010a). Three Sisters extends to within a mile of Mt. Bachelor's SUP boundary.

3.4.1.2.2 National Ambient Air Quality Standards (NAAQS)

The U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), sulfur dioxide (SO_2), and particulate matter (PM). Particulate matter is defined as fine particulates with a nominal aerodynamic diameter of 10 micrometers or less (PM_{10}) or 2.5 micrometers or less ($PM_{2.5}$). Primary standards for the criteria pollutants are health-based and are set at levels to protect the health of the most sensitive individuals in the population: the very young, the very old, and those with respiratory problems or other ailments. The EPA also established quality of life or secondary standards for the criteria pollutants. These may be the same as primary standards or less stringent. All standards are expressed as concentration and duration of exposure, and most address both short-term and long-term exposure (EPA 2010). The NAAQS are presented in Table 3-6.

When a designated air quality area or airshed within a state exceeds a NAAQS, that area may be designated as a "nonattainment" area. Areas with levels of criteria pollutants below the health-based standard are designated as "attainment areas." It is possible for a geographic area to be an attainment area for one criteria pollutant, but a nonattainment area for another. To determine whether an area meets the NAAQS, air-monitoring networks have been established and are used to measure ambient air quality. Monitoring sites, by design, are located in areas where high concentrations within a region are expected to occur. The Oregon Department of Environmental Quality (ODEQ) works with local communities to identify and prevent air quality problems using pollution reduction strategies, an air permitting program for industry, enforcement of regulations, public involvement, and air monitoring programs (ODEQ 2011a).

Table 3-6. EPA National Ambient Air Quality Standards, Significant Impact Levels, and Recorded Concentrations.

Pollutant	Standard Value[a]	Recorded Concentration[c]	Location[d]
CO			
8-hour average	9 ppm (10 mg/m^3)[b]	2.1 ppm	Eugene-Springfield Area
1-hour average	35 ppm (40 mg/m^3)[b]	3.1 ppm	
NO_2			
Annual arithmetic mean	0.053 ppm (100 µg/m^3)[b]	0.008 ppm	Hermiston
1-hour average	0.1 ppm (188 µg/m^3)[b]	0.037 ppm	Hermiston
O_3			
1-hour average	0.12 ppm (235 µg/m^3)[b]	NA	Bend (1 yr. of data)
8-hour average	0.075 ppm (effective 5/27/2008)	0.60 ppm	
Pb			
Quarterly average	1.5 µg/m^3	NA	None
PM_{10}			
24-hour average	150 µg/m^3 5 µg/m^3	47 µg/m^3	Eugene Amazon Park (3 yr 2nd high)
$PM_{2.5}$			
Annual arithmetic mean	15 µg/m^3	5.1 µg/m^3	Bend
24-hour average	35 µg/m^3	18 µg/m^3	Bend
SO_2			
Annual arithmetic mean	0.03 ppm (80 µg/m^3)[b]	1.6 ppb	Portland SE Lafayette (only current monitor)
24-hour average	0.14 ppm (365 µg/m3)[b]	4 ppb	
1-hour average	75 ppb	10 ppb	
3-hour average (secondary standard)	0.5 ppm (1,300 µg/m^3)[b]	NA	

[a] CO=primary standard; NO_2, O_3, Pb, and PM=primary and secondary standards; SO_2 = annual arithmetic mean. Mean and 24-hour average are primary standards, 3-hour average is a secondary standard. ppm=parts per million; ppb=parts per billion.

[b] Parenthetical value is an approximate equivalent concentration in micrograms per cubic meter.

[c] ODEQ 2010a. The Pb monitoring network was restarted in 2010, but no current design values are established.

[d] There are currently no NO_2 monitors near Mt. Bachelor.

Ambient air monitoring stations do not exist at the ski area. However, there are monitors near Bend, Oregon, and in surrounding areas of the state. Existing air quality near Bend is generally considered good based on the air quality index for both ozone and $PM_{2.5}$ (ODEQ 2011a).

Emissions data from the 2005 Western Regional Air Partnership (WRAP) for Deschutes County and Oregon are presented in Table 3-7. The report summarizes criteria pollutant levels in tons per year by source type. The data illustrate that emissions in Deschutes County are a small percentage of statewide totals.

Table 3-7. 2005 summary of emissions by source (tons per year) for Deschutes County and Oregon (WRAP 2005).

Source	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC
Area	37,816.8	1,059.5	34,620.3	7,638.5	416.7	11,067.6
On-road Mobile	32,791.8	3,169.6	84.0	60.1	55.7	2,853.5
Non-road Mobile	10,702.6	1,564.4	151.5	144.5	166.1	1,713.2
Point	112.0	125.7	600.6	321.0	1.9	265.7
Total Deschutes County	**81,423.3**	**5,919.2**	**35,456.4**	**8,164.1**	**640.3**	**15,900.0**
Area	1,619,954.3	35,265.7	770,421.8	223,352.6	19,866.1	470,853.8
On-road Mobile	773,097.4	82,754.2	2,315.7	1,653.5	1,536.9	67,284.4
Non-road Mobile	281,440.8	78,284.3	5,004.6	4,736.1	13,717.3	39,114.8
Point	23,188.2	12,885.0	11,220.0	7,014.8	5,090.0	12,365.4
Total Oregon	**2,697,680.6**	**209,189.2**	**788,962.1**	**236,757.1**	**40,210.3**	**589,618.4**
Deschutes County Percent of Oregon	3.0%	2.8%	4.5%	3.4%	1.6%	2.7%

The greatest sources of air pollution in Deschutes County are area sources (small mobile and stationary sources such as gas stations or wood burning, fires and biogenic sources); on-road mobile sources (automobiles and trucks traveling on established roads); and non-road mobile sources (construction and farm vehicles as well as off-road recreational vehicles). Industrial point sources are insignificant in the county.

Mt. Bachelor is in attainment of the air quality standards and is designated as a Class II area for the criteria pollutants. There are several Class I airsheds near the ski area, including Three Sisters, Mount Washington, and Mount Jefferson. The closest is Three Sisters, which is about 4 miles away.

3.4.1.2.3 Greenhouse Gases

The climate change research community has not yet developed specific tools for evaluating or quantifying end-point impacts attributable to the emissions of greenhouse gases from a single source. Also, scientific literature that addresses the climate effects of individual, facility-level greenhouse gas emissions has not been identified. The current tools for simulating climate change generally focus on global and regional-scale modeling. Global and regional-scale models lack the capability to represent important small-scale processes. As a result, confidence in regional- and sub-regional-scale projections is lower than at the global scale. There is thus limited scientific capability in assessing, detecting, or measuring the relationship between emissions of greenhouse gases from a specific single source and any localized impacts.

As a consequence, impact assessment of the effects of specific anthropogenic activities cannot be performed. Additionally, specific levels of significance have not yet been established. Therefore, climate change analysis for the purpose of this document is limited to accounting for and disclosing the factors that contribute to climate change. Qualitative and/or quantitative evaluations of potential contributing factors within the planning area are included where appropriate and practicable.

3.4.1.2.4 General Conformity

To eliminate or reduce the severity and number of NAAQS violations in nonattainment areas and to achieve expeditious attainment of the NAAQS, the EPA promulgated the Conformity Rule (40 CFR 6, 51, 93). The Conformity Rule applies to federal actions and environmental analyses, in nonattainment areas, completed after March 15, 1994. This rule contains a variety of substantive and procedural requirements to show conformance with both the NAAQS and state implementation plans.

The Mt. Bachelor ski area is located in Deschutes County. This county is in attainment of the NAAQS for all criteria pollutants as defined by EPA. Therefore, a General Conformity analysis is not required.

3.4.1.2.5 Air Quality Related Values

Federal land managers identified air quality-related values (AQRV) to be protected in federal areas such as National Parks and National Forest Class I areas. AQRVs are scenic, cultural, physical, biological, ecological, or recreational resources that may be affected by a change in air quality, as defined by the federal land manager. Specific AQRVs of concern are dependent on a number of variables, including the evolving state of the science, project-specific pollutants, site-specific management concerns, and the existing condition of the AQRVs. Visibility is the most important air quality value for the Proposed Action due to Mt. Bachelor's close proximity to Class I areas, particularly Three Sisters Wilderness. As there are not significant sources of acid rain in the area, projected emissions are small relative to regional sources, and flora and fauna are not expected to be affected, the other AQRVs are not discussed further.

3.4.1.2.6 Prevention of Significant Deterioration

In addition to the NAAQS, the EPA promulgated Prevention of Significant Deterioration (PSD) regulations to further protect and enhance air quality. The PSD regulations use an incremental approach to reach two goals, maintaining good air quality in areas that attain the national standards, and providing special protections for National Parks. These increments establish the maximum increase in pollutant concentration allowed above a certain baseline level. Complete consumption of an increment imposes a restriction on growth in the affected area but does not necessarily indicate an adverse health impact. PSD permits are required for major, new, stationary sources that emit 250 tons (100 tons for some specific sources) or more per year of an air pollutant. See Table 3-8 for the maximum allowable PSD increments over the baseline. Table 3-9 presents the PSD baseline dates triggered for the entire state of Oregon.

3.4.1.2.7 Visibility

Visibility is the degree to which the atmosphere is transparent to visible light. Visibility protection requirements are included in EPA PSD regulations, which require protection of AQRVs for Class I areas.

In response to EPA's Phase I visibility rules, the Oregon Department of Air Quality adopted the *Oregon Visibility Protection Plan* in 1986 (ODEQ 2010b). This plan contains short- and long-term strategies for making reasonable progress toward the national goal, related to addressing reasonably attributable impairment in the state's Class I areas through visibility monitoring and control strategies. This plan incorporates PSD requirements for visibility protection from new or modified major stationary sources, and if necessary, applying best available retrofit technology (BART) to existing stationary sources if certified as causing reasonably attributable visibility impairment.

Table 3-8. Prevention of Significant Deterioration of air quality increments – maximum allowable increase (µg/m^3).

Pollutant	Averaging Time	Class I	Class II
PM_{10}	24 hour	8	30
$PM_{2.5}$	Annual	NA	NA
	24 hour	NA	NA
SO_2	Annual	2	20
	24 hour	5	91
	3 hour	25	512
NO_2	Annual	2.5	25

Table 3-9. PSD baseline dates for the State of Oregon (ODEQ 2011b).

	SO_2	$PM_{2.5}$	PM_{10}	NO_2
All sources	Calendar Year 1978	Calendar Year 2007	Calendar Year 1978	Calendar Year 1988

The plan includes (a) visibility protection within Oregon's Class I areas (b) the mitigation of visibility impairment within the Mt. Hood and Central Oregon Cascade Wildernesses through short and long-term control strategies for forest prescribed burning and Willamette Valley agricultural field burning, (c) mitigation of impairment in the Eagle Cap Wilderness and Central Oregon Cascades resulting from agricultural field burning (OAR 2011).

Benchmark goals for reasonable progress in reducing regional haze on the 20 percent worst days include the following for the Central Cascades – Three Sisters Wilderness (ODEQ 2010b): a 1.5 deciview (dv) improvement to the 20 percent worst days is needed to meet the 2018 URP, and 6.5 dv needed by 2064. The sophisticated calculations required to determine progress toward this objective make it impractical to address in this analysis.

3.4.1.3 Direct and Indirect Effects

3.4.1.3.1 No-Action Alternative

Under the No-Action Alternative, elements of the Proposed Action would not be authorized, and there would be no increase in air emissions associated with the ski area. Emissions associated with growth or other developments would likely increase over time.

3.4.1.3.2 Proposed Action

Construction and operation under the Proposed Action would result in both temporary and ongoing increases in emissions to the atmosphere. Each of the emission sources is discussed below. An emission summary is presented in Table 3-10.

Table 3-10. Estimated pollutant emissions (tons per year).

Pollutant	Construction	Biomass Boiler	LPG Combustion	Snow Cat	Fire Pits	Total
PM_{10}	3.6	8.0	-0.1	0.0	0.0	11.5
$PM_{2.5}$	0.4	7.2	-0.1	0.0	0.0	7.5
NO_x	–	49.8	-1.5	0.6	0.3	49.2
VOC	–	2.4	-0.1	0.3	0.0	2.6
CO	–	23.8	-0.9	5.3	0.1	28.3
SO_2	–	3.5	-0.2	0.0	0.0	3.3
CO_{2e}	–	27,897	-1,472	275	332	27,092
Benzene	–	0.6	–	–	0.0	0.60
Toluene	–	0.1	–	–	–	0.1
Formaldehyde	–	0.6	–	–	0.0	0.6
Acetaldehyde	–	0.1	–	–	–	0.1
Acrolein	–	0.6	–	–	–	0.6

Construction

Construction activities related to lifts, trails, facilities are expected to produce short-term emissions of total suspended particulate (TSP), PM_{10}, $PM_{2.5}$, CO, NOx, and VOC. The initial construction activities would include excavation for new structures and buildings, and grading. Because detailed construction plans have not been developed, the construction emission inventory is focused exclusively on particulate matter.

EPA's TSP emission factor for heavy-construction operations (EPA 1995) is E = 1.2 tons/acre/month. Based on the emission factors for unpaved roads, the PM_{10} emission factor is 30 percent of the TSP factor, and the $PM_{2.5}$ emission factor is 10 percent of the PM_{10} factor. The eastside lift and initial trail work, plus relocation of the tubing hill are anticipated to be completed during the first 6-month construction season. Based on the disturbance areas defined in Table 3-2, 4.3 acres would be excavated and 172.9 acres would be graded during that period. It was estimated that excavation would take 1 month for each acre, and that 1 acre would be graded each day. The first year construction emissions are summarized in Table 3-10.

These construction emissions would be transitory and would have minimal direct or long-term impacts. Furthermore, construction impacts would occur in the summer months, while the highest emission levels in the area occur in late winter and early spring. The implementation of standard BMPs during construction periods would limit the marginal impact on air quality. It is unlikely that the proposed construction would cause and exceedance of NAAQS or PSD maximum allowable increases.

Biomass Facility

Operation of the 1 – 2 MW biomass cogeneration facility would produce emissions of TSP, PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, GHGs, and HAPS. Because the biomass facility would replace the current LPG usage at Mt. Bachelor, emissions from LPG combustion would be eliminated (NETL 2010). EPA emission factors (EPA 2003) for wood residue combustion in boilers were used assuming mixture of wet and dry wood,

and an electrostatic precipitator for control of particulate emissions. Annual emissions were based on facility operation of 7,008 hours per year (292 days). EPA emission factors (EPA 2008) for LPG combustion were used to estimate emission reductions from units being removed. Emissions from these sources are summarized in Table 3-10.

Based on the emissions calculated for the biomass facility, only NO_x emissions exceed the significant emission rate defined in Oregon DEQ's air permitting instructions (ODEQ 2011c). To estimate potential offsite impacts from operation of the biomass facility, EPA's SCREEN3 Model was used to estimate offsite concentrations of NO_2 (TTN 2011). The calculated emissions and engineering estimates for the stack parameters were input to the model (RTP 2010). The highest modeled 1-hour NO_2 concentration was 81.4 micrograms per cubic meter. This value is well below the 1-hour NO_2 standard of 188 micrograms per cubic meter. It is unlikely that emissions from the biomass facility would cause an exceedance of the NAAQS anywhere beyond the ski area boundary or a violation of PSD maximum allowable increases.

Transportation

As described in section 3.5.6, peak-hour traffic volumes for the Proposed Action are lower than those experienced during the winter of 2005/2006. Consequently, the direct and indirect motor vehicle emissions for the Proposed Action are lower than those in 2005/2006 and would not cause an exceedance of the NAAQS or PSD maximum allowable increases.

Slash Burning

Emissions from the burning of cleared vegetation and construction litter would be a short-term source of air pollutant emissions. The quantity of material to be burned is not yet defined. Some of the material could be used in the biomass facility. Emissions from slash burning were not quantitatively analyzed because quantities could not be estimated, and Forest Service, state, and local burn regulations control this activity. These regulations control the timing and location of burning, as well as what is being burned. As noted in section 2.2.6, any slash burning would be coordinated with DNF Fire Management personnel. An occasional burn would not have a long-term effect on air quality in the region.

Restaurant Grilling

The 2005/2006 season represents the highest number of visitors to Mt. Bachelor. Under the Proposed Action, it is assumed that the number of visits, and thus the number of meals grilled, would not exceed that experienced during 2005/2006. As a result, this activity would not cause an exceedance of the NAAQS or PSD maximum allowable increases.

Snow Cats

As part of the proposed action, one additional snow cat may be purchased. To estimate emissions from this vehicle, specifications from a Pisten Bully 600 were obtained (Pisten Bully 2006). Fuel-combustion emissions (NO_x, CO, PM, and VOCs) were calculated based on Tier 4 emission standards developed by the EPA (EPA 2004) for non-road diesel engines. Use of ultra-low-sulfur diesel fuel for the snow cat was also applied in the inventory. Carbon dioxide emissions were estimated based on the carbon content of diesel fuel (EPA 2005). Emissions are summarized in Table 3-10. The projected, marginal increase in emissions from this one snow cat, operating primarily during evening hours, would not cause an exceedance of the NAAQS or PSD maximum allowable increases.

Natural Gas Fire Pits

To estimate emissions from natural gas combustion in fire pits, it was assumed that up to 10 additional fire pits, rated at 80,000BTU/hour each, would be installed. Annual operation of the fire pits was assumed to be 7,008 hours (292 days). EPA emission factors for natural gas combustion in residential fireplaces were obtained from Section 1.4 of AP-42 (EPA 1998). Emissions are summarized in Table 3-10 and are

minimal. It is unlikely that emissions from the fire pits would cause an exceedance of the NAAQS anywhere beyond the ski area boundary or a violation of PSD maximum allowable increases.

Greenhouse Gases

GHG include carbon dioxide, methane, and nitrous oxide. Each gas has different physical properties. It is conventional to express all gas emissions in "equivalent amounts of carbon dioxide," where "equivalent" means "having the same warming effect over a period of 100 years. This is expressed as CO_{2e}. The Proposed Action would produce GHG emissions from the combustion of fuel by the biomass boiler, snow cat, and fire pits. Projected CO_{2e} emissions from these sources are summarized in Table 3-10.

Characterizing the net GHG impact of the biomass plant is complicated for several reasons. As indicated in Table 3-10, elimination of the current LPG combustion that fuels the walk-way snow-melting system would remove 1,472 tons of CO_{2e} annually. This reduction, plus the addition of a snow cat and 10 fire pits, would result in a net reduction of 239 tons of CO_{2e} per year, excluding the biomass plant. The biomass plant would add 27,897 TPY CO2e to the atmosphere resulting in a nominal net increase of 27,092 TPY CO2e. However, four factors should be considered in interpreting this figure:

- According to section 1.6 of AP-42 (*Wood Residue Combustion in Boilers*; EPA 2003), CO_2 emitted from the biomass boiler is "generally not counted as greenhouse gas emissions because it is considered part of the short-term CO_2 cycle of the biosphere." That means that the carbon stored in biomass makes its way back into the atmosphere in any case, whether it is burned as fuel or decays naturally over time. The fact that waste material would be the fuel source for the proposed plant increases the relevance of this direction.

- If the biomass were left standing, as part of a living forest, it would continue to remove carbon from the atmosphere rather than adding to it through combustion. However, the fuel for the proposed plant would be waste from forest management and other projects, not material specifically harvested as fuel. If not used for fuel, it would not serve to remove carbon from the atmosphere but would collected as firewood or be left in the forest to decay, either of which would add carbon into the atmosphere over time.

- A substantial amount of the waste material that would be used as fuel for the biomass plant would otherwise be harvested and burned as firewood, generating roughly the same carbon emissions.

- The figure of 27,092 TPY CO_{2e} is small in the context of atmospheric carbon. The EPA's threshold for major source permitting consideration of carbon sources is 100,000 tons of CO_{2e}.

Based on these considerations, precise calculation of the project's net impact on GHG would be extremely difficult. However, whether interpreted on the basis of the EPA's guidance that biomass emissions not be included in such calculations or on the minor increment of atmospheric carbon added even if the proposed biomass plant's emissions are included, it is reasonable to conclude that the project would have a very minor effect on GHG.

Proposed Action Emissions Summary

Emissions from the Proposed Action sources are summarized in Table 3-10. The total emissions for each pollutant are less than major source thresholds including PSD. The ski area would be classified as a minor source for all criteria pollutants and for GHG, and would therefore be subject to state permitting rules. It is unlikely that emissions from the Proposed Action would cause an exceedance of the NAAQS anywhere beyond the ski area boundary or a violation of PSD maximum allowable increases.

Visibility

Particulate emissions from the biomass facility would be controlled with an electrostatic precipitator with control efficiency between 90 and 99 percent.

The VISCREEN model (TTN 2011) was designed to determine whether a plume from a facility may be visible from a given vantage point (Level-1 Screening Analysis). The primary variables that affect whether a plume is visible or not at a given location include the quantity of emissions, type of emissions, relative location of the emission source and the observer, and the background visibility range.

Specifically, VISCREEN was used to assess potential visibility impacts near Mt. Bachelor inside and outside the Three Sisters Wilderness. The primary pollutants of concern that may impact visibility in the near-field are particulate matter and NO_x (as NO_2).

The maximum hourly emission rates of PM_{10} and NO_2 were input to the model as determined in the emission inventory, a default particle size and density, and worst-case meteorological conditions to assess potential plume impacts on visibility in the Wilderness. Worst-case meteorological conditions are assumed to be category F stability and a wind speed of 1.0 m/s. The default thresholds used to determine if the screening results are favorable, include the following:

- A Delta E value of <= 2, and
- A green contrast value of <= absolute value of 0.05.

The Delta E value is the color difference parameter and was developed to specify the perceived magnitude of color and brightness changes. The Delta E value is used as the basis for determining the perceptibility of plume visual impacts. The green contrast value is the contrast at a given wavelength of two colored objects such as plume/sky or plume/terrain. If all Delta E and green contrast values are below the respective thresholds within the Three Sisters Wilderness, then the visibility impacts are not expected to be significant.

The conservative screening analysis indicates potential visibility impacts above the significance thresholds within the Three Sisters Wilderness.

Because the Level-1 analysis results indicate results above the screening criteria, a Level-2 analysis is warranted once specific design parameters for the biomass facility are developed. The Level 2 screening allows the use of user-specified particle size, density, and worst-case meteorological conditions specific to the proposed biomass facility.

Given the relatively small emissions from the biomass facility, it is unlikely that the facility would contribute to any increase in regional haze, while providing a beneficial use for material that would otherwise be disposed as waste.

3.4.1.3.3 Alternative A – No New Eastern Catchline

This Alternative entails eliminating the proposed lower catchline. Compared to the Proposed Action, this alternative would result in an insignificant decrease in the amount of surface disturbance during construction, with a corresponding insignificant decrease in particulate emissions. Otherwise, impacts on air quality would be the same as described under the Proposed Action.

3.4.1.4 Cumulative Effects

The potential air quality impacts of the Proposed Action and Alternative A were assessed to determine what, if any, affects they would add to the cumulative actions (Table 3-5) as described below.

Cumulative actions 1, 2, 3, 5, 8, 10, and 11 would produce temporary construction emissions due to planned maintenance and improvement activities. These emissions would be transitory and would have minimal direct or long-term impacts. Furthermore, impacts would primarily occur in the summer months, while the highest emission levels in the area occur in late winter and early spring.

Cumulative actions 4, 9, the sno-parks, have the potential to draw additional traffic to those areas; however, the additional traffic is not anticipated to exceed previous peak traffic levels. Thus, air quality would be minimally impacted.

Cumulative action 6 involves alternative transportation planning. New bus service management would provide the opportunity for improved bus service. The implementation of new or improved bus service from Bend to Mt. Bachelor would potentially increase ridership, reduce the number of vehicles en route to and from the ski area, and potentially reduce congestion. If this situation occurs, there would be a net benefit to air quality.

Cumulative action 7 is implementation of the Forest-wide Travel Management Plan. To the extent that the plan reduces motorized travel, there would be a net benefit to air quality.

3.4.1.5 Forest Plan Compliance

No standards and guidelines from the NWFP or the Forest LRMP are relevant to air quality.

3.4.2 GEOLOGY AND SOILS

3.4.2.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

***Issue 1*:** Proposed construction may cause detrimental soil conditions that reduce long-term soil productivity.

Indicators: Determination of the acreage of disturbance contributing to detrimental soil conditions (i.e., compaction and reduced infiltration, puddling, accelerated erosion, topsoil displacement, and excess removal of organic material) or with the potential to contribute to detrimental soil conditions. The Forest LRMP (Standard and guideline SL-3) requires at least 80 percent of an activity area remain in acceptable soil quality conditions (Forest Service 1998). In this case, "activity area" as defined in the Forest LRMP is synonymous with "project area" as defined in this analysis, i.e., the area of physical disturbance associated with the proposed projects.

Analysis Area: Analysis of direct and indirect impacts focuses on the area of physical disturbance associated with the proposed projects (i.e., project area). The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

Issue 2: Volcanic features, such as lava tubes and caves, may be damaged by grading and excavation.

Indicators: Qualitative assessment of the likelihood of encountering such features in proposed disturbance areas and description of potential damage to them.

Analysis Area: Analysis of direct impacts focuses on construction sites where grading or excavation would occur. No indirect or cumulative impacts are anticipated.

3.4.2.2 Affected Environment

3.4.2.2.1 Soil Productivity

In general, soil characteristics are related to the parent material from which soils are formed as well as the processes that create soil, including climate (temperature and precipitation), living organisms, topography, and time. Characteristics of soil resources in the project area that are related to infiltration, erosion risk, and organic content are significantly influenced by the volcanic nature of parent material. Mt. Bachelor is located in the Cascade Range province and near the High Lava Plains and Basin and Range Provinces (Baldwin 1981). The Cascade Mountain Range was formed by a series of volcanoes with compositionally diverse features and deposits that extend from northern California to the southern end of British Columbia (Lite and Gannett 2002). Some of the larger volcanoes in this range include the three Sisters (North, Middle, and South) and Mount Jefferson located about 10 miles and 30 miles north of Mt. Bachelor, respectively.

The most extensive volcanic deposit on the DNF was created about 7,000 years ago by Mount Mazama (Crater Lake). This deposit of pumice and volcanic ash begins at the southern Forest boundary and is about 12 feet thick. It extends northward, decreasing in depth and particle size with distance from the source. Approximately 50 miles north, near Bend and roughly due east of Mt. Bachelor, this deposit consists primarily of sand-sized particles (Larsen 1976). Two extensive and more recent pumice deposits overlay portions of the Mount Mazama deposit. These deposits were made by the Devil's Hill (just west of Mt. Bachelor) and the Newberry volcanoes. The pumice from Devil's Hill extends eastward to the project area and consists of particles ranging from 0.5 to 4 inches. The Newberry crater is located near the southeast Forest boundary and does not influence soil resources at Mt. Bachelor. Finally, local basalt, ash, and cinder deposits from Mt. Bachelor overlay and intermix with volcanic material from Devil's Hill and Mount Mazama within the project boundary.

A comprehensive inventory of soil resources on the DNF (Larsen 1976) provides the following information. A typical, well-developed soil profile consists of a surface layer, containing some organic material, and several subsurface layers with unique chemical and physical characteristics that are formed as parent material is changed into soil. In contrast, soils on and around Mt. Bachelor are relatively poorly developed due to their young geologic age and volcanic origin. Although surface organic material occurs where vegetation is present, subsurface material is predominantly homogenous, coarse-textured, and influenced by the original form of volcanic parent material (e.g., ash, cinders, etc.).

Processes in the SUP area such as temperature and precipitation influence vegetation, which in turn influences soil development. Plant growth is hampered by soil conditions related to temperature and soil moisture levels (e.g., frost heaving, drought, extreme soil temperatures). Cold soils and frost heaving are a particular problem at high elevations, and hot soils can be a concern on southern aspects.

Another problem influencing soil resources in the SUP area is soil displacement and erosion, due in large part to the coarse nature of pumice soils. Movement of soils can be influenced by gravity (soil creep and dry ravel) and water. Soil creep is a slow and imperceptible process. Movement of dry soil in the SUP area occurs naturally on steep slopes and by wind erosion where soil surfaces are unprotected and fine particles can be detached. Due to the coarse nature and high porosity of soils in the SUP area, surface runoff is usually limited to short distances and to periods in the winter season when rapid snowmelt occurs. On occasion, localized, subsurface frost layers can form at Mt. Bachelor during the winter. This process prohibits infiltration and promotes surface runoff. In a few locations at Mt. Bachelor, soil layers are known to repel water due to the presence of a tight mat of needle litter on the surface and underlying shallow layer of soil (2–3 inches) that resists snowmelt infiltration. This condition occurs under some stands of mountain hemlock and mixed conifer (section 3.4.4) and is not a widespread characteristic.

The potential for soil compaction at Mt. Bachelor is primarily a function of soil texture. Coarse soils on upper slopes are less prone to compaction than finer textured soils that support vegetation growth at mid-slope and lower elevations. Naturally compacted soil (e.g., glacial till) is not typically present in the SUP.

Table 3-11 includes a summary of the general soil types found in the project area. Note that the surface erosion potential classes for these soil types range from low to high. This rating is based on the potential for accelerated erosion to occur if all vegetation (including litter) is removed. Other factors such as climate, slope, soil type, and hydrological characteristics are considered in evaluating the potential for surface erosion.

The soil most commonly found in the project area is Landtype 84 which covers about 2,200 acres within the SUP area and also has the highest potential for surface erosion (moderate to high). This soil is located around most of the toe slopes of Mt. Bachelor with the exception of the south side. Conditions that influence the high erosion potential primarily include slope gradient and to a lesser degree texture (loamy sands and sand).

Landtype 85 covers approximately 1,600 acres in the SUP area immediately down slope of Landtype 84. It has similar soil properties to Landtype 84 but has a low erosion potential due to decreased slope gradient.

Table 3-11. Soil resource inventory results for the Mt. Bachelor SUP area. Summarized from Larsen (1976).

Landtype						
Map Unit	**Name**	**Parent Material**	**Vegetation**	**Slopes**	**Surface Erosion Potential**	**SUP Area (ac/ % of total)**
3	Rocky mountain peaks.	Basalts, breccias, tuffs, cinders, and glacial deposits.	Extremely sparse.	30 % - vertical	Low	1,555 (18.8%)
5	Wet meadows.	Sandy gravels and peat.	Sedges, grass, wetland forbs, mosses, willow, alder.	None - slight	Low	12 (0.1%)
7	Barren flats.	Coarse pumice, cinders, ash, rock fragments.	Lodgepole pine.	None - slight	Low	19 (0.2%)
9	Barren cinder cones.	Coarse texture cinders and scoria.	Low-density elevation dependent vegetation.	25% - 70%	Low	169 (2%)
11	Lava flow with low-density timber.	Very broken basalts and scoria.	Mountain hemlock, lodgepole pine, ponderosa pine.	Varied	Low	654 (7.9%)
13	Rocky, shingle slopes on buttes at high elevations.	Complex of volcanic and glacial material.	Whitebark pine and mountain hemlock.	30 % - 80 %	Low To Moderate	1,572 (19%)
15	Lodgepole basins.	Lavas or gravels.	Lodgepole pine and needle grass.	None - slight	Low	175 (2.1%)

Table 3-11 (cont'd). Soil resource inventory results for the Mt. Bachelor SUP area. Summarized from Larsen (1976).

Landtype						
Map Unit	**Name**	**Parent Material**	**Vegetation**	**Slopes**	**Surface Erosion Potential**	**SUP Area (ac/ % of total)**
84	Steep side slopes of shield or composite volcanoes.	Thick layer of ash and pumice over stratified volcanic material.	Mountain hemlock, true firs, lodgepole pine, woodrush, huckleberry, sedge.	30 % - 80 %	Moderate To High	2,237 (27%)
85	Broad volcanic ridgetops, benches, and toeslopes of shield and composite volcanoes.	Thick layer of pumice and ash over older soil on complex volcanic materials.	Mountain hemlock, true firs, lodgepole pine, huckleberry, woodrush, sedge.	0 % - 30 %	Low	1,552 (18.7%)
GA	Complex map unit. Gently sloping glaciated uplands and smooth to slightly uneven lava plains.	Moderately thick layer of pumice and ash over glacial till or older soil overlaying basalts and andesites.	Lodgepole pine, mountain hemlock, true fir, white fir, currant, sedges, lupine, and needlegrass.	0 % - 30 %	Low To Moderate	6 (0.1%)
HK	Complex map unit comprised of barren lava flows on ridgetops, benches, and toeslopes of shield and composite volcanoes.	Basalt or pumice/ash overlaying older soil on complex volcanic materials.	Lava flows are barren of vegetation and adjacent to mountain hemlock, true firs, lodgepole pine, huckleberry, woodrush, and sedge.	Uneven rugged slopes ranging up to 30 %.	Low	272 (3.3%)
HM	Complex Map Unit Comprised of Units 84 and 85				Moderate	69 (1%)
TOTAL						**8,292**

Other soils that make significant contributions in the SUP area include Landtypes 3 and 13 which occur in concentric rings that cover about 1,600 acres each around Mt. Bachelor and are located upslope of Landtype 84. Landtype 3 covers the upper-third of Mt. Bachelor, followed by Landtypes 13 and 84, respectively. Landtype 3 comprises rocky peaks formed of basalt and volcanic material. The solid nature of these features allows for little vegetation growth and low erosion potential. Landtype 13 is less massive and includes glacial deposits and other weathered material. Although these soils are very shallow, some opportunities exist for vegetation growth in depositional areas. The surface erosion potential for Landtype 13 is moderate to low.

Other soils have been inventoried near the SUP boundary. Most of these soils have a low erosion potential, although some exhibit a low – moderate or moderate potential due to local topography or texture.

3.4.2.2.2 Lava Tubes and Caves

Lava tubes and caves are present in some lava flows originating from volcanoes in the Cascade Range. These underground features were created as the outer layer of a lava flow cooled and molten lava drained out of the hardened shell. Lava tubes and caves have formed in lava fields in some areas of the DNF. The Newberry National Volcanic Monument, located roughly 30 miles southeast of the project area, has numerous lava tube caves including the Lava River Cave, the longest known lava tube in Oregon. Some lava tubes and cave formations are accessed by recreational users and utilized for refuge and nesting by bat populations.

Mt. Bachelor is one of a series of low-sloped shield volcanoes capped by steeper slopes of basalt and basaltic andesite in the 15-mile Mt. Bachelor volcanic chain (Scott et.al. 1989, Wood and Kienle 1990). The summit of Mt. Bachelor comprises smaller cones, collapsed craters, blocky domes, and several lava plugs located in a cirque on the north side. The steep (25 degrees or more) upper slopes of the summit are covered with lava flows, some of which emerge from lava tubes (Wood and Kienle 1990). However, few lava tubes have been identified to date on middle or lower slopes of Mt. Bachelor or around the base of the mountain during past geologic assessments or construction activities in the project area.

Two lava tubes (known as Dutchman Cave 1 and 2) are located near the lower end of the Rainbow lift. The entrance to Dutchman Cave 1 is south of the Rainbow lift and less than 150 feet from trail I5. The entrance to Dutchman Cave 2 is between the top of the Carousel lift and the Rainbow lift and at least 300 feet from any ski trail or lift corridor clearing. Slopes around the entrance to the lava tubes range from about 15 – 25 percent (6 – 12 degrees). Dutchman Cave 2 is well known in the area but is not currently managed, and no official determination has been made regarding its significance in terms of habitat or recreation.

3.4.2.3 Direct and Indirect Effects

Soil productivity can be defined as "the capability of a soil for producing a specified plant or sequence of plants under specific management" (Natural Resources Conservation Service 1999). The potential for loss of productivity can be associated with surface disturbance that leads to compaction and decreased infiltration or to erosion and loss of desirable soil properties that support vegetation. Most of these soil properties are found in topsoil layers and can include soil texture, organic content, and soil nutrients. Due to the volcanic nature of parent material at Mt. Bachelor and other factors that lead to poor soil development, some locations in the project area have naturally low soil productivity.

The criteria for determining when and where detrimental soil conditions occur include (Forest Service 1998):

- Compaction: increase in bulk density of 20 percent or more for volcanic ash/pumice soils.
- Puddling: depth of ruts or imprints is 6 inches or more.
- Displacement: removal of more than 50 percent of the A horizon (generally considered to incorporate the bulk of plant rooting depth and nutrients/soil moisture critical to support plant life).
- Erosion: visual evidence of surface loss including the presence of rills, gullies, and/or water quality degradation.

Any change that results in disturbance of soil resources including vegetation removal, grading, or excavation can contribute to detrimental soils conditions or create the potential for these conditions to occur. In the assessment of direct and indirect effects described below, potential for loss of soil productivity is addressed in terms of erosion potential, disturbance type, and actual or potential contributions to detrimental soil conditions.

Permanent hardening would occur as a result of paving and building construction, and soil compaction would occur on trails and roads or as a temporary result of construction activities at building sites. Paved or hardened surfaces would contribute to detrimental soil conditions and a permanent loss of soil productivity. Coarse soil textures found in some locations of the project area would minimize temporary construction impacts (section 3.4.2.2.1). Road and trail features would maintain compaction by design to allow for continued use of unpaved surfaces over time.

Site-specific conditions can influence the processes of surface erosion and the ability of an area to recover following disturbance. Soil erosion in the project area is known to occur naturally as a result of processes associated with water, wind, and gravity (dry ravel or slides). The tendency for any site to exhibit erosion or stability over time is influenced by physical characteristics directly related to the erosion process (e.g., slope, soil texture, depth to bedrock, etc.), or by conditions that positively or negatively influence vegetation growth. The presence of vegetation can provide stability and resistance to erosive forces and is the most important factor in maintaining soil productivity.

Site specific conditions that influence rehabilitation efforts vary according to the individual project location. These conditions will not be discussed at the project level in this section. They would, however, be addressed in erosion control and rehabilitation plans prepared for each project or group of projects prior to implementation (section 2.2.6). These plans would incorporate standard ski area BMPs and would be subject to DNF review and approval. BMPs of this type have generally been successful in protecting soil productivity at Mt. Bachelor.

The potential effects of proposed projects on soil productivity and on lava tubes and caves are discussed below for the Proposed Action and each alternative.

3.4.2.3.1 No-Action Alternative

No soil resources would be disturbed in the project area under the No-Action Alternative, as the only projects to occur (i.e., upgrade of the guest services building and construction of a new administration building) would be located in the paved West Village parking lot. As a result, existing impacts on soil resources would not increase, and current efforts to control runoff and prevent accelerated erosion would continue. There would be no land conversion to a non-vegetative status and no slope grading, road development, or disturbance of new or previously disturbed sites, with the exception of the new administration building. No potential damage to lava tubes and caves would occur during grading and excavation. Conditions under the No-Action Alternative influencing geology and soil resources would not change from those described in section 3.4.2.2.

3.4.2.3.2 Proposed Action

Loss of Soil Productivity

The magnitude of direct effects on soil resources resulting from the Proposed Action is summarized in Table 3-12, including disturbance type, soil erosion potential, and acres contributing to a detrimental soil condition.

Surface disturbance under the Proposed Action would total 756 acres. The majority of this acreage (438 acres) is associated with selective tree removal in the Eastside pod ski area which would not disturb soil surfaces, decrease soil productivity, or otherwise contribute to detrimental soil conditions. Section 3.4 describes selective tree removal and the other disturbance types associated with implementation of these projects.

Also part of that total disturbance area, 96 acres of glading would remove larger trees to achieve skiable, 15- to 25-foot spacing in specific locations, while approximately 10 acres of clearing would remove all trees and large shrubs to create open ski lift corridors. These numbers are based on a conservative assumption that the entire area has potential to contribute to detrimental soil conditions. Both of these

disturbance types would result in small amounts of soil surface disturbance through compaction or scraping in areas where timber was removed for sale or use in the biomass facility.

Disturbance potential would be less in gladed than cleared areas due to the nature of these actions (section 3.4), but neither would result in notable erosion or a permanent contribution to detrimental soil conditions. However, they could potentially cause some compaction along travel corridors where logs were skidded and tracked or wheeled equipment were used. The coarse texture of soils found in some parts of the project area would help minimize compaction. The potential for erosion to occur would be limited by the temporary nature of these activities, the stabilizing force of existing vegetation, and the low slope gradient found in some areas of proposed development. Collectively, these factors indicate the potential for detrimental soil conditions to occur under glading and clearing activities could be avoided through proper use of BMPs.

The remaining disturbance types, grading and excavation, under the Proposed Action would impact the soil surface at different levels of intensity. Grading of 191 acres (Table 3-12) would remove all surface vegetation and most topsoil to create a relatively smooth surface for skier traffic. The amount of surface material removed during grading would be determined by existing surface roughness and the final design gradient. A total of 162 acres under the Proposed Action would contribute to potential detrimental soil conditions. Most of this disturbance (74 acres) would occur in Landtype 84. As shown in Table 3-11 above, Landtype 84 has a moderate to high surface erosion potential, due primarily to slope and soil texture. Surface vegetation on this landtype is a critical source of stability and protection from erosive processes. Topsoil would be conserved by stockpiling it then redistributing it across the graded slope.

The potential for graded areas to experience soil erosion, detrimental soil conditions, and a loss of soil productivity would be dependent on the success of subsequent rehabilitation efforts (section 2.2.6). About 28 acres would be converted to permanent detrimental soil conditions as a result of grading needed to construct roads, trails, and parking lots under the Proposed Action.

Excavation disturbance would occur during construction of foundations, drain fields, utility trenches, and terminal/tower footings. Excavation depths would generally be less than 3 – 4 feet or to bedrock, depending on the project type and location. Trenches constructed parallel to moderate or steep slopes would be a particular concern for concentrated flow and erosion.

Of 22 acres that would be excavated, most (16.6 acres) have a low soil erosion potential, while nearly 4 acres have a moderate to high erosion potential (Landtype 84). A total of 8.6 acres would not contribute to detrimental soil conditions due to previous disturbance. The remaining area of excavation would include 6 acres of permanent detrimental soil condition and 7 acres contributing to potential detrimental soil conditions.

After the construction period, trenches and other excavated areas would be backfilled, and disturbance would be comparable to graded areas prior to rehabilitation. Similar to graded areas, topsoil would be stockpiled and replaced on excavated areas to provide the best opportunity for reestablishing vegetation and maintaining soil productivity. The potential for these areas to experience soil erosion, detrimental soil conditions, and a loss of soil productivity would be dependent on the success of subsequent rehabilitation efforts.

Table 3-12 indicates that about 309 acres could contribute to detrimental soil conditions under the Proposed Action. This total includes 34 acres of permanent loss due to paving, building footprints, etc. The remainder (275 acres) has the potential to contribute to detrimental soil conditions and includes disturbance from glading (96 acres), clearing (10 acres), grading (162 acres), and excavation (7 acres). Disturbance from glading and clearing activities has a much lower potential to result in detrimental soil conditions than grading and excavation, due to the limited magnitude of actual surface disturbance.

Table 3-12. Areas contributing to detrimental soil condition under the Proposed Action.

Disturbance Type	Erosion Potential (ac)	Disturbance Acreage	Detrimental Soil Condition		
			None[1]	Permanent[2]	Potential[3]
Selective Tree Removal	Low	37.6	37.6	0.0	0.0
	Low – Moderate	324.2	324.2	0.0	0.0
	Moderate – High	75.7	75.7	0.0	0.0
	TOTAL	**437.5**	**437.5**	**0.0**	**0.0**
Glading	Low	16.6	0.0	0.0	16.6
	Low – Moderate	9.4	0.0	0.0	9.4
	Moderate – High	70.1	0.0	0.0	70.1
	TOTAL	**96.1**	**0.0**	**0.0**	**96.1**
Clearing	Low	4.1	0.0	0.0	4.1
	Low – Moderate	1.9	0.0	0.0	1.9
	Moderate – High	3.8	0.0	0.0	3.8
	TOTAL	**9.8**	**0.0**	**0.0**	**9.8**
Grading	Low	74.3	0.5	17.6	56.1
	Low – Moderate	35.9	0.0	3.7	32.2
	Moderate – High	80.4	0.0	6.9	73.5
	TOTAL	**190.5**	**0.5**	**28.2**	**161.8**
Excavation	Low	16.6	8.5	3.2	5.0
	Low – Moderate	1.4	0.0	0.8	0.6
	Moderate – High	3.8	0.1	2.1	1.6
	TOTAL	**21.9**	**8.6**	**6.1**	**7.1**
	GRAND TOTAL	755.8	446.6	34.3	274.8
	Percent of Project Area		59.1%	4.5%	36.4%
	Total area contributing to Detrimental Soil Condition (ac)[4]				309.2
	Percent of Project Area				40.9%

[1] No contribution to detrimental soil conditions due to siting in previously developed areas (parking lots, roads, etc.) or low impact disturbance type (e.g., selective tree removal).

[2] Permanent detrimental soil condition due to development resulting in hardened surface (e.g., buildings, parking lots, roads, trails, etc.).

[3] Potential contribution to detrimental soil conditions if site rehabilitation is not successful.

[4] Includes acres of permanent and potential detrimental soil condition.

The DNF has established an 80 percent threshold (Forest Service 1998) for maintaining soil quality in the project area (i.e., "activity area" in the cited agency directive). The 309 acres of disturbance that could potentially contribute to detrimental soil conditions under the Proposed Action would equate to 41

percent of the project area, exceeding this threshold. However, only 34 acres (4.5 percent) of that total would be permanently changed to a detrimental condition through paving, building, etc. The remaining 275 acres is considered a potential contribution based on soil erosion potential, disturbance type, and other factors. About 106 acres of this amount is associated with minimal disturbance from glading and clearing activities that have a high potential for successful rehabilitation.

In order to meet the 80 percent threshold for maintaining soil quality, appropriate, project-specific BMPs must be identified and successfully implemented. Section 2.2.6 requires that disturbed site rehabilitation be guided by an erosion control and rehabilitation plan prepared for each project or group of similar projects as a condition of approval. These plans would incorporate standard ski area BMPs and would be subject to DNF review and approval. As noted above, such BMPs have generally been successful in protecting soil productivity as the ski area has developed over time. These plans would also meet the effective ground cover objectives listed in Table 4-30 on p. 4-71 of the Forest LRMP.

Damage to Lava Tubes and Caves

The presence of lava tubes and caves has been noted throughout the DNF, with a high number located at the Newberry National Monument, approximately 30 miles southeast of Mt. Bachelor. Due to the specific volcanic nature of Mt. Bachelor, previous geologic assessments have found evidence of volcanic material emerging from lava tubes on upper slopes. Few lava tubes have been identified to date on middle or lower slopes of Mt. Bachelor or around the base of the mountain. However, two lava tubes are located along the lower portion of the Rainbow lift. Proposed glading in the Kids Adventure Zone would occur in the area where Dutchman Cave 1 is located. Trees would be removed at a target spacing of 15–25 feet in gladed areas. Existing tree cover surrounding the entrance would be left in place to divert skier traffic from the opening.

Beyond these two known lava tubes, Table 3-12 indicates that about 543 acres would be disturbed by activities with no potential to contact lava tubes or caves (i.e., selective tree removal, glading, and clearing). Grading activities under the Proposed Action would occur on 191 acres primarily associated with creating ski trails and the lower catchline. Grading activities would disturb soil surfaces to depths generally less than 1 foot and would likely not contact subsurface features such as lava tubes or caves, if any should be present. If the roof of tubes or caves were contacted during grading, local slope gradients would need to be adjusted, similar to when shallow bedrock is encountered. The horizontal shearing action of grading equipment would roughly parallel soil surfaces, lava tubes, and caves. As a result, the force produced during grading would likely not result in damage or habitat loss if contact were made.

A total of 22 acres would be disturbed by excavation activities under the Proposed Action. Excavation would occur to a depth of 3 – 4 feet or contact with bedrock. Unlike grading, excavation exerts a vertical force with a higher potential to penetrate lava tubes or caves. If these features were encountered during excavation, trenches or building footprints would need to be adjusted in order to avoid damage or habitat loss. Given the limited acreage proposed for excavation, most of it on the deeper soils of the base area, the potential for such damage is minimal.

Section 2.2.6 requires that disturbed site rehabilitation be guided by a plan for each project or group of similar projects as a condition of approval. These plans would incorporate appropriate guidance for grading and excavation efforts to minimize or eliminate potential impacts to lava tubes and caves. The plan would be subject to DNF review and approval.

3.4.2.3.3 Alternative A – No New Eastern Catchline

Total impacts under Alternative A by disturbance type are shown in Table 3-13. Under Alternative A, the proposed lower catchline would not be built and the selective tree removal on south and east-facing slopes between the proposed and existing catchlines would not occur. Impacts on soil productivity or damage to lava tubes and caves would be reduced by about 10.8 acres of grading, and the total project area would be reduced to about 354 acres. The total area contributing to detrimental soil conditions would be 298 acres, but that would equate to about 84 percent of the project area, reflecting the noted reduction of selective tree removal. The remainder of the project area would be substantially less than the 80 percent minimum threshold established by DNF. If approximately 228 acres of disturbance potentially contributing to detrimental soil conditions were successfully rehabilitated, the threshold would be reached.

Aside from this abstract threshold, the decrease of 392 acres of selective tree removal and 10.8 acres of grading under Alternative A would decrease potential impacts on soil productivity and potential damage to lava tubes and caves. All other impacts under Alternative A would be identical to those described for the Proposed Action.

3.4.2.4 Cumulative Effects

The cumulative effect of the Proposed Action and Alternative A on geology and soil resources are discussed below in the context of the projects listed in Table 3-5 that occur in the cumulative effects analysis area and their potential impacts on soil productivity and lava tubes and caves.

1. Sparky Vegetation Management Project

Commercial and pre-commercial thinning occurred on approximately 1,900 acres of a 14-mile long corridor surrounding Highway 46. Public firewood areas have been opened or are planned for much of this area to collect downed wood. As a result, some localized compaction of soil would occur where staging areas or temporary access roads are created. No notable impacts regarding loss of soil productivity would occur as a result and no cumulative impacts are anticipated. This project would not result in impacts on lava tubes or caves.

2. Existing Winter and Summer Trail Systems

The extensive system of winter, summer, and multi-use recreational trails developed in the area have altered existing soil surfaces in localized areas that were previously undisturbed. These trails typically convert undeveloped land to narrow, developed corridors through grading, trail maintenance, and ongoing recreational use. While hiking and ATV trails generally have surfaces that are more compacted, exclusively winter trail systems maintain a similar surface condition to native (undeveloped) soils. Development of winter or summer trail systems generally does not result in impacts on lava tubes or caves.

The impacts of the trail system on loss of soil productivity would combine with those of the Proposed Action or Alternative A to affect the analysis area in a cumulative manner. The Proposed Action would add about 14 acres of non-vegetated, summer-use, hiking and biking trails to the cumulative effects analysis area. However, given the minor and dispersed nature of impacts associated with the exisiting winter and summer trail system and either the Proposed Action or Alternative A, the cumulative impact on soil productivity would be marginal.

Table 3-13. Areas contributing to detrimental soil condition under the Alternative A.

Disturbance Type	Erosion Potential (ac)	Disturbance Acreage	Detrimental Soil Condition		
			None[1]	Permanent[2]	Potential[3]
Selective Tree Removal	Low	16.0	16.0	0.0	0.0
	Low - Moderate	27.6	27.6	0.0	0.0
	Moderate - High	2.4	2.4	0.0	0.0
	TOTAL	**46.0**	**46.0**	**0.0**	**0.0**
Glading	Low	16.6	0.0	0.0	16.6
	Low - Moderate	9.4	0.0	0.0	9.4
	Moderate - High	70.1	0.0	0.0	70.1
	TOTAL	**96.1**	**0.0**	**0.0**	**96.1**
Clearing	Low	4.1	0.0	0.0	4.1
	Low - Moderate	1.9	0.0	0.0	1.9
	Moderate - High	3.8	0.0	0.0	3.8
	TOTAL	**9.8**	**0.0**	**0.0**	**9.8**
Grading	Low	72.3	0.5	17.6	54.1
	Low - Moderate	31.7	0.0	3.7	28.0
	Moderate - High	75.7	0.0	6.9	68.9
	TOTAL	**179.7**	**0.5**	**28.2**	**151.0**
Excavation	Low	16.6	8.5	3.2	5.0
	Low - Moderate	1.4	0.0	0.8	0.6
	Moderate - High	3.8	0.1	2.1	1.6
	TOTAL	**21.9**	**8.6**	**6.1**	**7.1**
	GRAND TOTAL	353.5	55.2	34.3	264.1
	Percent of Project Area		15.6%	9.7%	74.7%
	Total area contributing to Detrimental Soil Condition [4]				298.4
	Percent of Project Area				84.4%

[1] No contribution to detrimental soil conditions due to siting in previously developed areas (parking lots, roads, etc.).
[2] Permanent detrimental soil condition due to development resulting in hardened surface (e.g., buildings, parking lots, roads, trails, etc.).
[3] Potential contribution to detrimental soil conditions if site rehabilitation is not successful
[4] Includes acres of permanent and potential detrimental soil condition.

3. Existing Summer Recreation Sites

The existing summer recreation sites have converted native land cover to areas that may include compacted surfaces (paved and unpaved), building footprints, or areas where some soil erosion has occurred. No known impacts on lava tubes or caves have occurred at these locations. The effects of the Proposed Action or Alternative A would be cumulative with similar areas where soil productivity is lost by hardening or compacting soil surfaces. Any loss of top-soil under the Proposed Action or Alternative A that supports vegetative cover would also produce a cumulative effect. However, the recreation sites occupy only a tiny fraction of the analysis area. As shown in Table 3-2 and Table 3-12 for the Proposed Action, and Table 3-13 for Alternative A, most disturbance is associated with selected tree removal, glading, and clearing activities that have minimal or no effect on soil productivity. As a result, the cumulative effect would be minor.

4. Existing Sno-Parks

Cumulative effects on soil productivity from existing sno-parks would be similar to but less than those occurring from summer recreation sites. Effects would be defined by the extent these areas incorporate compacted surfaces or disturb soil in a way that leads to surface erosion. No known impacts on lava tubes or caves have occurred at these locations. Projects included under the Proposed Action or Alternative A (e.g., parking lots, roads, minor grading, etc.) would be cumulative with these existing impacts but minor.

5. County Road Maintenance

County road maintenance would include repair of the existing road system and snow removal on Hwy. 45. Neither the Proposed Action nor Alternative A would generate cumulative impacts with county road maintenance in regard to loss of soil productivity or damage to lava tubes or caves.

6. Alternative Transportation Planning

Alternative transportation planning would include identifying alternative sources of transportation for recreation users of the Forest. Neither the Proposed Action nor Alternative A would generate cumulative impacts with alternative transportation planning in regard to loss of soil productivity or damage to lava tubes or caves.

7. Travel Management Plan

Travel management planning, specifically restricting summer motorized use to designated roads, would result in a positive cumulative effect by limiting compacting and disturbance of soil surfaces and potential loss of soil productivity. It would not generate cumulative impacts in regard to lava tubes or caves. Soil density would be preserved across the analysis area by limiting further compaction and erosion occurring from unauthorized trails or improper use of existing trails.

8. Invasive Plant Treatments

Invasive plant treatments would also result in a positive cumulative effect by helping to maintain native vegetation, which is associated with increased soil productivity due to increased protection of soil surfaces, higher infiltration, and long-term stability. It would not generate cumulative impacts in regard to lava tubes or caves. As discussed in section 3.4.4.3, the Proposed Action and Alternative A have the potential to increase noxious weeds in the project area, but design criteria and mitigation measures have been developed to limit that impact.

9. Kapka Butte Sno-Park

Similar to existing sno-parks, effects of the Kapka Butte Sno-Park on soil productivity would be defined by the extent this facility incorporates hardened surfaces or disturbs soil in a way that leads to surface erosion. Projects included under the Proposed Action and Alternative A (e.g., parking lots, roads, grading, etc.) would be cumulative with these impacts. Any additional impacts would be minor due to the

small area affected by this project. This project would not generate cumulative impacts in regard to lava tubes or caves.

10. Fish Passage Improvements

This project would upgrade culverts at the Soda Creek and Goose Creek road crossings providing increased bankfull width and improving passage of large wood and debris. Neither the Proposed Action nor Alternative A would generate cumulative impacts with this project in regard to loss of soil productivity or damage to lava tubes or caves.

11. Nordic Center Hazard Tree Removal

This cumulative action would remove trees that pose a hazard to Nordic Center operations. Neither the Proposed Action nor Alternative A would generate cumulative impacts with this project in regard to loss of soil productivity or damage to lava tubes or caves.

3.4.2.5 Forest Plan Compliance

The NWFP includes direction for protecting watershed resources as part of the Aquatic Conservation Strategy (ACS), which is designed to (1) protect aquatic and riparian-dependent species and resources and (2) support restoration of degraded habitats. There are four components of the ACS including Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. These four components are addressed in nine objectives that collectively assure that the processes that Riparian Reserves are intended to protect function appropriately. Although not mentioned specifically in ACS objectives, soil resources and soil productivity are an important component of healthy riparian reserves and watershed health. A detailed discussion of each of the nine ACS objectives is found in section 3.4.3, Water and Watershed Resources.

Management direction for the DNF is outlined in the Forest LRMP. A total of seven standards and guidelines included in the plan are intended to maintain or enhance long-term soil productivity. Consistence with each of the applicable standards and guidelines is addressed below.

- SL-1. Management activities will be prescribed to promote maintenance or enhancement of soil productivity. The potential for detrimental soil damages will be specifically addressed through project environmental analysis. Alternative management practices will be developed and mitigating measures implemented when activities will result in detrimental soil compaction, puddling, displacement, or soils with severely burned surfaces or those with accelerated erosion.

  Discussion: All proposed projects would be implemented in a manner that would promote maintenance or enhancement of soil productivity. Erosion control and rehabilitation plans would be prepared for each project or group of projects to minimize conditions leading to soil compaction, puddling, displacement, burned soil surfaces or accelerated soil erosion (section 2.2.6). All plans would be subject to DNF review and approval.

- SL-3. Leave a minimum of 80 percent of an activity area in a condition of acceptable productivity potential for trees and other managed vegetation following land management activities. Include all system roads, landings, spur roads, and skid roads or trails to evaluate impacts. Soil monitoring, to include statistical methods, will be required on all sensitive soil areas. Activity area is the total area of ground impacted activity and is a feasible unit for sampling and evaluating.

  Discussion: Rehabilitation of all sites, regardless of size of disturbance, would be guided by a plan prepared for each project or group of projects and subject to review and approval by DNF (section 2.2.6). This plan would leave all practical portions of the disturbed area (i.e., not areas occupied by buildings, parking lots, etc.) in a condition of acceptable productivity potential for

managed vegetation. Furthermore, this plan would meet effective ground cover objectives listed in Table 4-30 on p. 4-71 of the Forest LRMP

The percent of the project area that could contribute to detrimental soil conditions is shown in Table 3-12 (Proposed Action) as 40.9 percent and in Table 3-13 (Alternative A) as 84.4 percent. As a result, successful rehabilitation of areas with potential to contribute to detrimental soil conditions will be needed to meet the 80 percent threshold for each scenario. Monitoring of rehabilitation success is a routine function of SUP administration.

- SL-4. Any sites where this direction (SL-3) cannot be met will require rehabilitation. Measures may include tillage, smoothing, fertilizing or spreading of biologically rich organic materials.

  Discussion: Erosion control and rehabilitation plans would be prepared for each project or group of projects involving surface disturbance in order to restore and preserve soil productivity (section 2.2.6). Where appropriate, BMPs would include tillage, smoothing, fertilizing or spreading of biologically rich organic materials to restore and preserve soil productivity. All plans would be subject to DNF review and approval.

- SL-5. The use of mechanical equipment in sensitive soil areas will be regulated to protect the soil resource. Operations will be restricted to existing trails and roads whenever feasible.

  Discussion: Sensitive soil areas are defined as soils with a high erosion potential. All projects or group of projects with a moderate – high erosion potential (Table 3-12) would restrict use of mechanical equipment to existing trails and roads whenever feasible. However, ski areas are by definition steep and thus more erosion prone, so this direction will not be broadly applicable.

- SL-6. In order to minimize soil erosion by water and wind, the following ground cover objectives should be met within the first 2 years after an activity is completed (Table 3-14).

  Discussion: Erosion control and rehabilitation plans that are prepared for each project or group of similar projects (section 2.2.6) should ensure that minimum percent effective ground cover thresholds are met for the four soil erosion potential categories. All plans would be subject to DNF review and approval prior to disturbance. Monitoring of rehabilitation success is a routine function of SUP administration.

Table 3-14. Ground cover objectives to prevent surface soil erosion (DNF LRMP, Table 4-30, p. 4-71).

Surface Soil Erosion Potential[1]	Minimum Percent Effective Ground Cover[2]	
	First year	Second year
Low	20 – 30	31 – 45
Moderate	31 – 45	46 – 60
High	46 – 60	61 – 75
Severe	61 – 75	76 – 90

[1]Erosion potential can be obtained from the Erosion Hazard Rating Form or the DNF Soil Resource Inventory (Larsen 1976).

[2]Effective ground cover includes all living or dead herbaceous or woody materials and rock fragments greater than 0.75-inch diameter in contact with the ground surface.

Eight standards and guidelines in the Forest LRMP are intended to protect and manage cave resources and control access to caves when necessary maintain or enhance habitat and recreational values. Consistence with the three standards and guidelines applicable to the Proposed Action is discussed below.

- CV-2. Significant and potentially significant caves will be protected and managed in accordance with the Federal Cave Resources Protection Act of 1988. Surveys will be conducted to determine the significance of all caves which have been found on the Forest and the list will be periodically updated.

  Discussion: No assessment has been completed to date to determine the significance of the lava tube located near the top of the Carousel lift.

- CV-3. Until a significant cave list is completed, all caves will be protected as follows:

  - Trees will not be harvested in a 150- to 200-foot radius around cave entrances and infeeder drainages with slopes of less than 30 degrees. There will be no ground disturbing activities on slopes steeper than 30 degrees adjacent to cave entrances.

  Discussion: Under the Proposed Action, the opening to the Dutchman Cave 1 lava tube on the south side of Rainbow Lift would be located within the proposed glading area for the Kids Adventure Zone. Some trees would be removed in the area to achieve a target spacing of 15 – 25 feet. However, trees immediately surrounding the cave entrance would be left in place to divert skiers away from the opening. Site-specific measures outlined under CV-5 may be necessary to mitigate any effects on temperature or drainage patterns on this cave, pending determination of the lava tube's significance.

- CV-5. Measures for the protection of caves will be incorporated into project plans for road construction, timber harvest, tree planting, and blasting near caves, and any activity which could change cave temperatures and drainage patterns.

  Discussion: Section 2.2.6 requires that disturbed site rehabilitation be guided by a rehabilitation plan prepared for each project or group of similar projects as a condition of approval. This plan would address any impacts under the Proposed Action with potential to disturb lava tubes' or caves' temperatures and drainage patterns, and the plans would prescribe practices to mitigate any such effects.

3.4.3 WATER AND WATERSHED RESOURCES

3.4.3.1 Scope of Analysis

The project area includes no live water and no surface hydrologic connectivity to waters outside the project area, which limits the scope of this portion of the analysis. Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

***Issue 1*:** Proposed construction and snowmaking projects may disturb the surface-water flow regime, drainage channel characteristics, and groundwater recharge through physical, surface disturbance.

Indicators:

- Acres of disturbed surface area.
- Location and amount of water applied as machine-made snow.

- Assessment of associated direct and indirect effects on surface-water flow regime, drainage channel characteristics, and groundwater recharge.

Analysis Area: Analysis of direct and indirect impacts focuses on the area of grading and excavation associated with the proposed projects. No cumulative impacts are anticipated.

Issue 2: Runoff from expanded parking lots and the proposed drain field expansion could lead to contamination of groundwater.

Indicators: Assessment of runoff and contaminant-control aspects of parking lot design and of pertinent soil and hydrological conditions at the proposed drain field expansion site.

Analysis Area: Direct and indirect impacts are assessed at the proposed parking and drain field expansion sites . Cumulative impacts are not anticipated due to the lack of hydrological connectivity outside the project area.

The following water quality issues were identified but not carried into detailed analysis for the reasons noted:

- Adequacy of current water sources and water rights to support the proposed snowmaking expansion. Section 2.3.2 describes proposed snowmaking water use, sources, and rights, concluding that all are sufficient. Beyond that, this is more a legal and administrative issue than an environmental one.
- Impacts of water withdrawal from Todd Creek. The ski area's existing main well meets the projected needs for culinary and snowmaking water under the Proposed Action. Their secondary well would provide adequate backup if the main well went down. The ski area's existing Todd Creek water right and infrastructure in place to use it (i.e., pumps and pipeline to the resort) became obsolete when the two wells were developed, making water withdrawal from Todd Creek unnecessary and impossible without substantial repair of the infrastructure.
- Impacts of using salt on ski race courses. Mt. Bachelor uses a very minimal amount of salt (i.e., about 200 – 300 pounds per year) to maintain race courses. The Proposed Action would not change this practice. Given the small amount, dispersed application, and dilution inherent in this use, it would have no measurable impact.

3.4.3.2 Affected Environment

3.4.3.2.1 Surface Flow and Groundwater Recharge

The Mt. Bachelor SUP area is located in four watersheds that intersect at the peak of Mt. Bachelor – Dutchman Creek, Soda Creek, Snow Creek/Deschutes River, and Quinn Creek. The SUP area lies above the headwaters of all four creeks. All four watersheds are located in the Deschutes River Basin. These watershed areas are officially defined as 6th-field (12-digit identification numbers) subwatersheds by the DNF and others. This classification scheme is based on a hierarchical system established by the United States Geological Survey (USGS) and utilized by many government agencies. For discussion purposes, the EIS will refer to these sub-watersheds as watersheds. With the exception of the Snow Creek/Deschutes River watershed, all other watersheds are closed in regard to surface hydrology (i.e., no surface water is delivered to areas outside of the watershed boundary). The Snow Creek/Deschutes River watershed includes the uppermost segment of the Deschutes River, approximately 4 miles southwest of the SUP boundary.

All existing ski area development is located in the Dutchman Creek and Soda Creek watersheds. The Dutchman Creek watershed includes slopes on the south and east side of Mt. Bachelor and incorporates

ski lifts and trails accessed from the Sunrise base area. The Soda Creek watershed is primarily located on the north side of Mt. Bachelor and includes the West Village base area as well as ski lifts and trails that slope to the northwest and northeast.

Mt. Bachelor is located about 5 miles east of the Cascade Mountain Range. Mt. Bachelor and Newberry Volcano comprise the two significant volcanic ridges in the Deschutes River Basin located east of the Cascades (Sherrod et.al. 2002). Orographic processes (influenced by elevation) release large amounts of precipitation as moist air moves inland from the Pacific Ocean and passes east over the mountains. In some cases, local precipitation along the Cascades can reach 200 inches per year (Daly et. al. 1994).

Seasonal patterns of precipitation are influenced by topography. In general, land areas located between the coast and the Cascades have relatively consistent precipitation throughout the year, while areas located east of the mountains receive more precipitation during winter months. Subsequently, precipitation in the SUP area occurs primarily in the form of snow.

Spatially distributed precipitation values for watersheds in the SUP area are contained in the Parameter-elevation Regressions on Independent Slopes Model (PRISM) dataset (Daly et al. 1994). PRISM is a modeling system that uses data collected at meteorological stations and a digital elevation model (DEM) to generate estimates of climatic parameters such as precipitation. Based on this model, monthly average precipitation (1960 – 2001) at the summit of Mt. Bachelor ranges from 1.5 to 15.5 inches per month (91 inches per year) and from 1.5 to 11.5 inches per month (72 inches per year) at the base of the mountain. The duration of the snowpack varies annually, with snowcover at higher elevations remaining throughout most of the year. Annual snowdepth records collected by Mt. Bachelor indicate that snow is present at the base area from October through June. Based on these observations and the PRISM monthly data record for precipitation and air temperature, about 80 percent of annual precipitation falls in the form of snow. Annual average precipitation levels have also been recorded during the past 40 – 70 years at lower elevations around Mt. Bachelor, including stations located approximately 20 miles to the north, east, and south at Sisters (13.6 inches), Bend (11.6 inches), and Wickiup Dam (20.9 inches), respectively.

Natural precipitation on Mt. Bachelor is supplemented with a snowmaking system that supports early season operations as well as construction of terrain park features and a halfpipe. The snowmaking system covers a total of 27 acres of ski trail near the Pine Marten Express including the Thunder/Flatfoot run, the Slopestyle Arena, and the terrain park and halfpipe features in the Arena. A maximum of 6.1 million gallons of water is used to create artificial snow for these areas each year. All existing snowmaking occurs in the Soda Creek watershed on elevations ranging from 6,400 to 7,800 feet.

Surface water features located in the watersheds that intersect the SUP area include streams, lakes, and reservoirs. Groundwater is discharged from springs or collected by streams in areas where the water table is near the surface. Both ground and surface water systems are influenced by annual precipitation amounts.

Surface water features found in the SUP area itself are limited to one ephemeral stream channel segment that roughly parallels the Summit Express and Sunrise Express lifts and a perennial segment of Todd Creek that crosses the northern SUP boundary for a distance of about 1 mile, outside the project area. The ephemeral stream channel segment does not support riparian vegetation and reportedly contains periodic flows only during warm afternoon hours in the spring snowmelt season. All channel features (and periodic flows) disappear upslope of the West Village base area. The Dutchman Creek stream channel appears about 1 mile southeast of the base area, on the south side of Hwy. 46.

Surface water features are regulated by the Oregon Department of Environmental Quality (ODEQ) per regulations contained in Section 303(d) of the Federal Clean Water Act and summarized in a Memorandum of Agreement between the U.S. Environmental Protection Agency (EPA) and ODEQ (EPA

2000). Water quality measurements are compared to numeric standards and pollution indicator values to determine if the health of a water body is impaired. If impairment is evident, the water body is placed on the Oregon 303(d) list of impaired waters and subject to additional monitoring and assessment. No streams are included on the current 303(d) list for watersheds that intersect the SUP area. Lava Lake is on the 2010 303(d) list due to low levels of dissolved oxygen. This lake is located in the Snow Creek/ Deschutes River watershed and more than 3 miles south east of the SUP boundary.

In general, overland surface flows are limited to the spring season when snowmelt exceeds the infiltration capacity of the soil. Soils in the SUP area are derived from volcanic ash and pumice (Larsen 1976). Surface soil layers are comprised of pumiceous loamy sands while subsurface layers are sands or sandy loams. Permeability of surface soils is high due to the porous and fractured geologic make-up and increases with depth below the surface (Larsen 1976). Steep slopes found at upper elevations of the SUP area generally have a greater potential for surface runoff than lower elevations, where moderate slopes and shallow soils are found. Areas where soil compaction has occurred (e.g., roads, trails, parking lots) also have a higher potential for runoff due to their impervious nature.

Groundwater flow in the upper Deschutes River Basin is directed to high elevation lakes or the Deschutes and Little Deschutes River (Gannet et. al. 2001). In regard to the Mt. Bachelor SUP area, local groundwater flow on the north and west slopes moves toward nearby lakes (e.g. Sparks Lake, Hosmer Lake, and Lava Lake). Regional ground water flow paths in and around the SUP area contribute recharge to the upper Deschutes River. Shallow groundwater flow may also contribute to streams in localized areas where intense snowmelt occurs.

Groundwater recharge occurs where water infiltrates downward to the saturated area of the groundwater flow system. Recharge can occur via infiltration from precipitation or irrigation, or as loss from streams and canals. Levels of groundwater recharge in the Upper Deschutes Basin (including the SUP area) were estimated by the USGS as part of an assessment of groundwater hydrology (Gannet et. al. 2001). This effort included use of a Deep Percolation Model (DPM) that accounted for processes that influence groundwater recharge and spatial variability of physical and biological properties. Annual recharge in the Upper Deschutes Basin (from precipitation only) was estimated at less than 1 inch at lower elevations where annual precipitation levels are less than 12 inches, and more than 130 inches at high elevations in the Cascades where more than 200 inches of precipitation occur (Gannet et. al. 2001). DPM for groundwater recharge in the Mt. Bachelor area was estimated at 25 – 140 inches per year. This equates to 30 – 100 percent of the total precipitation at Mt. Bachelor, depending upon which precipitation and recharge figures are used.

3.4.3.2.2 Groundwater Quality and Potential Contamination

Existing parking lots cover a total of 34 acres in the SUP area, including 24 acres at the West Village area, 8 acres at the Sunrise base area, and about 2 acres associated with the maintenance facility located between these two areas. All of these lots are paved and plowed to maintain access during the ski season. During the spring season, snow that is piled at lot boundaries melts and creates runoff which infiltrates into the coarse soils that surround each lot. This runoff may be contaminated by small quantities of oil, grease, fuel, and other fluids leaking from vehicles.

Contributions of parking lot runoff to ephemeral stream channels is not a concern due to distance and the high infiltration capacity of native soils, but infiltration and recharge of groundwater aquifers does occur during the snowmelt season. However potential groundwater contamination is minimized by dilution from the large volumes of snowmelt and the capacity of the soil to filter particulates and adsorb dissolved contaminants. The ability of soil to remove contaminants is based in part on soil properties that induce chemical reactions with dissolved ions. These properties result in adsorption, or ionic bonding, that effectively retains dissolved pollutants and improves the quality of groundwater. Soil properties that support adsorption include the presence of organic matter, clay, and elements that have a positive ionic

charge (e.g., calcium, magnesium, and potassium). Although soils at Mt. Bachelor are inherently low in clay, there is sufficient organic matter (primarily in surface layers) and mineral elements with a positive charge to support adsorption of pollutants carried by snowmelt infiltration (Sussman 2011).

Given the small amounts of contaminants involved, the amount of precipitation and thus dilution, and the depth of the adsorption zone above groundwater, soil contamination associated with the parking lots is minimal.

Commercial septic systems in Oregon, including the siting, design, and installation of systems, are regulated by ODEQ. Routine operation and maintenance of septic systems is overseen by ODEQ directly or through cooperative agreements with county agencies which represent the state in this effort. In that Mt. Bachelor's system is a large, commercial one, ODEQ oversees its operation. Sewage and wastewater produced at the West Village base area, the Sunrise base area, and adjacent buildings are treated in septic systems connected to seepage beds or drain fields (ODEQ 2003). Swales located near each drain field divert incoming snowmelt runoff from the area to avoid saturation of the drain field.

Depth to groundwater in this area is about 800 feet, based on observations from potable wells at Mt. Bachelor. This depth provides a sufficient buffer for soils to treat septic effluent and eliminate the potential for groundwater contamination. Local soil properties in and around the existing drain fields have been evaluated according to their suitability for use as a sewage filter field and are considered well suited for this purpose (Larsen 1976). The existing systems at Mt. Bachelor have functioned properly historically during periods of peak flow (late December through mid-January) and throughout all other times of the year (Frost 2010).

3.4.3.3 Direct and Indirect Effects

Any change in the impervious nature of soil surfaces influences the ability of water to either infiltrate or contribute to surface runoff. Soil resources in the SUP area have naturally high infiltration rates and must be compacted by natural or human processes or covered by impervious material in order to support surface runoff. Proposed developments associated with building, paving, or compacting (non-paved roads) would increase the area of impervious surface and the volume of runoff produced at these locations. Increased runoff would infiltrate outside of impervious areas and could potentially transmit pollution into groundwater. Expanded wastewater treatment also has the potential to contaminate groundwater.

The magnitude of direct effects on watershed resources resulting from the Proposed Action and alternatives is provided in Table 3-15, summarizing more detailed disturbance figures discussed in section 3.4. Note that no disturbance would take place in the Snow Creek/Deschutes or the Quinn Creek watersheds. The effect of proposed developments on the surface-water flow regime, drainage channel characteristics, groundwater recharge, and groundwater quality is discussed below for each alternative.

3.4.3.3.1 No-Action Alternative

Both projects occurring under the No-Action Alternative (i.e., remodeling of the West Village guest services building, and replacing the adjacent sprung steel administration structure with a new two-story building) would be located in the West Village parking lot, replacing one impervious surface with another. As a result, there would be no notable change from the conditions described above (section 3.4.3.2) under the No-Action Alternative. There would be no new effects on surface-water flow regimes, drainage channel characteristics, or groundwater recharge. The existing snowmaking system, parking lots, and drain fields would continue to be used in their present condition and would be maintained to minimize potential impacts on groundwater quality and other aspects of the environment. Existing soil conditions would continue to process parking lot runoff and drain field discharge at levels that minimize effects on groundwater.

3.4.3.3.2 Proposed Action

Surface Flow and Groundwater Recharge

Table 3-15 indicates that under the Proposed Action a total of 717 acres of surface disturbance would occur in the Dutchman Creek watershed and 38 acres in the Soda Creek watershed. Most of the disturbance in the Dutchman Creek watershed would be the result of selective tree removal along southeast slopes of Mt Bachelor to improve tree skiing between the existing and proposed catchlines. The majority of disturbance to the Soda Creek watershed would result from grading of mountain bike and hiking trails, the West Village parking lot, and the tubing area.

Table 3-15. Watershed disturbance under the No-Action Alternative, Proposed Action, and Alternative A (no new catchline).

	Dutchman Creek Watershed			**Soda Creek Watershed**		
	Total Area 21,107 ac			Total Area 23,336 ac		
	Portion within SUP Area 2,978 ac			Portion within SUP Area 2,651 ac		
Alternative/ Disturbance Type[1]	**No Action**	**Proposed Action**	**Alternative A**	**No Action**	**Proposed Action**	**Alternative A**
Selective Tree Removal	0	432.8	41.0	0	4.7	4.7
Glading	0	96.1	96.1	0	0	0
Clearing	0	9.8	9.8	0	0	0
Grading	0	167.5	156.7	0	23.1	23.1
Excavation	0	11.2	11.2	0	10.7	10.7
Total Area	0	717.3	314.7	0	38.5	38.5
West Village Parking Lots	-	-	-	24.2	27.2	27.2
Sunrise Village Parking Lots	8.1	15.1	15.1	-	-	-
Sunrise Village Drain Field	0.5	3.6	3.6	-	-	-

[1]This term describes the highest level of disturbance associated with a given project, and lower levels may also be applicable. For example, under "selective tree removal" only that level of disturbance would occur, but under "excavation," "clearing" and "grading" would also occur prior to excavation.

An additional 2 – 3 million gallons of water would be applied each year to 25.4 acres of ski trails located in the Soda Creek watershed. The proposed locations of snowmaking coverage are discussed in section 2.2.3.2 and shown in Figure 2-4. Machine-made snow would be applied to high-traffic trails as needed to

create sufficient coverage for safe skiing and grooming throughout the ski season. With the increased coverage provided under the Proposed Action, the maximum amount of water used each year for snowmaking purposes would total 9.1 million gallons, all of which would be applied to ski trails in the Soda Creek watershed. The machine-made snow created by the proposed snowmaking system would melt with natural snow and contribute to runoff and ground water recharge during the spring season. Given the existing precipitation levels on these trails and the high infiltration rate of native soils, the proposed amounts of water would not alter the existing snowmelt and surface flow regime or groundwater levels in the affected drainages.

A detailed description of disturbance occurring with each proposed project is included in section 3.4, and disturbance locations are shown in Figures 2-1 through 2-4. Any activities that would increase the impervious nature of soils (e.g., building footprints and paved or compacted surfaces) would locally alter the surface flow regime by increasing runoff volumes in areas where natural infiltration had previously occurred. In these areas, surface runoff would flow across impervious surfaces and eventually infiltrate into nearby undisturbed areas. Given the soil properties at Mt. Bachelor, additional runoff volumes would be absorbed and contribute to groundwater recharge. Any change in the timing of runoff would be negligible, as most precipitation falls in the form of snow so the timing of surface runoff is not connected to precipitation events. Runoff during rain events would occur more quickly from paved areas and building footprints in comparison to the No-Action Alternative, but runoff would also infiltrate quickly into undisturbed areas.

No changes to drainage channel characteristics would occur under the Proposed Action. None of the proposed projects are located near the ephemeral channel segment above the Sunrise base area.

The effects of physical surface disturbance on groundwater recharge at the project-site level can be evaluated in terms of intensity and magnitude of disturbance during construction, the condition of disturbed areas following rehabilitation, and the intended long-term use of developed areas. The effects of the various disturbance types associated with the Proposed Action are as follows.

The greatest level of physical surface disturbance would occur during excavation of building foundations, drain fields, utility trenches, and terminal/tower footings. Such disturbance would total 11.2 acres in the Dutchman Creek watershed, 10.7 acres in Soda Creek. Relatively confined areas would be disturbed at depths generally less than 3 feet or to contact with bedrock, depending on the project type. Disturbance would occur over relatively short periods that are needed to bury conduit or complete building foundations and tower footings. Once construction was finished and backfill replaced, disturbance intensity of excavated areas would be similar to graded areas prior to rehabilitation.

Surface grading would result in shallow (less than 1 foot) disturbance. This would involve 167.5 acres in the Dutchman Creek watershed and 23.1 acres in Soda Creek. Infiltration of snowmelt runoff in graded areas would depend on soil density following rehabilitation and the long-term condition of soil surfaces in developed areas. The final gradient of ski trails, the tubing hill, access roads, parking lots, and biking/hiking trails would determine the direction of snowmelt runoff. Prior to rehabilitation, graded areas would exhibit barren soil, and some erosion could occur without appropriate mitigation, particularly on moderate or steep slopes.

Revegetation and other efforts to stabilize soils would promote infiltration and groundwater recharge in areas where soil surfaces were not developed for parking lots or roads. As stipulated in section 2.2.6, disturbed site rehabilitation would be guided by an erosion control and rehabilitation plan prepared for each project or group of similar projects as a condition of approval. These plans would incorporate appropriate BMPs and would be subject to DNF review and approval.

Paved or compacted soil surfaces would create runoff and eliminate or significantly reduce local infiltration. Although runoff would occur from buildings, parking lots, roads, and other hardened areas, it would infiltrate into nearby undeveloped areas where native coarse soils were found. This process would divert local recharge a short distance away during the time these features remain in place. Based on existing hydrological conditions described above, these slight changes would not affect groundwater volumes or flow paths in the SUP area.

Disturbance resulting from clearing activities would involve removal of shrubs and trees in lift corridors, affecting 9.8 acres in the Dutchman Creek watershed, and none in Soda Creek. A limited amount of physical surface disturbance would occur during this process. Trees would be felled and skidded to staging areas, resulting in surface disturbance along skid routes. Some compaction of soils would also occur along these routes, depending on the amount of use each route receives during clearing activities. No notable surface disturbance is anticipated to occur in areas where glading or selective tree removal is proposed. Due to the minimal level of physical surface disturbance associated with selective tree removal, glading, and clearing, no notable effects on groundwater recharge would result from these activities under the Proposed Action.

Groundwater Quality and Potential Contamination

A total of 10 acres of parking lots would be constructed under the Proposed Action, including 7 acres at the Sunrise base area and 3 acres at West Village. Runoff to adjacent areas would increase, and snow removal would concentrate runoff in snow storage areas. Surface runoff and plowed snow would contain some contaminants such as oil, grease, fuel, and other automotive fluids. These contaminants would add to the pollution contributed by existing parking lot runoff and snowmelt.

The existing septic system and drain field serving the Sunrise base area would be expanded by about 3.1 acres under the Proposed Action, increasing treatment capacity to as much as 20,500 gallons per day (approximately 2.2 times greater than the existing system). The proposed drain field would be located adjacent to the existing drain field and would include a primary drain field (1.4 acres) and a reserve drain field (1.7 acres). Soil resources at the location of the proposed drain field have been evaluated for suitability as a sewage filter field (Larsen 1976) based on soil depth, texture, permeability, drainage and slope. A portion of the proposed expanded and reserve drain field sites are located on soils considered poorly suited for such use due to potentially shallow depth to bedrock. An on-site investigation of this area has been completed by ODEQ, and it was subsequently approved for installation of the proposed drain field treatment system (Baggett 2011).

As discussed above (section 3.4.3.2.2), the ability of soil to remove contaminants from infiltrating water is based on soil properties that induce chemical reactions with dissolved ions. These properties are based on the presence of organic matter and positively charged ions that adsorb pollutants carried by infiltration. Based on existing soil properties at the proposed parking lots and drain fields, pollution carried by runoff and infiltrating water would be processed, and no reduction in groundwater quality would occur under the Proposed Action.

3.4.3.3.3 Alternative A – No New Catchline

Under Alternative A, the proposed lower catchline would not be built and the selective tree removal on south and east-facing slopes above the catchline would not occur. Impacts on watershed resources would be reduced by about 10.8 acres of grading and 392 acres of selective tree removal in the Dutchman Creek watershed. All impacts on the Soda Creek watershed under Alternative A would be identical to those described for the Proposed Action. Total impacts on Dutchman Creek under Alternative A by disturbance type are shown above in Table 3-15.

3.4.3.4 Cumulative Effects

The cumulative effect of the Proposed Action and Alternative A on watershed resources are discussed below in the context of the projects listed in Table 3-5 that occur in the Dutchman Creek and Soda Creek watersheds and their potential impacts on surface flow, groundwater recharge, and groundwater quality.

1. Sparky Vegetation Management Project

Surface flow, groundwater recharge, and groundwater quality would not be noticeably affected by segments of the Sparky Vegetation Management Project that occur along the Hwy. 46 corridor in the Dutchman Creek and Soda Creek watersheds. No cumulative impact is anticipated.

2. Existing Winter and Summer Trail Systems

The extensive system of winter, summer, and multi-use recreational trails developed in the area have altered existing soil surfaces and increased runoff marginally in localized areas that were previously undisturbed. These trails typically convert narrow, undeveloped corridors to a developed land cover type through grading and leveling. While hiking and ATV trails generally have surfaces that are more dense and more prone to runoff, winter trail systems generally maintain a similar surface condition to native (undeveloped) soils.

The impacts of the trail system on surface flow, groundwater recharge, and groundwater quality would combine with those of the Proposed Action or Alternative A to affect the Dutchman Creek and Soda Creek portions of the analysis area in a cumulative manner. The Proposed Action would add about 14 acres of non-vegetated, summer-use, hiking and biking trails to the analysis area. However, given the minor and dispersed nature of impacts associated with the existing winter and summer trail system and either the Proposed Action or Alternative A, the cumulative impact would be marginal.

3. Existing Summer Recreation Sites

The existing summer recreation sites have converted native land cover types to a developed land cover type that may include paved and unpaved hardened surfaces and restroom facilities. The effects of the Proposed Action or Alternative A would be cumulative with these effects. However, the recreation sites occupy only a tiny fraction of the analysis area and, as shown in Table 3-15 and Table 3-2, most land conversion under the Proposed Action and Alternative A is associated with selected tree removal, glading, clearing, and grading activities that do not result in structures or hardened surfaces and thus do not effect surface runoff, groundwater recharge, or groundwater quality. As a result, the cumulative effect would be minor.

4. Existing Sno-parks

Cumulative effects on surface runoff, groundwater recharge, and groundwater quality from existing snow parks are similar to those occurring from summer recreation sites. Effects would be defined by the extent these areas incorporate hardened surfaces, generate contaminated runoff, and treat wastewater with septic systems. Projects included under the Proposed Action or Alternative A (e.g., snowmaking, structures, parking lots, roads, drain fields, etc.) would be cumulative with these existing impacts but negligible.

5. County Road Maintenance

County road maintenance would include repair to the existing road system and snow removal on Hwy. 45. Neither the Proposed Action nor Alternative A would generate cumulative impacts with county road maintenance in regard to surface runoff, groundwater recharge, or groundwater quality.

6. Alternative Transportation Planning

Alternative Transportation Planning would include identifying alternative sources of transportation for recreation users of the Forest. Neither the Proposed Action nor Alternative A would generate cumulative

impacts with alternative transportation planning in regard to surface runoff, groundwater recharge, or groundwater quality.

7. Travel Management Plan

Travel management planning, specifically restricting summer motorized use to designated roads, would result in a positive cumulative effect by limiting disturbance of soil surfaces. Water infiltration and groundwater recharge would be preserved across the analysis area. Impacts on groundwater quality would also be reduced/minimized by managing vehicle access and potential contamination by petroleum products. The net cumulative effect would be improved watershed conditions.

8. Invasive Plant Treatments

Invasive plant treatments would also result in a positive cumulative effect by helping to maintain native vegetation, which is associated with better soil conditions and higher infiltration and recharge rates. As discussed in section 3.4.4.3, the Proposed Action and Alternative A have the potential to increase noxious weeds in the project area, but design criteria and mitigation measures have been developed to limit that impact. The cumulative effect would be improved watershed conditions.

9. Kapka Butte Sno-Park

Similar to existing sno-parks, effects of the Kapka Butte Sno-park would be defined by the extent this facility incorporates hardened surfaces, generates contaminated runoff, and treats wastewater with septic systems. Projects included under the Proposed Action or Alternative A (e.g., snowmaking, structures, parking lots, roads, drain fields, etc.) would be cumulative with these impacts. Any additional impacts would be minor due to the small area affected by this project.

10. Fish Passage Improvements

This project would upgrade culverts at the Soda Creek and Goose Creek road crossings providing increased bankfull width and improving passage of large wood and debris. Neither the Proposed Action nor Alternative A would generate cumulative impacts with this project in regard to surface runoff, groundwater recharge, or groundwater quality.

11. Nordic Center Hazard Tree Removal

This action would remove trees that pose a hazard to Nordic ski operations. Neither the Proposed Action nor Alternative A would generate cumulative impacts with this project in regard to surface runoff, groundwater recharge, or groundwater quality.

12. Dutchman Creek Cinder Pit Expansion

This project would initially involve clearing of a 4.5-acre site adjacent to Hwy. 45, then excavation of cinder material for road maintenance over the next 5 – 10 years. Due to the spatial separation, neither the Proposed Action nor Alternative A would generate cumulative impacts with county road maintenance in regard to surface runoff, groundwater recharge, or groundwater quality.

3.4.3.5 Forest Plan Compliance

Management direction for the DNF is outlined in the Forest LRMP. A total of seven standards and guidelines focus on protection of water quality and practices that reduce pollution or potential pollution of receiving water bodies. Due to the absence of surface water bodies in the SUP area or hydrologically connected to it, these standards and guidelines are not applicable to the Proposed Action.

The NWFP includes direction for protecting watershed resources as part of the Aquatic Conservation Strategy (ACS), which is designed to (1) protect aquatic and riparian-dependent species and resources and (2) support restoration of degraded habitats. There are four components of the ACS including Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. These four components are

incorporated into the following nine objectives that are the framework of the ACS. To summarize the objective-specific discussion below, this project would be consistent with the ACS.

- ACS Objective 1. *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. (Forest Service and Bureau of Land Management 1994)*

  Discussion: The Proposed Action and alternatives do not retard the attainment of this objective at the local or watershed scale. There are no aquatic systems within the project area (i.e. proportion of the SUP directly impacted by the Proposed Action).

- ACS Objective 2. *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include flood plains, wetlands, upsweep areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

  Discussion: The project would not affect floodplains, wetlands, upsweep areas, headwater tributaries, and riparian or aquatic refugia. Network connections critical to aquatic and riparian-dependent species are not affected. The project maintains this objective at the local and watershed scale.

- ACS Objective 3. *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

  Discussion: The project has no effect on shorelines, banks, and bottom configurations as there are no riparian areas or streams within the project area. This objective is maintained at the local and watershed scale.

- ACS Objective 4. *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

  Discussion: The project has no effects on water quality as the nearest stream (Todd Creek) is 0.7 miles from the project area. This objective is maintained at the local and watershed scale.

- ACS Objective 5. *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

  Discussion: The project would have no effect on sediment regimes as there are no aquatic systems in the project area. This objective is maintained at the local and watershed scale.

- ACS Objective 6. *Maintain and restore in-stream flows sufficient to create and restore riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration and spatial distribution of peak, high, and low flows must be protected.*

  Discussion: The nearest aquatic system is Todd Creek, which is outside the project area. Based on hydrograph monitoring since the 1970s, no measurable changes in the flow regime are

anticipated in Todd Creek, which is a spring-fed, groundwater system. The project would maintain this objective at the local and watershed scale.

- ACS Objective 7. *Maintain and restore timing, variability, and duration of flood plain inundation and water table elevation in meadows and wetlands.*

  Discussion: The project would have no effects to floodplain inundation and water table elevations as there are no aquatic systems in the project area.. The project would maintain this objective at the local and watershed scale.

- ACS Objective 8. *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.*

  Discussion: The project would have no effects on riparian plant communities as none exist within or near the project area, therefore this objective would be maintained at the local and watershed scale.

- ACS Objective 9. *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

  Discussion: There are no riparian habitats within the project area. The project maintains this objective at the local and watershed scale.

3.4.4 VEGETATION

3.4.4.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

***Issue 1*:** Proposed projects may result in disturbance, loss, and conversion of existing vegetation through clearing and grading.

Indicators: Acreage of vegetation disturbed, converted, or lost, by cover type, as a percentage of total cover in the SUP area. Cover types are broadly defined by dominant forest type or as natural non-forested, ski trail, or developed. The seral stage of affected forest types is also considered in the analysis.

Analysis Area: Analysis of direct impacts focuses on the area of physical disturbance associated with the proposed projects in the context of the SUP area. No indirect or cumulative effects on vegetation are anticipated.

***Issue 2*:** The proposed projects may impact special-status plants through direct, physical disturbance or alteration of habitat. Whitebark pine is addressed as it has recently been classified as a candidate for federal listing.

Indicators: Acreage of disturbance within areas known to be occupied or potentially occupied by special-status plants, including federally listed, Forest Service Sensitive, and Survey and Manage species.

Analysis Area: Analysis of direct impacts will focus on the area of physical disturbance associated with the proposed projects. No indirect effects on special-status plant species are anticipated. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

***Issue 3*:** The proposed projects may impact wetlands, if any are identified, through clearing and grading or through alteration of surface or subsurface hydrology.

Indicators: Acreage of wetland habitat altered and narrative discussion of implications.

Analysis Area: Analysis of direct impacts focuses on the area of physical disturbance associated with the proposed projects. No indirect or cumulative effects on wetlands are anticipated due to the lack of hydrological connectivity.

***Issue 4*:** The proposed projects may increase the types and extent of noxious weed populations in the SUP area through clearing, grading, importing fill material, and accidental seed introduction.

Indicators: Area of disturbance susceptible to establishment of currently present or introduced species of noxious weeds.

Analysis Area: Analysis of direct impacts focuses on the area of physical disturbance associated with the proposed projects. Indirect impacts are considered at the SUP level. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

3.4.4.2 Affected Environment

3.4.4.2.1 Disturbance, Loss, and Conversion of Existing Vegetation

The project area is characterized by three forested land cover types (mountain hemlock, lodgepole pine, and mixed conifer) and four non-forested land cover types (lava, naturally non-forested, ski trail, and developed; Figure 3-2 and Table 3-16). Two of the non-forested land cover types are naturally occurring and two are associated with the ski area development.

Table 3-16. Acreage of land cover types within the Mt. Bachelor SUP.

Land Cover Type	Acres	Percent of Area
Mountain Hemlock	5,434.3	65.3
Lodgepole Pine	271.0	3.3
Mixed Conifer	73.5	0.8
Lava	618.7	7.4
Natural Non-Forested	1,088.2	13.1
Ski Trail	688.9	8.3
Developed	149.8	1.8
Total	8,324.4	100

Note that the following descriptions of forested land cover types were drawn from *Forested Plant Associations of the Oregon East Cascades* (Simpson 2007), while descriptions of the non-forested types were developed for this analysis.

Note also that while common names are used for the more familiar plant species discussed in this EIS (followed by their scientific names when they first appear), common names for many of the more rare, special status species have not been established. As a result, only scientific names are used for special status species.

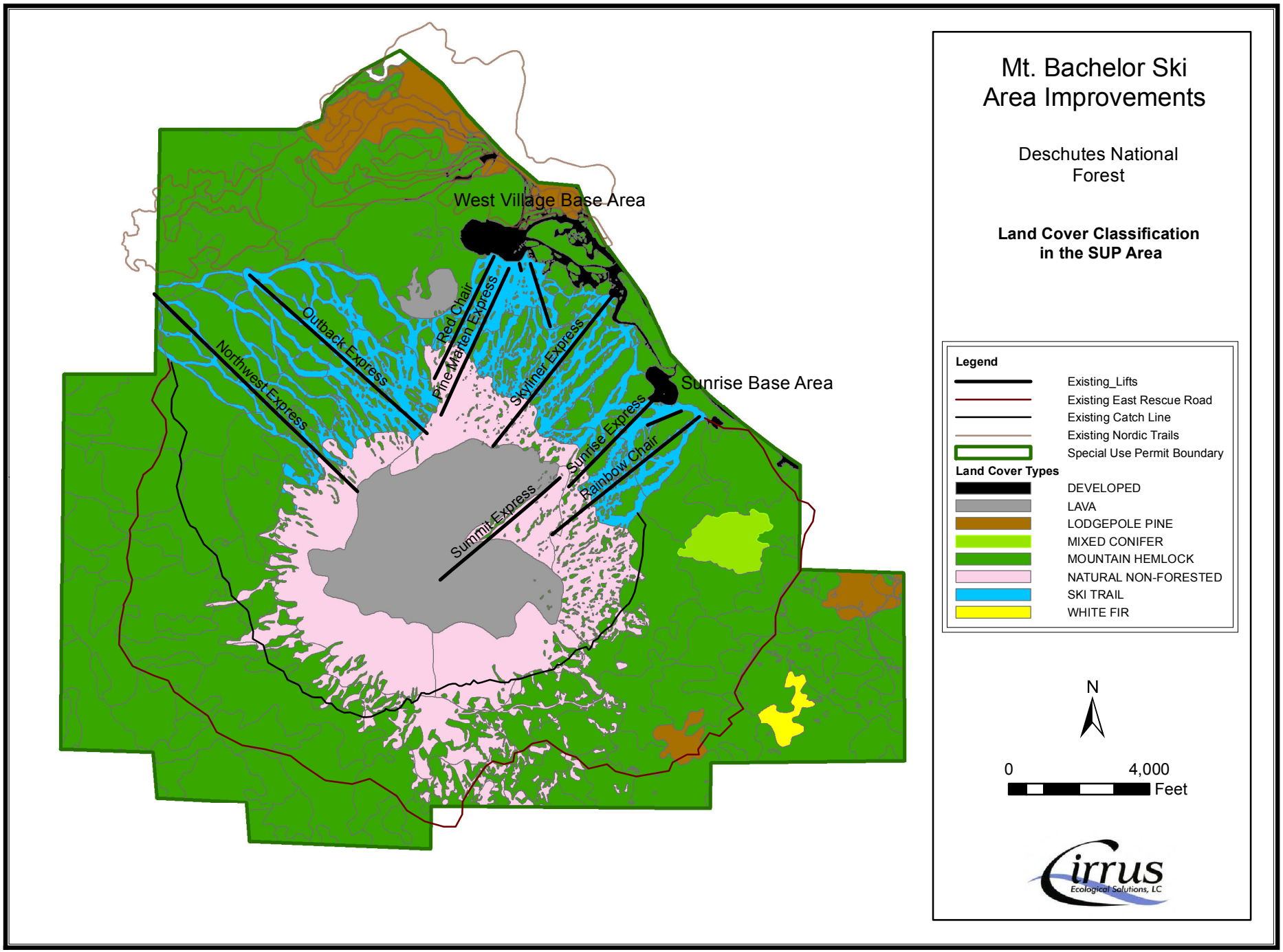

Figure 3-2. Existing Landcover types.

Mountain Hemlock

Mountain hemlock (*Tsuga mertensiana*) is the most prevalent land cover type occurring in the project area, totaling approximately 5,434 acres. Mountain hemlock typically occupies cold sites with snow accumulations of several feet or more during winter. These snowpacks persist well into June or early July, resulting in a relatively short growing season. Mountain hemlock is resistant to physical snow damage.

At the highest elevations, mountain hemlock grades quickly into lava/subalpine parkland or whitebark pine (*Pinus albicaulis*) associations. The controlling mechanisms of the ecotone between forest (tree island) and non-forest are complex and still only poorly understood. Snowpack depth and duration, and excess or insufficient soil moisture during the growing season, are some of the primary operating factors. Other tree species that are often associated with mountain hemlock are generally excluded within the project area because of the harshness of the site, although firs are present in some areas.

Stands within the project area are near the upper elevational limits of the series, and most areas have nearly pure canopies of mountain hemlock, with crowns heavily festooned by lichens. Most stands have a uniform size-class structure, giving the false impression of an even-aged stand. Reproduction is sparse.

Undergrowth in most areas is depauperate, characterized by a few scattered plants and deep litter. Smooth woodrush (*Luzula hitchcockii*) and grouse whortleberry (*Vaccinium scoparium*) are typical understory species in these colder and often excessively drained areas.

Lodgepole Pine

Lodgepole pine (*Pinus contorta*) is a minor land cover type in the project area, totaling approximately 271 acres. Dry lodgepole pine associations found in the project area have depauperate understory vegetation due to the excessively drained soils. Tree layers average 20 – 30 percent cover of lodgepole pine. Shrubs and graminoids typically average 5 – 10 percent each, and forbs are not well represented, averaging less than 1 percent cover. Common understory species are long-stolon sedge (*Carex inops*), Ross's sedge (*C. rossii*), squirreltail (*Elymus elymoides*), and western needlegrass (*Achnatherum occidentale*).

The lodgepole pine associated with ash/pumice deposits and sites located on lower slope positions are usually climax lodgepole pine, while sites on mid to upper slopes may be seral to mountain hemlock where they are located adjacent to stands with mountain hemlock. Soils are derived from airfall pumice and pumice alluvium/lava colluvium. Surface textures are gravelly coarse sand.

The tree layer is dominated by lodgepole pine. Within the project area, the shrub layer is essentially absent and the herbaceous layers are graminoid dominated. Forbs are almost nonexistent; cover averages less than 1 percent. Silvery lupine (*Lupinus argenteus*) is likely to increase with disturbance. Long-stolon sedge, squirreltail, and western needlegrass (*Achnatherum occidentalis*) occur most commonly. Graminoid cover is typically 10 – 15 percent in late seral stands but increases significantly following disturbance. Long-stolon sedge and western needlegrass consistently have the highest cover values.

Mixed Conifer

Mixed conifer is a minor land cover type occurring low on the east side of Mt. Bachelor on approximately 73 acres. It is surrounded by mountain hemlock. Canopy cover is lower than in the adjacent mountain hemlock and tree species are more diverse. Dominant and co-dominant trees include western white pine (*Pinus monticola*), whitebark pine, lodgepole pine, and mountain hemlock. Mortality among the larger pine trees is high due to disease and insects. Understory species include the same species that occur in mountain hemlock but ground cover is higher.

Old Growth

An analysis of the forested portions of the SUP area was conducted using LIDAR data to assess the occurrence of large-structured trees as a metric to estimate the occurrence of old growth. Large-

structured trees include stands with an average diameter at breast height (dbh) greater than 20 inches. Based on this analysis, approximately 1,138 acres of old growth occur in the project area, occurring primarily in the mountain hemlock land cover type.

Natural Non-Forested

Natural non-forested is the second most prevalent land cover type in the project area, occurring on approximately 1,088 acres. It occurs between the lava land cover type and the mountain hemlock land cover type. This land cover is a transition between the two and contains forested pockets of mountain hemlock. As elevation increases, the forested pockets are increasingly comprised of whitebark pine. At these elevations, the whitebark pine is small and scrubby. Most larger pines are dead. Between the forested pockets are lava dikes and outcrops separated by relatively flat spots with accumulations of volcanic soils. The lava outcrops commonly support Davidson's penstemon (*Penstemon davidsonii*), pasque flower (*Anenome drummundii*), wavy leaf paintbrush (*Castelleja applegatei*), partridge foot (*Leutkea pectinata*), pussy paws (*Cistanthe umbellata*), and spotted saxifrage (*Saxifraga bronchialis var. austromontana*). Flat areas between the lava outcrops support predominately dry sedge communities comprised of sedges (*Carex nigricans, C. brewerii, C. spp.*).

Lava

This land cover type is restricted to approximately 619 acres on the upper elevations of Mt. Bachelor. It is defined by volcanic rocks. Vegetation is very sparse and restricted to pockets with primary soil development and includes species previously noted as occurring on lava outcrops.

Ski Trail

The ski trail land cover type occurs on approximately 689 acres and is characterized by relatively narrow corridors that cross other naturally occurring land cover types, particularly mountain hemlock. Around the bases of the lifts, ski trail polygons become wider to accommodate skier circulation. At the upper elevation of this land cover type, ski trail intergrades with and transitions to natural non-forest.

This cover type results from clearing of forested vegetation followed by summer grooming, which entails grading the trails to create a more consistent surface to facilitate skiing, particularly during low snow conditions. Lava ridges, humps, and other topography are removed to fill lower areas during this process. Vegetation within the ski trail is dependent on the interval since disturbance and the reclamation efforts that were carried out. Recently disturbed ski trails tend to be bare, rocky surfaces of crushed or pulverized volcanics. Sites with more time since disturbance often have natural revegetation with native species adapted to disturbance. These include sedges (*Carex halliana*, *C.* spp.), partridge foot, mountain hemlock regeneration, and Davidson's penstemon. Non-native species occur on some ski trail sites, primarily in the base area, dating to past use of non-native species in revegation mixes. These species include smooth brome (*Bromus inermis*), orchard grass (*Dactylis glomerata*), timothy (*Phleum pretense*), and clover (*Trifolium spp*.).

On-mountain infrastructure, including lifts, access roads, and the Pine Marten Lodge, is also located within the ski trail land cover type.

Developed

This land cover type is restricted to approximately150 acres in the base area and includes highly developed sites such as parking lots, roads, and base area infrastructure, including the West Village Lodge and the Sunrise Lodge.

3.4.4.2.2 Special-Status Plants

Threatened, Endangered, or Sensitive (TES) Plants

No federally listed Threatened or Endangered plant species are known to occur on the DNF. However, of the 60 vascular and nonvascular (i.e., bryophytes, lichens, and fungi) Sensitive plant species currently

listed as potentially occurring on the DNF (Table B-1, Appendix B), 26 are known to occur on the Forest. Two vascular species, *Pinus albicaulis* and *Botrychium pumicola*, are known to occur in the Mt. Bachelor SUP, and two other vascular species, *Carex abrupta* and *Arnica viscosa*, are known to occur near the project area. Note that 10 of the nonvascular Sensitive species listed for the DNF are also Survey and Manage species, which are addressed under that heading below.

Habitat requirements of all 60 DNF Sensitive species were reviewed to determine their probability of occurrence in the project area (Table B-1, Appendix B). Based on this review, the 13 Sensitive species listed in Table 3-17 have at least a moderate likelihood of occurring in the project area, including six vascular plants and seven nonvascular plants.

Surveys for vascular species were completed in all potentially disturbed areas in August and September of 2011. No vascular Sensitive plant species were located during these surveys, with the exception of whitebark pine. Whitebark pine occurs in the Eastside pod, primarily at higher elevations.

Whitebark pine has been experiencing steady declines over its entire range due largely to a combination of infection from an introduced fungus, white pine blister rust, and an unprecedented outbreak of mountain pine beetles.

Condition surveys of whitebark pine on the DNF have confirmed the same overall trend of declining health and increased mortality in most whitebark stands from blister rust and mountain pine beetle. Locally, blister rust infection rates range vary from 0 to 80 percent, with a pattern of higher infection rates closer to the Pacific crest and less to the east in areas such as Paulina Peak. Large populations of mountain pine beetles have crept upward to the higher-elevation stands and are killing many of the mature and large cone bearing trees in several areas of the Forest, including Mt. Bachelor.

Mt. Bachelor has a large population of whitebark pine with the heaviest concentrations and stands located on the southern and southeastern aspects. Surveys completed for this project noted that most larger whitebark pine trees have been killed by disease or insects, but smaller trees in stands where whitebark pine is common or even dominant (particularly near the upper elevations of the forest zone) are locally common. The DNF has established four whitebark pine monitoring plots on Mt. Bachelor to track the status and trend of this species as part of a wider forest monitoring program. Based on data from the *Whitebark Pine Blister Rust Survey Application Database Ver. 1.01*, regeneration within the whitebark pine zone ranges from 174 to 920 trees per acres.

Surveys for nonvascular Sensitive species were conducted in conjunction with those addressing Survey and Manage species, discussed below. No Sensitive nonvascular species were located. Based on these survey results, whitebark pine is the only Sensitive plant species carried into the impact analysis.

Survey and Manage Species

In addition to effects on TES species, all Forest Service projects, programs, and activities in the NWFP area are reviewed for possible effects on Survey and Manage species. On July 2011, the Survey and Manage Settlement Agreement was signed, which directs the Forest Service to use the list of Survey and Manage species provided with the new settlement agreement for decisions signed after September 30, 2012 (Forest Service/Bureau of Land Management 2011).

Table 3-17. List of Forest Service Sensitive species with moderate or higher probability of occurring in the project area.

Species (Life Form)[1]	Habitat	Known to Occur in Mt. Bachelor SUP/ On DNF
Alpova alexsmithii (F)	Coniferous forest, particularly including Pacific silver fir, lodgepole pine, Engelmann spruce and mountain hemlock; a mycorrhizal species.	No/Yes
Arabis suffrutescens var. horizontalis (VP)	Alpine to subalpine meadows, woods; summits, ridges; steep exposed rock outcrops.	No/No
Arnica viscosa (VP)	Subalpine or higher scree, talus gullies and slopes w/ seasonal runoff; lava flows; may be in moraine lake basins or crater lake basins.	No/Yes
Brachydontium olympicum (B)	On subalpine or higher rock or soil in boulder fields, moraines, cliff ledges; often in areas of late snowmelt.	No/No
Botrychium pumicola (VP)	Alpine-subalpine ridges, slopes and meadows; montane forest openings, open forest in basins with frost pockets, and pumice flats.	Yes/Yes
Carex abrupta (VP)	Subalpine and higher; moist meadow, lake shore, dry grassy hillside, and bare roadside.	No/No
Conostomum tetragonum (B)	Likely above timberline on soil in rock crevices in boulder fields, moraines, and ledges of cliffs.	No/No
Eucephalus gormanii (VP)	Rocky ridges, outcrops, or rocky slopes in alpine or subalpine mixed conifer forest.	No/No
Gastroboletus vividus (F)	Higher elevation coniferous forest with subalpine fir, Shasta red fir, and mountain hemlock; a mycorrhizal species.	No/No
Hygrophorus caeruleus (F)	Coniferous forests near melting snowbanks; a mycorrhizal species.	No/Yes
Pinus albicaulis (VP)	Harsh, cold sites characterized by rocky, poorly developed soils and snowy, wind-swept exposures, also high-elevation sites near treeline.	Yes/Yes
Polytrichum sphaerothecium (B)	Igneous rocks in subalpine parkland to alpine krummholz.	No/No
Ramaria amyloidea (F)	Montane coniferous forests with documented elevations of 1,800-5,600 feet; associated species include white fir, Shasta red fir, lodgepole pine, and western white pine; a mycorrhizal species.	No/Yes

[1]Life form codes: F = fungus, VP = vascular plant, B = bryophyte.

The 2001 ROD, as modified by the 2011 Settlement Agreement, includes direction to conduct "equivalent-effort" surveys in old- growth forest for all habitat-disturbing projects with decisions in 2011 and beyond. Old-growth forest is defined as "at least 180 – 220 years old with moderate-to-high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees; some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground."

Habitat disturbing activities are defined as "those disturbances likely to have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements." The 2001 ROD also states, "'Habitat disturbing' is not necessarily the same as 'ground disturbing'; helicopter logging or logging over snow-pack, for example, may not disturb the ground but might clearly affect microclimate or life cycle habitat factors. Conversely, an activity having soil-disturbing effects might not have a large enough scope to trigger a need to survey."

In determining a need for survey the 2001 ROD directs line officers to "consider the probability of the species being present on the project site, as well as the probability that the project would cause a significant negative effect on the species habitat or the persistence of the species at the site." The ROD stipulates survey requirements for each of the six categories of Survey and Manage species. Depending on the categories in which any such species that are located fall, the agency is directed to manage either all known sites or known high-priority sites in a manner consistent with the habitat requirements of the species.

The DNF lists 64 Survey and Manage species documented or suspected to occur on the Forest. A pre-field review was completed to determine which of the species that require predisturbance surveys may occur in the project area. The key habitat factors considered in that review were:

- The project area is within an existing ski area.
- The west side of the project area has been heavily influenced by past ski areas operation, while the east side is predominantly unaffected.
- The project area is dominated by a mountain hemlock association.
- Stands of old growth forest occur throughout the mountain hemlock forest. These stands occur as noncontinous units larger than 5 acres in the Eastside pod and tubing area.
- Soils are characterized by sandy volcanic ash and pumice over buried soils on glacial till, as well as sandy, pumiceous volcanic ash over sandy to loamy buried soils.
- The elevation ranges from about 6,200 to 8,000 feet.
- The average annual precipitation is about 35 inches.

In consideration of these factors, the pre-field review determined that 30 species that require predisturbance surveys could occur in the project area. These species are listed in Table B-2 of Appendix B. They include nonvascular plants, specifically fungi, and one lichen, *Cladonia norvegica*. Because old growth occurs throughout the project area, protocol surveys are being completed for these Survey and Manage fungi species. The first year's spring surveys were completed during summer of 2011, and the first year's fall surveys were completed in October 2011. The second year's spring and fall surveys were conducted in June, July, and Novemberof 2012. Based on survey results, one Category B species, *Ramaria rubrievanescens* occurs in the project area. This fungus was found within the alignment of the proposed Eastside Express lift tower terminal access road.

3.4.4.2.3 Wetlands

Surface water is uncommon in the Mt. Bachelor project area. There is one perennial stream, Todd Creek, and one pond in a crater, both with associated wetland and/or riparian fringes. However, these features are located in the north part of the project area away from any proposed development. Because these features are not located in areas subject to direct or indirect impacts, they are not discussed further.

3.4.4.2.4 Noxious Weeds

Non-native invasive plants are aggressive species capable of degrading environmental quality or causing economic harm. Invasive plants are undesirable in forest ecosystems because they tend to displace native plants, degrade wildlife habitat, contribute to soil erosion, and potentially reduce recreational values. They have developed many characteristics, such as rapid growth rates, high seed production, and extended growing periods, that give them competitive advantages over native plants.

The Forest Service provides comprehensive management direction for noxious weeds at the national, Regional, and Forest levels. The following are most relevant to this project:

- The 1998 DNF *Noxious Weed Control Environmental Assessment* with its supplemental *Deschutes National Forest Integrated Weed Management Plan*, which promote prevention, early treatment, maintenance, and awareness. Management actions include analyzing the risk of noxious weed invasion during the project planning process and developing tactics to avoid introduction or spread of noxious weeds, including clean equipment provisions in contracts, implementing measures to prevent weed introduction and spread, and increasing awareness of noxious weeds and the risks they pose, both within the Forest Service and with the public.
- Amendment of the Forest LRMP to incorporate standards and guidelines from the Forest Service Region 6 *Invasive Plant Environmental Impact Statement* (R6 IP EIS). The Final EIS was released in June 2005, and the Record of Decision (ROD) was signed in October 2005. Implementation began March 1, 2006.
- Preparation of an *Invasive Plant Treatments Final EIS* which was released in December 2007 by the Deschutes and Ochoco National Forests. The Record of Decision has not yet been signed, as this document is currently undergoing continued environmental analysis. The purpose of the Final EIS is to reduce the extent of specific invasive plant infestations at identified sites, and to protect areas not yet infested from future introduction and spread of invasive plant species.

Since the early 1990s, the Forest Service has gathered information on the location and size of all known noxious weed sites. This information has been entered into the Natural Resource Inventory System (NRIS) database for the Forest Service and GIS "Invasives" layer for the DNF.

Noxious Weed Status in the Project Area

Based on NRIS database and DNF GIS data, several noxious weeds are known to occur within or near the project area. Spotted knapweed (*Centaurea stoebe*) occurs along Hwy. 46. Canada thistle (*Circium arvense*) also occurs along Hwy. 46, and there are occurrences around Sparks Lake.

Surveys completed for this EIS confirmed the presence of spotted knapweed in the Hwy. 46 corridor near the ski area. This species has apparently expanded its occurrence along the highway corridor relative to the 2002 – 2008 occurrences documented in the NRIS database. However, it was not found within the ski area boundary at any of the proposed development sites.

A small, previously undocumented population of Canada thistle was identified in the disturbance area for the Sunrise base area wastewater line. Other weedy species noted in the project area included shepherd's purse, (*Capsella bursa-pastoris*), kochia (*Kochia scoparia)*, tansy mustard (*Descurainia spp.*), and mullen (*Verbascum thapsus*), all located in the vicinity of the West Village Lodge in disturbed land cover types.

Risk Ranking

The DNF employs a method to rank the relative risk posed by noxious weeds for a given project as high, moderate, or low. Factors considered in determining the level of risk of the introduction or spread of noxious weeds are shown in Table 3-18.

The risk ranking for this project area is moderate because, although there are known weed populations in and adjacent to the project area and vectors 1, 6, and 7 are operative, project operations are limited in or adjacent to weed populations.

Table 3-18. Weed risk ranking.

High	Known weeds in/adjacent to project area; AND
	Any of vectors #1-8 in project area; AND
	Project operation in/adjacent to weed population.
Moderate	Any of vectors #1-5 present in project area.
Low	Any of vectors #6-8 present in project area; OR
	Known weeds in/adjacent to project area without vector presence.

Vectors (ranked in order of weed introduction risk):

1. Heavy equipment (implies ground disturbance)
2. Importing soil/fill
3. OHV
4. Grazing (long-term disturbance)
5. Pack animals (short-term disturbance)
6. Plant restoration
7. Recreationists (hikers, mountain bikers)
8. Project vehicles

3.4.4.3 Direct and Indirect Effects

3.4.4.3.1 No-Action Alternative

Disturbance, Loss, and Conversion of Existing Vegetation

Under the No-Action Alternative, there would be no physical disturbance, loss, or conversion of existing vegetation through ski area development. Only the developed cover type would be disturbed by construction of the West Village administration building. The vegetation would essentially remain as described in section 3.4.4.2.1. Natural factors, including wind, ice and snow, insects, and disease, would continue to act on the forest, creating smaller openings and patches. On-going ski area maintenance operations would prevent forested regeneration from overgrowing existing ski trails and maintain them as clearings, and hazard trees would be felled.

Special-Status Plants

Similarly, since there would be no disturbance of the existing vegetated land cover types due to clearing, grading, or other project-related impacts, there would be no direct or indirect impacts on special-status plant species or their habitats. However, impacts on whitebark pine due to disease and insect vectors would continue to affect the density, number, distribution, and seral-stage structure of whitebark pine within the project area and beyond.

Survey and Manage Species
Likewise, since there would be no disturbance of the existing vegetated land cover types due to clearing, grading, or other project-related impacts, there would be no direct, indirect, or cumulative effects on Survey and Manage species or their habitat under the No-Action Alternative.

Wetlands
As noted above, there would be no disturbance of the exiting habitat due to clearing, grading, or other project-related impacts. The few wetlands that do occur in the SUP area are not affected by ongoing ski area operations. Therefore, there would be no direct or indirect impacts on wetlands.

Noxious Weeds
As there would be no disturbance to the exiting habitat due to clearing, grading, or other project-related impacts, the existing conditions described in section 3.4.4.2.4 would remain. Due to the nature of the noxious weeds present in the area, there is a moderate risk that spotted knapweed could become established in the project area and that Canada thistle could expand, particularly in the base area and along roads and ski trails that have been subject to past disturbance.

3.4.4.3.2 Proposed Action

Disturbance, Loss, and Conversion of Existing Vegetation
The Proposed Action would result in disturbance of the project-area land cover types described previously (section 3.4.4.2.1) due to selective tree removal, glading, clearing, grading, and excavation. Table 3-19 shows these impact acreages as percentages of the total acreage in that land cover type in the SUP area. Table 3-2 discloses the impact each element or class of elements comprising the Proposed Action would have on the various land cover types by type of disturbance. The effect of each type of disturbance on the land cover or forest structure is discussed below.

Selective tree removal would affect approximately 438 acres, or approximately 5 percent of the SUP area, and principally occurs in mountain hemlock. It would result in a very minor impact in terms of stand structure, canopy closure, density, and seral stage because it would only involve the removal of single, scattered trees or small clumps of saplings from discrete locations to facilitate tree skiing. As noted in section 3.2, this treatment was designed to avoid altering the structure of the stand by limiting the size and number of trees that could be removed. Much of the area identified for selective tree removal is mature mountain hemlock forest with an open, skiable forest structure, but there are pockets of thick mountain hemlock regeneration. These areas are often between the ridges and occasionally create choke points that hinder skier traffic. Selective tree removal would open these areas up to allow skiing.

Glading would affect approximately 96 acres, or approximately 1 percent of the SUP area, and also principally occurs in mountain hemlock. It would only remove smaller trees, leaving larger trees in place to achieve a target spacing of 15 – 25 feet between trees (section 3.2). Much of the forest where glading would be applied is mature mountain hemlock forest with a naturally open stand structure. Thus glading would remove occasional smaller trees (less than 21-inch dbh, as noted in section 3.2) to facilitate skier access, leaving the overall stand structure, canopy closure, density, and seral stage essentially unchanged.

Clearing would affect approximately 10 acres, or 0.1 percent of the SUP area, primarily in the new lift corridor. Clearing principally affects forested land cover types and would remove all trees and tall shrubs using tracked or wheeled equipment. The ground surface would not be graded, leaving the understory in place, although there would be ground disturbance associated with equipment operation and log removal. The understory in mountain hemlock is typically depauperate in the project area. Cleared areas may become dominated by sedges or forbs and resemble some of the existing ski runs, or they may become dominated by tree regeneration. In that case, ski area maintenance would maintain these areas as early seral forest. Thus clearing would convert forested mountain hemlock cover to the ski trail cover type, substantially altering stand structure, canopy closure, and density.

Table 3-19. Acres of each land cover type affected under the Proposed Action by disturbance type (acreage and percentage of that cover type in the total SUP area).

	Land Cover Types (ac/%)							
	Mountain Hemlock	**Natural Non-Forested**	**Mixed Conifer**	**Ski Trail**	**Devel-oped**	**Lava**	**Lodge-pole Pine**	**Total**
Selective Tree Removal	318.9 5.9%	113.8 10.5%	1.9 2.6%	3.4 0.5%	0 0.0%	0 0.0%	0 0.0%	438 5.3%
Glading	88.1 1.6%	0.5 0%	3.7 5%	3.9 0.6%	0 0.0%	0 0.0%	0 0.0%	96.2 1.2%
Clearing	6 0.1%	3.3 0.3%	0.4 0.5%	0 0.0%	0 0.0%	0.1 0.0%	0 0.0%	9.8 0.1%
Grading	111.7 2.1%	37.1 3.4%	22.1 30.1%	11.9 1.7%	3.8 2.5%	3.7 0.6%	0.1 0.0%	190.4 2.3%
Excava-tion	6 0.1%	3.2 0.3%	0 0.0%	6 0.9%	6.2 4.1%	0.4 0.1%	0 0.0%	21.8 0.3%
Total Impact	530.7 9.7%	157.9 14.5%	28.1 38.2%	25.2 3.7%	10 6.7%	4.2 0.6%	0.1 <0.1%	756.2 9.1%
Total in Project Area	5,434.3	1,088.2	73.5	688.9	149.8	618.7	271.0	8,324.4

Grading would affect 190 acres, or 2 percent of the SUP area. Grading would recontour and smooth the soil surface using caterpillars or other heavy equipment, generally after a clearing treatment. It would result in a complete type conversion from the existing land cover to ski trail. Under the Proposed Action, the majority of the grading would occur in a forested land cover type. Trees would be cut and the understory removed as the surface was reshaped. Stand structure, canopy closure, and density would be substantially altered. Seral stage would be set back, and the area would be removed from the forest land cover type. Revegetation would occur after construction was completed, and native species adapted to disturbed soils would become established over time, based on the condition of some of the exiting ski trails that have been graded and subsequently regrown native species. A number of species that occur at Mt. Bachelor are able to grow on poorly-developed volcanic soils, and newly graded ski runs resemble poorly developed volcanic soils as a growth medium.

Excavation would affect approximately 22 acres, or 0.3 percent of the SUP area. In terms of its effect on existing land cover, excavation would be similar to grading: any trees, understory, or other vegetation would be removed and the ground surface would be worked prior to excavation. After construction, part of the area disturbed by excavation would be reclaimed and allowed to regrow vegetation. These areas would be converted to the ski trail cover type, while areas directly occupied by infrastructure would be converted to the developed type.

Old Growth

The Proposed Action would impact approximately 64 acres of old growth. This represents less than 6 percent of the total in the project area (section 3.4.4.2.1). This total impact comprises of 1 acre of that would be impacted by excavation, 60 acres that would be impacted grading, and 3 acres that would be impacted by clearing. These areas would be converted to non-forest cover types and would thus be lost as potential old growth. Design criteria and mitigation measures (section 2.2.6) would limit glading to trees less than 21 inches dbh and selective tree removal to trees less than 8 inches dbh, with the exception of hazard trees. As a result, these areas would experience very minor impacts in terms of stand structure, canopy closure, density, and seral stage and would thus maintain their current old growth characteristics.

Special-Status Plants

A biological assessment providing more detailed analysis of potential effects on federally listed species and a biological evaluation addressing Forest Service Sensitive species have been prepared. These documents are included in the administrative record and are included by reference in this analysis.

As noted in section 3.4.4.2.2, no federally listed Threatened or Endangered plant species are known to occur on the DNF. Further, based on the surveys completed for this project (vascular plants) and in progress (fungi), no special status plants, with the exception of whitebark pine, occur in the project area. There are no known Survey and Manage species or Survey and Manage sites within areas affected by the Proposed Action, so no impacts on Survey and Manage species are anticipated under the Proposed Action. Therefore, with the exception of whitebark pine, there would be no impacts on special status species.

Whitebark pine, recently listed as a candidate species and therefore as a Forest Service Sensitive species, does occur in the project area and would be affected by the Proposed Action. Construction of the lift corridor and upper terminal and the ski runs in the Eastside pod would result in the loss of whitebark pine. Notably, whitebark pine occurs in the upper approximately 500 – 700 feet of the Eastside pod in the transition from the mountain hemlock to natural nonforest cover type. In addition, the lower segment of the new catchline and adjacent trails would affect a stand of mixed conifer where whitebark pine is an important component of the forest. Isolated individuals and smaller whitebark pine stands occur in other parts of the project area as well. Many of the larger whitebark pine trees are dead, but smaller trees are present and may be locally common.

Whitebark pine that occur within the proposed Eastside pod ski trails, lift corridor, and upper terminal site would be removed. In accordance with the mitigative criteria listed in section 2.2.6, the only whitebark pine removed in selective tree removal or glading areas would be hazard trees, so impacts on the species in areas subject to these treatments would be negligible. Overall, it is estimated that roughly 6 acres of clearing and grading would occur in stands containing whitebark pine, resulting in potential removal of over a thousand trees, the majority being seedlings and saplings. No select trees or monitoring plots that have been established for studies within the Mt. Bachelor SUP area would be affected.

Whitebark pine seedlings and saplings may be removed under the Proposed Action by the construction of the proposed mountain bike trails. Whitebark pine trees greater than 8 inches dbh would not be cut (section 2.2.6).

Although the Proposed Action would impact whitebark pine, the extent of the impact would be relatively small considering the wide distribution of whitebark pine at Mt. Bachelor and elsewhere in the region relative to the small acreage of impacted habitat under the Proposed Action. **Therefore, although the Proposed Action would impact individuals, it would not contribute toward a trend toward federal listing or loss of viability to the population or species.**

Mt. Bachelor will collaborate with the DNF in an effort to plant rust-resistant whitebark pine seedlings in stands affected by insects or disease that are outside areas of proposed development as mitigation for impacts on this species under the Proposed Action, as specified in section 2.2.6.

Survey and Manage Species

As noted above, there would be short-term and long-term disturbance to habitat due to implementation of the Proposed Action. Protocol surveys for Survey and Manage species completed for this project in fall of 2012 found one species, *Ramaria rubrievanescens,* in the project area. This fungus was found within the alignment for the proposed Eastside Express lift lower terminal access road. As proposed, this project would create a summer access road to the lower terminal of the Eastside Express lift for construction and maintenance. Trees would be cleared, the road surface would be graded, and an electrical line to power the lift would be installed in the road prism. In addition, the route would be groomed as a skiway for snowcat and skier access in the winter.

Ramaria rubrievanescens is a Category B species, for which management of known sites is required. The project was reviewed by an interdisciplinary team to determine measures that would be required to protect the site. Guidance on management of Survey and Manage sites includes the following:

> Threats to these taxa are those actions that disrupt stand conditions necessary for their survival, particularly damage to host trees and disturbance of soil occupied by host tree roots. These include logging that removes mycorrhizal hosts and other actions that cause disturbance to the soil, particularly road, trail, and campground construction. (*Ramaria* section of *Management Recommendations for Survey and Manage Fungi*, 1997, Group 7-21.)
>
> …at and around known sites, it is recommended that current habitat conditions and micro-climatic conditions be maintained, impacts from soil disturbing activities minimized, and damage or removal of host trees prevented. (*Ramaria* section of *Management Recommendations for Survey and Manage Fungi*, 1997, Group 7-25.)

Literature was reviewed to identify pertinent studies to guide the development of measures to protect the site. Although research specific to *Ramaria rubrievanescens* was not available, studies dealing with other species of fungi provided some general parameters for site protection.

Several studies found that the genet (a group of genetically identical individuals) size of fungi varies by species. In *Tricholomopsis*, a litter fungus, genet size is known to range up to 150 meters, while in *Armillaria*, a root-rot fungus, it may range up to 635 meters (Hansen and Hamelin 1999). Based on sporocarp distribution, a genet size of 1.5 meters is known in *Hebeloma* and 27 meters in *Suillus* (Dahlberg and Stenlid 1995). While the extent of the genet varies by species, *Rameria rubrievanescens* is most similar to *Suillus*, making *Suillus* the best indicator of expected genet size for *Ramaria*.

In terms of the effect of clearings on the hypha (the long, branching filamentous structures of fungi growing underground), studies in interior cedar-hemlock forests of northwest British Columbia showed when tree cutting creates clearings of 900 square meters or greater, there is a significant gap in the below-ground hyphal network (Durrall et al 1999). This suggests that clearing greater than 32 meters (110 feet) in diameter could be expected to affect hypha development. The 30-foot corridor proposed for the access route is well below this distance.

Other studies have shown that the edge effects of retention patches extend nearly 10 meters in coastal western hemlock (Jones et al. 2008) and at least 15 – 20 meters in Douglas fir forest (Outerbridge and Trofymow 2004). These studies suggest that fungi hypha could extend 33 to 66 feet into a clearing. This distance is greater than the proposed 30-foot width of the proposed clearing for the access route.

Based on this information from the literature, consideration of the stand characteristics, consultation with other botanists and managers, and discussion with the interdisciplinary team, design features and mitigation measures were developed to protect this site. These measures are listed in section 2.6.6 and constitute the required management to protect the site from loss.

To summarize these measures, the site management plan would allow minimal tree clearing for a winter-only snowcat access and skiway, and a 150-foot-radius management buffer would be placed around the fungus site. The required summer access road to the Eastside Lift lower terminal would be shifted to the east, well outside of the Survey and Manage buffer, to an alignment where no Survey and Manage species were located during the surveys. There would be no disturbance of the ground surface within the management buffer, and this level of tree removal would not substantially affect fungus habitat within the buffer.

This plan is based on a number of factors. The site is located in a relatively open stand of mountain hemlock characterized by tree spacing ranging between 15 and 30 feet. The route would be cleared to a width of approximately 30 feet to allow snowcat passage once adequate snow was present, which is within the range of natural openings in the stand. Given this naturally open spacing, relatively few trees would be removed to establish this trail width, and the nature of fungus habitat would not substantially change.

Beyond that, as noted above, the literature suggests that fungal mycorrhizae extend into clearings further than 30 feet. Since no substantial soil disturbance would be allowed during tree removal, and snowcat passage would occur over compacted snow cover, subsurface mycorrhizae would not be affected. Leaving felled trees on site would enhance existing habitat, offsetting any minor, adverse effects on the site.

These measures would protect the Survey and Manage site from loss, allowing it to continue to host *Ramaria rubrievanescens*, meeting the intent of the Survey and Manage program.

Wetlands

As noted in section 3.4.4.2.3, no wetlands occur within the area that would be disturbed by the Proposed Action. Therefore, there would be no direct or indirect effect on wetlands as a result of the Proposed Action.

Noxious Weeds

As noted in Table 3-19, approximately 211 acres would be affected by ground disturbing activities (grading and excavation). This represents approximately 2 percent of the SUP area. Areas subject to ground disturbance would be at increased risk for noxious weed establishment. As noted in section 3.4.4.2.4, the project area has a moderate risk of noxious weed introduction or spread. Surveys completed for this project found that weed establishment on disturbed sites within the existing ski area has been very limited and BMPs outlined in section 2.2.6 have been incorporated to manage the risk posed by noxious weeds. Given these considerations, the actual risk posed by noxious weeds under the Proposed Action would be relatively low.

3.4.4.3.3 Alternative A – No New Catchline

Under Alternative A, the proposed lower catchline would not be built, and selective tree removal between the existing and proposed catchlines would not occur. This would reduce the overall impact indicated in Table 3-19 by approximately 403 acres, as detailed in Table 3-20. This represents a 6 percent reduction in area affected by grading and an 89 percent reduction in area affected by selective tree removal.

This alternative would also reduce the impact on whitebark pine by eliminating grading in the area at the start of the catchline where whitebark pine occurs. Alternative A would also reduce the impact on old

growth by approximately 1 acre of grading relative to the Proposed Action. Other than these reductions in the magnitude of effects, the impacts under Alternative A would be essentially the same as under the Proposed Action for all four issues.

Table 3-20. Changes in acreage of impacts under the Alternative A relative to the Proposed Action (Table 3-19).

Disturbance Type	Mountain Hemlock (acres)	Mixed Conifer (acres)	Natural Non-Forested (acres)	Total
Grading	103.9	21.0	35.2	179.6
Acreage Reduction v. Proposed Action	7.8	1.1	1.9	10.8
Percent of SUP Affected	1.2%	0.3%	0.4	2.2%
Selective Tree Removal	16.5	0	26.5	118.2
Acreage Reduction v. Proposed Action	302.4	1.9	87.5	391.8
Percent of SUP Affected	0.2%	0%	0.3%	1.4%
Total Reduction	310.2	3	89.4	402.6

3.4.4.4 Cumulative Effects

The cumulative actions considered in this analysis are described in Table 3-5, and the cumulative effects analysis area is shown in Figure 3-1. The cumulative effects, defined as the direct and indirect impacts of the Proposed Action or Alternative A and coupled with those of the noted cumulative actions, are as follows.

1. Sparky Vegetation Management Project

Impacts on forest vegetation due to the Sparky Vegetation Management Project are closely aligned temporally and spatially with the Proposed Action and Alternative A. The vegetation management project addressed hazard trees and may have marginally altered the stand structure, canopy closure, and seral stage of the corridor of forest along Hwy. 46, which crosses the north edge of the project area, and in effect widened the highway corridor. However, it did not remove the area from forested condition. The effects of the Proposed Action or Alternative A on structure, canopy closure, and seral stage are cumulative with the approximately 1,900 acres of forest that were altered by the Sparky Vegetation Management project.

2. Existing Winter and Summer Trail Systems

The extensive system of winter, summer, and multi-use recreational trails developed in the area have altered the existing vegetation. These trails typically converted narrow corridors of native vegetation through grading to a developed land cover type and are maintained as such. The construction of trails under the Proposed Action, including ski trails, would cumulatively add approximately 185 acres of additional trail impact in the analysis area. The construction of trails under Alternative A would cumulatively add approximately 174 acres of additional trail impact in the analysis area.

3. Existing Summer Recreation Sites

The existing summer recreation sites have converted both forested and non-forested native land cover types to a developed land cover type. The effects of the Proposed Action or Alternative A would be cumulative with the land cover conversion associated with the existing summer recreation sites. Impacts associated with the Proposed Action and Alternative A would cumulatively increase the area altered by recreation sites by approximately 756 and 354 acres, respectively. These impacts would range from minor changes due selective tree removal and glading, to complete type conversion due to grading and excavation.

4. Existing Sno-Parks

In terms of cumulative effects on vegetation, existing sno-parks are similar to summer recreation sites: areas have been converted to a developed land cover to facilitate recreation. The Proposed Action and Alternative A would be cumulative with these existing impacts, increasing the affected acreage by approximately 756 and 354 acres, respectively, as noted above.

5. County Road Maintenance

Cumulative impacts on vegetation from county road maintenance with either the Proposed Action or Alternative A would be minor due to the limited spatial extent of these maintenance impacts.

6. Alternative Transportation Planning

Neither the Proposed Action nor Alternative A would generate cumulative vegetation impacts with alternative transportation planning effort.

7. Travel Management Plan

Travel management planning would result in no net new disturbance would have positive cumulative effect on vegetation resources relative to the Proposed Action or Alternative A. It would reduce the impact on land cover types due to off-trail travel, particularly in non-forested areas. It would also reduce the risk of spreading noxious weeds to new areas.

8. Invasive Plant Treatments

Invasive plant treatments would have a positive cumulative effect for vegetation resources relative to the Proposed Action or Alternative A. Reducing the extent of existing noxious weed populations and limiting their ability to further spread would reduce the cumulative risk of noxious weed impacts under the Proposed Action or Alternative A.

9. Kapka Butte Sno-Park

The impacts of the construction of the Kapka Butte Sno-Park and the impacts of either the Proposed Action or Alternative A would be cumulative. All would convert existing land cover to a developed type. The additional cumulative impact on vegetation resources would be minor due to the relatively small extent of area affected by the Kapka Butte project.

10. Fish Passage Improvements

The cumulative impacts of the fish passage improvement projects would be minor for vegetation resources. There would be a relatively small increase in disturbed area subject to increased risk of noxious weed establishment, and a minor amount of native vegetation would be impacted.

11. Nordic Center Hazard Tree Removal

This cumulative action would remove trees that pose a hazard to Nordic ski operations. The extent of the impact of this action would be minor in terms of its effect on forest structure. However, the impacts of

the Proposed Action or Alternative A would be cumulative with the Nordic Center hazard tree removal effects, resulting in a minimal increase in the overall impact to forest habitats.

3.4.4.5 Forest Plan Compliance

The following NWFP direction is relevant to the project in terms of vegetation resources:

- Direction for pre-disturbance surveys is contained in the 2001 ROD standards and guidelines.

  Discussion: As detailed in section 3.4.4.2.2, Survey and Manage species have been evaluated for the project area through a pre-field analysis, and surveys in accordance with the 2001 ROD's standards and guidelines, and using the 2011settlement agreement list, have been conducted in areas that would be affected by the proposed improvements.

- Direction for maintaining old growth fragments in watersheds where little remains is listed at C-44 of the NWFP. This standard states:

  > Landscape areas where little late-successional forest persists should be managed to retain late-successional patches. This standard and guideline will be applied in fifth field watersheds (20 to 200 square miles) in which federal forest lands are currently comprised of 15 percent or less late-successional forest. This assessment should include all allocations in the watershed. Within such an area, all remaining late-successional stands should be protected. Protection of these stands could be modified in the future, when other portions of the watershed have recovered to the point where they could replace the ecological roles of these stands.

  Discussion: An analysis of the forest structure and size class in the two watersheds the project area falls in, the Deschutes River-Charleton Creek and the Fall River-Deschutes River watersheds, was conducted using GIS data compiled by the DNF. Based on this analysis, the Deschutes River- Charleton Creek watershed contains approximately 24 percent old growth, and the Fall River, Deschutes River watershed contains approximately 22 percent old growth. Thus this direction for maintaining old growth in these watersheds is met.

The following Forest-wide standards and guidelines from the Forest LRMP are relevant to this analysis:

- TE-1. During environmental analysis of each project activity, available habitat, location records, and other information will be reviewed to determine whether known or suspected locations of Sensitive plant species or their habitats occur.

  Discussion: A pre-field review was conducted for this project. This review considered federally-listed as well as Forest Service Sensitive species and Survey and Manage species. Based on this review, two Sensitive species were identified as occurring in the project area, and other species were identified as potentially occurring. This assessment was used to guide botanical surveys, as detailed in the preceding discussion.

- TE-2. If no suitable habitat or reported locations of plants are identified, these findings will be documented, and no further investigation is required. However, personnel should continue to watch for the occurrence of previously unknown populations. Where local conditions warrant, field reconnaissance will be performed even though available records do not indicate the presences of Sensitive species.

Discussion: The pre-field review and habitat assessment of the project area indicated the potential for species of concern to occur in the project area. Therefore, surveys were conducted in areas where project effect could occur.

- TE-3. When suitable habitats or reported locations are suspected to occur in the area of influence of the project, a field reconnaissance will be performed to more precisely verify the presence, abundance, and distribution of Sensitive species. If the search is conducted during a season of the year when positive identification is probable and no listed species are found, this fact will be documented and no further investigation is needed. Again, personnel will remain alert to the possibility of overlooked populations.

  Discussion: As previously noted, potentially suitable habitat for sensitive species occurs in the project area. Therefore, surveys were conducted, and as noted in section 3.4.4.2.2, whitebark pine occurs in areas subject to project disturbance. No other sensitive species were located in areas subject to disturbance under the Proposed Action.

- TE-4. If listed plant species are found in the project influence area, their actual distribution and current status will be determined. Informal consultation with the Endangered Species Branch of the USDI Fish and Wildlife Service will be initiated if the species is federally listed. If the proposed project would jeopardize the existence of the species, it would be modified or curtailed. If this is accomplished, a no-effect situation exists and will be clearly spelled out in the environmental analysis and project plan and project personnel will be fully responsible for being aware of and implementing them. Supervision of the activity will assure that actions which jeopardize the listed species do not occur.

  Discussion: As previously noted, no federally listed Threatened or Endangered plant species are known to occur on the DNF. Therefore, consultation with the FWS is not warranted for this project.

- TE-5. If action which may affect habitat for federally listed Endangered or Threatened species cannot be avoided, the activity will be deferred until a formal consultation with the Species Branch of the USDI Fish and Wildlife Service is completed to determine a course of action.

  Discussion: As previously noted, no federally listed Threatened or Endangered plant species are known to occur on the DNF. Therefore, consultation with the FWS is not warranted for this project.

- TE-6. Field surveys, ecological studies, and management recommendations will be completed for Sensitive plants as described in the implementation schedule of the Forest Threatened, Endangered, and Sensitive Plant Program presented in Appendix 13.

  Discussion: Field surveys were conducted in the areas of potential disturbance under the Proposed Action. Whitebark pine, a Sensitive species, occurs in the project area and would be affected by the Proposed Action, as discussed in section 3.4.4.3.2

- TE-7. Where possible, opportunities to enhance the propagation of sensitive plant species will be pursued.

  Discussion: As mitigation for impacts on whitebark pine, Mt. Bachelor will collaborate with the DNF in planting rust-resistant whitebark pine seedlings in insect and disease affected areas outside the disturbance footprint of the Proposed Action, as detailed in section 2.2.6.

No Forest LRMP standards and guidelines for Management Area 11 are relevant to the aspects of vegetation resources discussed in this analysis.

3.4.5 WILDLIFE

3.4.5.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

***Issue 1*:** The proposed projects may impact the abundance, distribution, structure, and function of habitat for wildlife species. The impacts of construction noise and human activity may also affect wildlife use of project-area habitats.

Indicators:

- Acreage of disturbance by land cover type, with emphasis on key habitats.
- Assessment of the remaining amount of key and connecting habitat for wide-ranging species.
- The timing and location of construction noise and human activity.

Analysis Area: The area of analysis for direct effects includes the project area (i.e., the disturbance footprint of the proposed projects). Indirect effects are addressed at a larger scale as appropriate, generally the SUP area. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

Issue 2: Habitat effects may impact special-status wildlife species, including federally listed, Forest Service Sensitive, Management Indicator (MIS), Survey and Manage, and migratory bird species.

Indicators:

- Identification of special-status species present.
- Assessment of impacts on these species due to habitat changes and increased human activity.

Analysis Area: The area of analysis for direct effects includes the project area. Indirect effects are addressed at a larger scale as appropriate, generally the SUP area. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

3.4.5.2 Affected Environment

3.4.5.2.1 Wildlife Habitat

Many wildlife species are closely linked to specific habitat features. Thus, the habitat types present in the project area are indicative of the wildlife species likely to occur there. As described above (section 3.4.4.2.1), the SUP area includes three forested land cover types (mountain hemlock, lodgepole pine, and mixed conifer) and four non-forested land cover types (lava, natural non-forested, ski trail, and developed). Although mixed conifer forest types often include Douglas-fir and ponderosa pine, for the purposes of this analysis mixed conifer forest consists of western white pine, whitebark pine, lodgepole pine, and mountain hemlock. All land cover types in the developed part of the SUP area are fragmented naturally. Further fragmentation has resulted from ski area development. The habitat characteristics of each are briefly discussed below as they pertain to the species addressed in this analysis (section 3.4.5.2.2 and Tables 3-12 – 3-23, 3-25 – 3-27).

The mountain hemlock forest cover type is recognized as potential foraging or cover habitat for a number of wildlife species including certain neotropical migratory birds, deer, elk, predatory mammals, and small mammals. Many of the wildlife species that inhabit mountain hemlock stands are open habitat species which are using the adjacent meadows between tree islands (Forest Service 1997). The overstory canopy cover varies across the SUP area but is typically 35 to 65 percent. The understory canopy is very sparse and provides little food for herbivorous wildlife species, other than mountain hemlock seeds. As a result, wildlife use is likely limited to species which forage primarily on mountain hemlock seeds, or species which prey on those herbivores. Due to the lack of vegetation, wildlife cover in the understory consists mostly of downed logs and rock outcroppings. During the winter months, the snowpack covers both the sparse vegetation and this other cover. Stands of old-growth forest occur throughout the mountain hemlock land cover type. The mountain hemlock stands also contain some large decadent or dead trees, both standing and down. Mountain hemlock stands in the southeastern part of the project area (area proposed for selective tree removal) are relatively open and discontinuous.

Lodgepole pine stands have a relatively open canopy and a very sparse understory that consists of scattered shrubs and graminoids (grasses and sedges). Lodgepole pine is recognized as potential habitat for certain neotropical migratory birds, upland game birds, deer, elk, predatory mammals, and small mammals (Anderson 2003). Within the SUP area, the overstory canopy cover averages approximately 25 – 30 percent. The sparse understory includes forbs and graminoids, which provide approximately 5 – 10 percent cover. Rock outcroppings and small-diameter downed logs provide the majority of wildlife cover. The majority of lodgepole pine stands in the SUP area occur in the Nordic Center and to the east of the proposed Eastside pod (Figure 3-2). These stands, particularly near the northeastern limit of the SUP area, have been affected by insects and disease, resulting in a high density of snags and some down wood.

The majority of mixed conifer exists in a stand on the lower east slope of Mt. Bachelor and consists of mountain hemlock, lodgepole pine, western white pine, and whitebark pine. The understory is typically less sparse than in either the mountain hemlock or lodgepole pine stands. Mixed conifer is potential habitat for certain neotropical migratory birds, non-migratory birds such as jays and nutcrackers, deer (*Odocoileus hemionus*), elk (*Cervus canadensis nelsonii*), predatory mammals, and small mammals. The pine component of these stands has also suffered substantial mortality due to insects and disease, resulting in numerous snags and some down wood.

The lava land cover type consists of exposed, volcanic rock. Vegetation is present only in small pockets of shallow, poorly developed soil. Crevices or caves present within the lava may provide habitat for bat species and other small mammals.

The natural non-forested land cover type is the transition between the lava and mountain hemlock land cover types and extends up to the summit of Mt. Bachelor. Vegetation may include small pockets of either mountain hemlock or whitebark pine but is generally open, with a sparse, short forb/graminoid understory. The natural non-forested areas may provide habitat for certain neotropical migratory birds and small mammals.

Ski trails are located on the northwest, north, and east slopes of Mt. Bachelor and in the Nordic Center area. Areas that have been converted to ski trails have typically been cleared, groomed, and graded to facilitate skiing, especially during low-snow conditions. Little or no vegetation exists on ski trails that were recently constructed and on those segments of trail located above the tree line. Older trails located below the tree line are meadow-like and are often covered in native graminoids and forbs. During winter months, the snow covering the trails is compacted by ski and snow grooming traffic such that these open areas are not likely to be used by rodents or other burrowing mammals. The ski trails may provide habitat for certain neotropical migratory birds and small mammals and are also foraging areas for deer and elk at

lower elevations during the growing season. The presence of small birds and mammals may also attract foraging raptors.

Developed land includes highly developed features such as parking lots, roads, and base area infrastructure. Developed land is not considered wildlife habitat.

Key and Connecting Wildlife Habitats

Key wildlife habitat within the SUP area includes mapped nesting, roosting, and foraging (NRF) habitat, and dispersal habitat for northern spotted owl (*Strix occidentalis caurina*). Fawning and calving habitat for mule deer and elk has been identified both within and adjacent to the SUP area, as has dead wood habitat (e.g., snags and downed wood), caves, cliffs, and talus slopes. Occurrence of these key habitats in the project area itself (i.e., the area of actual physical disturbance) is discussed below.

The mapped NRF habitat occupies approximately 99.0 acres and is located in the mature mountain hemlock stands in both the southwest and northwest corners of the SUP area. There is no mapped NRF habitat in the project area, including in the site of the proposed Eastside pod. The nearest, previously identified northern spotted owl activity centers are located approximately 6 and 9 miles to the southwest. No portion of the SUP area lies within a designated critical habitat unit (CHU), and the nearest designated CHUs are located approximately 11 miles to the southwest and 11 miles to the north of the project area (FWS 2008a). The current levels of noise and human activity at Mt. Bachelor are likely to affect the suitability of northern spotted owl habitat (see noise and human activity discussion below).

Except for areas of mapped NRF habitat, Mt. Bachelor is considered to be dispersal habitat for spotted owls. As defined in the DNF *Aquatic and Terrestrial Programmatic Biological Assessment* (Programmatic BA), northern spotted owl is defined as generally having trees with an average diameter of 11 inches dbh, canopy cover of 40 percent, and adequate space beneath the canopy for owl movement. However, in mountain hemlock and lodgepole pine forests, the average size may be as small as 7 inches diameter and canopy cover may be as low as 30 percent (Forest Service 2010b). Vegetative modeling indicates that there are about 5277 acres of northern spotted owl dispersal habitat in the SUP area. The dispersal habitat is distributed around the SUP area, though the better quality habitat is located on the north and west slopes of Mt. Bachelor. Forest stands in these areas consist of relatively larger trees and higher crown closures than in other portions of the SUP. As a result, the dispersal habitat on the north and west sides is likely to be used more by northern spotted owls potentially moving through the area.

The fawning and calving habitat for mule deer and elk includes creeks, springs, and wet meadows associated with Todd Creek, along the north boundary of the SUP area, and Dutchman Creek, adjacent to the southeast boundary (Ardt 2011), both outside the project area. The SUP area is not included in the Forest LRMP list of key elk areas.

As discussed above, insect and disease have heavily impacted conifer stands in the SUP area, particularly the lodgepole pine component. As a result, there is an abundance of dead wood which provides potential reproductive habitat for cavity-nesting woodpeckers, American marten, and other species dependent on such habitat. Lodgepole pine snags and downed wood are smaller in diameter and are likely to be used by black-backed and three-toed woodpeckers. It is less likely that American marten would use them as denning sites, though they may hunt for small mammals in concentrations of downed lodgepole pine. The larger diameter dead wood in the whitebark pine and mountain hemlock stands is more suited for American marten denning sites.

Caves and lava tubes are also present in the SUP area. Although lava tubes have been identified near the summit of Mt. Bachelor (Wood and Kienle 1990), few lava tubes have been identified on middle or lower slopes or around the base of the mountain during past geologic assessments and construction activities in the project area. Two lava tubes are located near the base of the Rainbow lift, one more than 300 feet

from an existing ski trail, the other less than 150 feet. These lava tubes are well known to recreationists and subject to a high level of disturbance throughout the year.

Cliffs and associated talus slopes occurring in the SUP area are located upslope from the project area, north of the Summit Express lift upper terminal. No seeps or springs are located within the project area (sections 1.7 and 3.4.3.2.1).

The degree of connectivity between habitats is quite variable across the SUP area as a result of both natural and management-imposed fragmentation. The area if of the proposed Eastside pod and lower catchline on the east and southeast slope of Mt. Bachelor are currently not dissected by ski trails. As a result, there are fewer linear boundaries between forested and non-forested habitat than exist in already developed portions of the ski area. Due to the lack of linear habitat boundaries, the east and southeast slope may provide better connecting habitat. However, although there are no linear boundaries, this area does contain a mix of forested habitat, clearings, and transitional zones between the two. This natural discontinuity may limit the usefulness of the stands to function as connective habitat for wildlife with requirements that include interior or uninterrupted forest stands. In other portions of the project area, the forested habitat is relatively fragmented into long, narrow islands. Wildlife species selecting the resulting tree island habitats are likely those that prefer edge habitat.

Noise and Human Activity

The human activity and noise associated with the current use and operation of Mt. Bachelor are likely to have affected the suitability of habitat in the project area. As a result, habitats that would be considered suitable outside of an intensively managed recreation area may not function as such within the Mt. Bachelor SUP area. In general, noise and human activity during winter months are concentrated on Hwy. 46, ski area roads, ski trails, and at lift terminals, lodges, parking lots, and other ski resort infrastructure. Dispersed skiing also occurs in forest stands adjacent to ski trails and, to a lesser degree, on undeveloped slopes of the mountain. The existing catchline functions as a soft boundary to dispersed skiing, and there are still some skiers who elect to descend further down slope. Since the lifts run between the hours of 9:00 AM and 4:00 PM, human activity is highest during the day time. Nordic skiing may begin earlier and end later. Grooming occurs nightly on downhill and Nordic trails. Snowmaking also occurs at night in the Pine Marten pod when natural snowfall is insufficient to provide adequate ground coverage. Roads and parking lots are cleared as needed using both snow plows and industrial snow throwers.

During the "shoulder seasons" and summer months, human activity within the SUP is considerably reduced. Little activity occurs during the spring and fall shoulder seasons, other than basic ski area maintenance and summer recreation.

A description of the major disturbances as they relate to wildlife habitat follows:

- Hwy. 46: This highway is the main access road to Mt. Bachelor and is located on the eastern edge of the SUP area. Disturbances associated with the road include vehicular traffic and snow removal. Although Hwy. 46 is closed beyond the West Village base area during winter months, it is open to snowmobile traffic. Passenger vehicle traffic has been found to generate sound levels of 55 – 90 dBA, snowmobiles generate 73 – 120 dBA, and equipment used in snow removal generates 85 – 110 dBA (Berger et al. 2008). This noise is greatest adjacent to the road and attenuates with distance as a function of topography, vegetation, and air temperature. When industrial snow throwers are used to clear Hwy. 46, thrown snow causes a physical disturbance both in and below the tree canopy within approximately 200 feet of the highway.
- Parking Lot Use: The parking lots at Mt. Bachelor have a combined capacity of 3,652 cars, 5 buses, and 10 RVs (Mt. Bachelor 2010). The majority of the parking is provided in the West Village lot. Although the lot may not reach capacity each day, the disturbance associated with

substantial human activity and noise affects the adjacent habitat. The noise generated by vehicles is less in parking lots than on Hwy. 46 due to reduced operating speeds, but it likely still reaches 55 – 75 dBA. Since there are no overnight accommodations at Mt. Bachelor, most vehicles leave at the close of business. Occasionally RVs do stay in the West Village lot, and these are typically parked on the south side of the lot. RVs do not create much of a night-time disturbance since owners have been observed to primarily remain inside the RVs.

- Parking Lot and Service Road Snow Removal: Parking lot and service road snow removal takes place on an as needed basis. When snowfall is minor, plows are used to push the snow towards the perimeter of the lot or road. Industrial snow blowers are then used to throw the snow beyond the lot or road boundary. Thus, even for minor snow events, snow removal results in a physical disturbance in the tree canopy up to 200 feet away from the lot or road. Damaged trees are visible in the forested stands around parking lots and adjacent to service roads. Snow removal occasionally occurs during the day but typically is done at night after the ski area has emptied of vehicles. During larger snow events, snow plows and blowers typically work in tandem around the clock to clear lots and roads and to make way for the anticipated skier influxes. Snow plows and snow throwers are capable of generating sound levels of 85 – 110 dBA. The combined physical, light, and noise disturbances results in increased stress for wildlife in adjacent habitat.
- Downhill Skiing: Mt. Bachelor has a current downhill skiing capacity of 16,870 skiers per day, but base area capacity (currently 10,050; Mt. Bachelor 2010) limits peak day visitation. Downhill skiing is most concentrated on existing trails and skiways on the northwest, north, and northeast slopes of Mt. Bachelor. These trails have a total length of approximately 65.4 miles in the 5.5 square miles of the skiable area above the catchline, for a trail density of 11.9 miles of trail per square mile. Although the majority of skiing is likely to be concentrated on developed trails, dispersed skiing is allowed on the backside of the mountain and in other undeveloped areas within the ski area boundary. The density of off-piste skiers is difficult to determine but is anticipated to be less than on trails.
- Nordic Skiing: The Nordic Center, located between Hwy. 46 and the alpine skiing area, contains a network of Nordic ski trails. The 3.25-square-mile Nordic Center has approximately 35 miles of groomed trails, for a trail density of 10.8 miles of trail per square mile (Mt. Bachelor 2010). The spacing between trails is variable, though trails often are parallel to each other and about 200 – 400 feet apart. The Nordic area has a peak use of approximately 470 skiers per day with an average of 400 skiers per day during the 10 busiest days of the last 5 years. Additional events such as skiing workshops are offered at the Nordic Center and increase human activity.
- Ski Trail Grooming: Under current operation, many of the downhill trails and all Nordic trails are groomed each night. Although downhill grooming continues for the duration of the season, Nordic grooming typically begins around Thanksgiving and continues until mid-April. The grooming machines are equipped with halogen lights to provide adequate forward and reverse visibility. The lighting is likely to disturb wildlife found near the trails. The groomers also generate noise disturbance in adjacent habitat. Grooming machines used at Mt. Bachelor generate sound levels of 76 dBA at operating RPMs (Lomax 2012). The slow operating speed of the grooming machines results in prolonged sound disturbance. Grooming and snow compaction may alter the competitor/predator communities because the packed snow routes provide winter access to areas not normally available to some species and may hinder subnivean movement (Gaines et al. 2003).
- Lifts: A total of 14 lifts and moving carpets operate at Mt. Bachelor. These lifts vary in capacity from 1,200 people per hour to 2,400 people per hour and have a combined capacity of 23,050 people per hour. The concentration of humans at the top and bottom terminals and in the lift alignment impacts wildlife found in the adjacent habitat. The amount of noise generated by the

lift itself as measured at the drive terminal is 73 – 78 dBA.

- Maintenance: Maintenance activities include vehicular traffic on roads that access chair lifts and other infrastructure, work performed on those features, erosion control and mitigation efforts, and removal of hazard trees. Maintenance is performed on an as-needed basis and thus results in varying levels of human activity and noise. For example, erosion control may involve the use of front-end loaders and backhoes (85-102 dBA) while hazard tree removal typically involves chainsaws (77- 115 dBA). The location, timing, and duration of maintenance activities within the SUP area also vary. Although routine infrastructure maintenance is most concentrated in the summer months, some work is performed in response to heavy winter storms.
- Summer Recreation: Recreation activity is most concentrated around the West Village base area, the Pine Marten Lodge, and the slope in between. This area is used for hiking, disc golf, sightseeing, summer dog sledding, social events, and mountain-top dining. Alpine hiking occurs across the SUP area and on the existing trail between the Sunrise base area and the summit of Mt. Bachelor. A mountain bike trail also begins at the Sunrise base area and parallels Hwy. 46 before crossing the Nordic area and leaving the SUP area. Two horse trail segments cross through the Nordic area, one through a lodgepole pine stand near Todd Creek Horse Camp, and one through the lodgepole pine and mountain hemlock stands further to the west.

Human activities similar to those described above for the Mt. Bachelor SUP area have been found to impact wildlife. The impact of vehicles, including off-highway vehicles and snowmobiles, on wildlife may include collisions, physical disturbances at a specific site, or noise disturbances adjacent to those sites. Roads and trails used by vehicles may create a barrier to wildlife movement, and habitat loss and fragmentation. The operation of heavy equipment such as front-end loaders, groomers, and snow throwers, also creates disturbances at specific sites. Small hand tools such as chainsaws may impact wildlife, though a response may not be detectable in species greater than 325 feet away (Temple and Gutierrez 2003). Hiking, biking, skiing, snowshoeing, and other non-motorized trail use has also been found to impact wildlife at distances ranging from 165 to 2,000 feet (Gaines et al. 2003). Breeding bird species composition, abundance, nesting, and nest predation in both forested and grassland communities was altered by the presence of non-motorized recreation trails for a distance of approximately 325 feet (Miller et al. 1998).

3.4.5.2.2 Special Status Wildlife Species

Tables 3-21 – Table 3-23 and Tables 3-25 – Table 3-27 display Threatened and Endangered species, DNF Sensitive species; MIS as listed in the Forest Plan (Forest Service 1990), Landbird Focal Species (Altman 2000), Birds of Conservation Concern (FWS 2008b), and High Priority Shorebirds (FWS 2004) of the DNF for which analysis is required. Survey and Manage species are also Sensitive species and are identified in the same table.

Species in bold font are those for which there is habitat in the project area and which are therefore addressed in this analysis. All others lack habitat in the project area, would not be affected by the Proposed Action or alternatives, and are not considered further in this analysis.

Note that when a species is listed in more than one status category, discussion of that species is found under the most restrictive category. For example Townsend's big-eared bat (*Corynorhinus townsendii*) is both a Sensitive species and a MIS, so the most detailed discussion of this species is found in the Sensitive species section of this analysis.

Federally Listed Species

Two federally listed species are known to occur on the DNF (Table 3-21): Columbia River bull trout and the northern spotted owl, both of which are Threatened (Forest Service 2008). There is no Designated Critical Habitat (DCH) for bull trout within the SUP area (FWS 2010) and no other habitat due to the lack

of perennial waterbodies. Based on these considerations, the Columbia River bull trout is not addressed further in this analysis.

Table 3-21. DNF Threatened and Endangered species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat	Habitat Present in the Project Area[2]
Columbia River Bull Trout *Salvelinus confluentus*	Threatened S2	Columbia River and tributaries	No
Northern Spotted Owl ***Strix occidentalis caurina***	Threatened S3	Multilayered canopy dominated by large overstory trees with >50% canopy closure. Snags and decadent trees important source of nesting cavities.	Yes, marginal quality

[1]NatureServe status for Oregon: S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure, S5 = Secure, B = Breeding, N = Non-breeding, NA = Not applicable, HB = Possibly extirpated.
[2]If habitat for a species is not present, there would be no effect on that species.

The northern spotted owl is the only federally listed terrestrial wildlife species known to occur within the Mt. Bachelor SUP area (Table 3-21). As noted above (section 3.4.5.2.1), the SUP area has no northern spotted owl DCH, though it contains 99.0 acres of mapped NRF habitat, none of which is located in the project area. The majority (91.8 acres) of the NRF habitat is located just north of the Outback Express lift and within the Nordic Center.

According to the DNF Programmatic BA, spotted owls generally require mature or old-growth coniferous forest with complex structure including multiple canopy layers, large green trees and snags, heavy canopy habitat, and coarse woody material on the forest floor (Forest Service 2010b). A wide variety of forest types are utilized. On the DNF, NRF habitat includes stands of mixed conifer, ponderosa pine with white fir understory, and mountain hemlock with subalpine fir. Suitable nest sites are generally in cavities in the boles of either dead or live trees. Platform nests may also be used (but more rarely), which include abandoned raptor nests, broken treetops, mistletoe brooms, and squirrel nests. Relatively heavy canopy habitat with a semi-open understory is essential for effective hunting and movement. In addition, large diameter trees with the ability to produce large limb structure or epicormic branching are characteristics of a good nest tree. These characteristics are generally found in Douglas-fir, some ponderosa pine, and white fir (rarely). On the DNF, nest trees are predominantly large Douglas-firs.

Northern spotted owls have been shown to respond to disturbances, including noise and human activity. An often cited study found that owls exhibited increased stress when within 0.25 mile of a major logging road, and that owls with home ranges in proximity to clear-cut prescriptions were more affected than owls near selective tree removal prescriptions (Wasser et al. 1997). Although there are no logging roads in the NRF habitat located at Mt. Bachelor, vehicles and machines operating on Hwy. 46, ski area service roads and parking lots, and groomed ski trails may be affecting owls within 0.25 mile of these features (see section 3.4.5.2.1 for a description of noise and human activity associated with these features). A more recent study found that stress in owls was unrelated to proximity to roads, irrespective of noise, at distances up to 0.5 mile (Hayward et al. 2011). Hayward et al. (2011) proposed that owl stress was a function of detecting a disturbance rather than reacting to the noise itself.

Northern spotted owl surveys conducted for this analysis were begun according to FWS survey protocol during 2011 (FWS 2011a), and second-year surveys were completed in 2012 according to the FWS 2012 Revision to the 2011 protocol (FWS 2012). The survey area included all mapped NRF habitat as well as forest stands that appeared to have features similar to NRF habitat within 1.2 miles of the project area (i.e., the disturbance footprint of the proposed projects). Canopy cover in the surveyed habitat is quite variable, averaging about 35 – 45 percent. Small, isolated patches of higher canopy cover are present. The overstory consists of mountain hemlock with some white fir and has an average size class of at least 15 inches diameter at breast height (dbh). Understory/secondary canopy exists in small patches and consists of small western hemlock, some white fir, and sparse huckleberry and grasses. Ground cover beneath the tree canopy is dominated by litter, duff, gravel, rock outcrops, and downed wood. Few suitable nesting trees were observed. The tree canopy becomes more open, with even fewer suitable nest trees, further to the west, north, and northeast as the canopy transitions from mountain hemlock to lodgepole pine.

During the 2011 surveys, no northern spotted owl nests were located, though audio responses were detected. These detections indicate that there is an activity center within the survey area, and that it meets the criteria of Resident Single Status (see FWS protocol for definitions). A single unknown owl (*Strix* sp.) was visually observed during the 2012 survey. Since the follow-up efforts to locate and identify the unknown owl were not successful, the 2012 detection did not result in an additional activity center. However, these detections necessitate that spot checks be completed in 2013 and 2014 as per the FWS protocol (FWS 2012). A previous northern spotted owl survey completed in 1994, prior to the construction of the Northwest Express lift, did not detect any northern spotted owls (SRI/Shapiro 1994).

The activity center includes approximately 91.8 acres of NRF habitat, 90.6 of which are located in the smaller 0.5-mile core area. As noted in the DNF Programmatic BA, at least 50 percent cover of suitable habitat within the core area is considered as necessary to maintain spotted owl life history functions. Approximately 18 percent of the newly identified core area is comprised of NRF habitat. The suitability of this NRF habitat is likely marginalized due to its location within the Nordic Center and adjacency to the Outback Express lift. The results of the Hayward et al. (2011) study suggest that the existing disturbances associated with human activity may affect northern spotted owl habitat suitability in any part of the SUP area where those disturbances are detected. Since the existing human activity and noise in this area (i.e., downhill skiers, Nordic skiers, lift noise, and nightly grooming) occur both in and directly around the NRF area, they would be detected by any owls using the habitat.

Of the approximately 5277 acres of northern spotted owl dispersal habitat located within the SUP area, 543.5 acres are within the project area. The newly identified activity center extends beyond the boundary of the SUP area and includes 2521.2 acres of dispersal habitat, of which 448.1 acres are located in the core area. As mentioned above, the dispersal habitat consists of larger trees with higher canopy cover on the north and west slopes of Mt. Bachelor.

The Oregon spotted frog, the west coast distinct population segment (DPS) Pacific fisher, and wolverine are candidate species for federal listing and are also DNF Sensitive species. They are discussed under that heading below.

Forest Service Sensitive Species

The DNF Sensitive species list includes a total of 21 invertebrate and vertebrate species (Forest Service 2008). The habitat requirements of all 21 species were reviewed and compared to the habitats present in the project area (Table 3-22). Habitat has been identified in the project area for four Sensitive species, American peregrine falcon, Pacific fisher, wolverine, and Townsend's big-eared bat. One other Sensitive species, the Oregon spotted frog, was considered because it has dual status as a candidate for federal listing. The Oregon spotted frog was subsequently dropped from the analysis for reasons discussed below. As a result, a total of four Sensitive species are addressed in this analysis.

Table 3-22. DNF Sensitive species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat	Habitat Present in the Project Area[2]
Amphibians			
Oregon Spotted Frog *Rana pretiosa*	Sensitive, FWS Candidate S2	Emergent wetlands in open areas of forested landscapes adjacent to springs, ponds, or lakes.	No
Birds			
Tricolored Blackbird *Agelaius tricolor*	Sensitive, BCC S2B	Breeding habitat is freshwater marshes with emergent vegetation. Non-breeding habitat is cultivated land and pastures.	No
Bufflehead *Bucephala albeola*	Sensitive S2B, S5N	Breeding habitat is mixed forests with snags adjacent to lakes, ponds, and streams. Nests in natural tree cavities. Non-breeding habitat is open water.	No
Greater Sage-grouse *Centrocercus urophasianus*	Sensitive, BCC S3	Foothills, mountains, and plains dominated by sagebrush. May use mountain brush/aspen riparian areas during brooding	No
Yellow Rail *Coturnicops noveboracensis*	Sensitive, BCC S1B	Breeding habitat is shallow freshwater marshes and wet meadows. Non-breeding habitat is grain fields or marshes with deep, dense grass canopy.	No
American Peregrine Falcon ***Falco peregrinus anatum***	Sensitive, MIS, BCC S2B	Open areas adjacent to rivers and associated with cliffs or tall, man-made structures in human population centers.	Yes, low quality
Northern Bald Eagle *Haliaeetus leucocephalus*	Sensitive, MIS S4B, S4N	Breeding habitat includes large trees adjacent to fish-bearing waterbodies. Non-breeding may be removed from waterbodies if medium-sized mammals and carrion are available.	No
Harlequin Duck *Histrionicus histrionicus*	Sensitive S2B, S3N	Breeding habitat includes shrubby riparian areas adjacent to fast-moving mountain streams. Non-breeding habitat is rough coastal water.	No
Lewis' Woodpecker *Melanerpes lewis*	Sensitive, BCC, MIS, Landbird Focal Species S2	Breeding habitat is open forest and woodland, typically dominated by ponderosa pine, oak.	No
White-headed Woodpecker *Picoides albolarvatus*	Sensitive, BCC, MIS Landbird Focal Species S2	Montane ponderosa pine forests with large diameter snags.	No
Horned Grebe *Podiceps auritus*	Sensitive, MIS S2B, S5N	Breeding habitat is marshes, ponds, and lakes. Non-breeding habitat is inland waterways	No

Table 3-22 (cont'd). DNF Sensitive species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat	Habitat Present in the Project Area[2]
Northern Waterthrush *Seiurus noveboracensis*	Sensitive S2	Breeding habitat is cool, wooded swamps ponds, and slow moving rivers that are bordered by alder and willow. Winters in Central and S. America.	No
Invertebrates			
Silver-bordered Fritillary *Boloria selene*	Sensitive S2	Wet meadows, marshes, bogs, and other open portions of shrub wetlands.	No
Johnson's Hairstreak *Callophrys johnsoni*	Sensitive S2	Old-growth or late-successional red fir, western hemlock, or gray pine forests having dwarf mistletoe (*Arceuthobium sp.*).	No
Crater Lake Tightcoil *Pristiloma arcticum crateris*	Sensitive, Survey & Manage S1	Non-acid fens and sedge wetlands from approximately 2000 – 6400 feet in elevation.	No
Pristine Springsnail *Pristinicola hemphilli*	Sensitive S2	Small, cold, pristine seeps and springs with a coarse gravel or cobble substrate.	No
Mammals			
Pygmy Rabbit *Brachylagus idahoensis*	Sensitive S2	Dense sagebrush stands located on deep, loose soil	No
Townsend's Big-eared Bat ***Corynorhinus townsendii***	Sensitive, MIS S2	Colonies often located in caves and mines with good ventilation. Uses pine, hemlock, fir, or broadleaf forests in Oregon.	Suspected
Wolverine ***Gulo gulo***	Sensitive, FWS Candidate, MIS S1	Subalpine forests and alpine fellfields, alpine meadows, lodgepole pine, or red fir forests. Dens in caves, crevices, or under fallen trees. Usually avoids areas with high human presence.	Yes, low quality
Fisher ***Martes pennanti***	Sensitive, FWS Candidate S2	Dense, contiguous upland and lowland forests with little or no human disturbance. Large snags needed for den sites.	Yes, marginal quality

[1]MIS = Management Indicator Species, BCC = Bird of Conservation Concern, NatureServe status for Oregon: S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure, S5 = Secure, B = Breeding, N = Non-breeding, NA = Not applicable, HB = Possibly extirpated.

[2]If habitat for a species is not present, there would be no impact on that species.

The Oregon spotted frog inhabits aquatic sites with slow moving fresh water and avoids dry uplands (Forest Service 2010b). The only potential habitat or known occurrences within the SUP area are along Todd Creek, which is outside of the project area and is not known to currently support any Oregon

spotted frogs. Based on these considerations, the Oregon spotted frog would not be affected and is not addressed further in this analysis.

According to the *Regional Forester's Special Status Species List*, wolverines are suspected to occur on the DNF, but there have been no documented occurrences since 1965 (Forest Service 2008). The only known wolverines currently existing in Oregon are located in the Eagle Cap Wilderness, approximately 220 miles northeast of the project area (ODFW 2011). Wolverines are associated with subalpine forests and alpine fellfields and meadows. Subalpine cirque habitats are required for natal denning, security areas, and summer foraging (Forest Service 2007). Dens are located in caves, rock crevices, or under large fallen trees (NatureServe 2011). The DNF has developed habitat models to determine the amount and distribution of potential reproductive wolverine habitat, indicating that there is no potential denning habitat within the SUP area (Forest Service 2012). There are no known occurrences of wolverine in the SUP area. The SUP area is considered low quality habitat because of the high level of human activity and lack of suitable cirque habitat in non-recreated areas. Although recent findings suggest that wolverines may tolerate motorized and non-motorized winter recreation (Heinemeyer et al 2010), the longer and higher use levels at Mt. Bachelor are likely to discourage wolverine from inhabiting the SUP area.

American peregrine falcons typically nest on rocky cliff faces or crags, using ledges beneath overhangs or holes. Breeding and nesting habitat is typically associated with water (White et al. 2002). Forest-wide, there are an estimated 17,590 acres of potential peregrine falcon reproductive habitat. Within the project area, the only mapped potential reproductive habitat is located between existing Nordic trails on the north slopes of Old Maid, a small hill located within the Nordic Center just north of the West Village parking lot. The mapped habitat covers a total of 4 acres in the SUP area, 0.7 acres of which are within the project area. Although it was identified through habitat modeling, this area experiences a high level of human disturbance during the winter and extending into the spring and summer for as long as the snow pack persists. This period of high use coincides with peregrine falcon breeding (White et al. 2002). Peregrine falcons are unlikely to use this or other portions of the project area as reproductive habitat.

Currently there are two known populations of Pacific fisher in Oregon: one in the southern Cascade Range approximately 48 miles southwest of the SUP area, and one in the northern Siskiyou Mountains (Forest Service 2006). Both are the result of previous re-introductions, and neither population has expanded its range beyond a relatively small area in more than 20 years (Aubry and Lewis 2003). Due to the high level of human activity and sparse understory, the SUP area is considered to be marginal habitat for Pacific fisher. Although they could potentially occur in the SUP area, it is more likely that fisher would inhabit other, less disturbed areas such as the Sisters Wilderness to the north, and that any use of the Mt. Bachelor area would be transitory.

Townsend's big-eared bats have a wide distribution and are documented to occur in the DNF. These bats are associated with caves or cave-like roosting habitat. Although lava tubes have been identified near the summit (Wood and Kienle 1990), few lava tubes have been identified to date on middle or lower slopes of Mt. Bachelor or around the base of the mountain during past geologic assessments or construction activities in the project area. Two lava tubes are located near the base of the Rainbow lift, one more than 300 feet from an existing ski trail, the other less than 150 feet. These lava tubes are well known to recreationists and subject to a high level of disturbance throughout the year. No bats have been observed in these lava tubes. Given the level of human disturbance, it is unlikely that Townsend's big-eared bats would use them for hibernation or as a maternal site (York 2011). Habitation of the project area by this species is unlikely.

Survey and Manage Species

All Forest Service projects, programs, and activities in the NWFP area are reviewed for possible effects on Survey and Manage species. On July 2011, the Survey and Manage Settlement Agreement was

signed, which directs the Forest Service to use the list of Survey and Manage species provided with the new settlement agreement for decisions signed after September 30, 2012.

The 2001 ROD, as modified by the 2011 Settlement Agreement, includes direction to conduct "equivalent-effort" surveys in old- growth forest for all habitat-disturbing projects with decisions in 2011 and beyond. Old-growth forest is defined as "at least 180 – 220 years old with moderate-to-high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees; some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground."

Habitat disturbing activities are defined as "those disturbances likely to have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements." The 2001 ROD also states, "'Habitat disturbing' is not necessarily the same as 'ground disturbing'; helicopter logging or logging over snow-pack, for example, may not disturb the ground but might clearly affect microclimate or life cycle habitat factors. Conversely, an activity having soil-disturbing effects might not have a large enough scope to trigger a need to survey."

In determining a need for survey, the 2001 ROD directs line officers to "consider the probability of the species being present on the project site, as well as the probability that the project would cause a significant negative effect on the species habitat or the persistence of the species at the site." The ROD stipulates survey requirements for each of the six categories of Survey and Manage species. Depending on the categories in which any such species that are located fall, the agency is directed to manage either all known sites or known high-priority sites in a manner consistent with the habitat requirements of the species.

Only three Survey and Manage species are documented or suspected to occur on the Forest: the great gray owl, evening fieldslug, and Crater Lake tightcoil. A pre-field review was completed to determine the need for pre-disturbance surveys. The key habitat factors considered in that review were:

- The project area is within an existing ski area with intense recreation use and human presence.
- The snow on ski trails and other open areas is compacted by grooming.
- The west side of the project area has been heavily influenced by past ski areas operation, while the east side is predominantly unaffected.
- The project area is dominated by a mountain hemlock association.
- Stands of old-growth forest occur throughout the mountain hemlock forest. These stands occur as noncontiguous units larger than 5 acres in the Eastside pod and tubing area.
- The understory beneath the mountain hemlock stands is very sparse, lacking both cover and forage for wildlife species.
- The elevation ranges from about 6,200 to 8,000 feet.
- The project area is dry and there are no wetlands, waterbodies, or other perennial water sources.
- Winter snow accumulation is typically several feet thick and frequently persists into June or July.

In consideration of these factors, the pre-field review determined pre-disturbance surveys would not be needed for the evening fieldslug, Crater Lake tightcoil or great gray owl. There are no known sites for either species within the project area or in a 0.25-mile buffer around the project area. There is no suitable evening fieldslug or Crater Lake tightcoil habitat, and the project area is considered marginal habitat for great gray owl due to factors listed above. Furthermore, pre-disturbance surveys are not required for the great gray owl when proposed activities are located above elevations of 6,000 feet (Quintana-Coyer et al.

2004). Great gray owl surveys were conducted in 2011 in an area adjacent to the SUP. None were detected.

Management Indicator Species

The Forest LRMP identifies a group of wildlife species as MIS, selected because they represent other species with similar habitat requirements. MIS can be used to assess the impacts of management activities on a wide range of habitat types (Forest Service 2002). The habitat requirements and distribution of potential reproductive habitat of all MIS were reviewed to determine if suitable reproductive habitat is present in the project area (Table 3-23). Based on this review, a total of 11 MIS were found to have potential reproductive habitat within the project area. A 12th MIS, elk, does not have any DNF-identified potential reproductive habitat within the project, but the Oregon Department of Fish and Wildlife (ODFW) identified elk calving habitat adjacent to the project area. As a result, elk are addressed with the other MIS in this section. Specialized habitats, such as seeps and springs, which typically occupy a small area but support a wide range of species, would not be impacted because they are not present within the project area.

Table 3-23. DNF Management Indicator Species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat Represented by Species	Habitat Present in the Project Area[2]
Birds			
Cooper's Hawk ***Accipiter cooperi***	MIS S4	Mature moderately dense forests; especially high canopy closure and large trees, can also use mature forests with high canopy closure/tree density	Yes
Northern Goshawk ***Accipiter gentiles***	MIS S3	Mature and old-growth forests; especially high canopy closure and large trees	Yes
Sharp-shinned Hawk ***Accipiter striatus***	MIS S4	Mature and old-growth forests; especially high canopy closure and large trees in addition to young, dense, even-aged stands	Yes
Western Grebe *Aechmophorus occidentalis*	MIS S3B, S2S3N	Lakes, ponds, streams with emergent vegetation	No
Wood Duck *Aix sponsa*	MIS S4	Lakes, ponds, streams; a cavity nester	No
Northern Pintail *Anas acuta*	MIS S5	Open areas near water	No
American Wigeon *Anas americana*	MIS S5	Lakes, ponds, streams; nests in clumps of grasses in meadows and tall grasslands	No
Green-winged Teal *Anas carolinensis*	MIS S5	Freshwater marshes with emergent vegetation	No
Northern Shoveler *Anas clypeata*	MIS S5	Grassy areas near water	No

Table 3-23 (cont'd). DNF Management Indicator Species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat Represented by Species	Habitat Present in the Project Area[2]
Cinnamon Teal *Anas cyanoptera*	MIS S5	Lakes, ponds, streams with cover vegetation along banks	No
Blue-winged Teal *Anas discors*	MIS S4	Marshes, lakes, ponds, and slow-moving streams	No
Mallard *Anas platyrhynchos*	MIS S5	Open water with emergent vegetation	No
Gadwall *Anas strepera*	MIS S5	Concealed clumps of grasses in meadows and tall grasslands	No
Golden Eagle *Aquila chrysaeotus*	MIS, BCC S4	Large open areas with cliffs and rock outcrops	No
Great Blue Heron *Ardea herodias*	MIS S4	Riparian edge habitats including lakes, streams, marshes and estuaries	No
Lesser Scaup *Aythya affinis*	MIS S3B, S4N	Dry grassy areas near lakes at least 10 feet deep	No
Redhead *Aythya americana*	MIS S4	Freshwater marshes, lakes, and ponds with thick vegetation	No
Ring-necked Duck *Aythya collaris*	MIS S3	Thick emergent vegetation on shores of lakes and ponds	No
Canvasback *Aythya valisineria*	MIS S4	Lakes and ponds with emergent vegetation	No
Canada Goose *Branta canadensis*	MIS S5	Lakes, ponds, streams with emergent vegetation	No
Common Goldeneye *Bucephala clangula*	MIS S4	Lakes, ponds, streams; cavity nester	No
Barrow's Goldeneye *Bucephala islandica*	MIS S3B, S3N	Lakes, ponds, streams; cavity nester	No
Red-tailed Hawk ***Buteo jamaicensis***	MIS S5	Large snags, open woodland or country. Uncommon in dense forest	Yes
Northern Flicker *Colaptes auritus*	MIS S5	Open woodlands	No
Pileated Woodpecker ***Dryocopus pileatus***	MIS S4	Dense, mature to old-growth mixed conifer forests with large snags and logs; in Oregon often selects Douglas-fir and ponderosa pine.	Yes, marginal quality
Common Loon *Gavia immer*	MIS SHB, S5N	Edge of remote freshwater lakes and ponds	No

Table 3-23 (cont'd). DNF Management Indicator Species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat Represented by Species	Habitat Present in the Project Area[2]
Hooded Merganser *Lophodytes cucullatus*	MIS S4	Lakes, ponds, streams; cavity nester	No
Common Merganser *Mergus merganser*	MIS S4	Lakes, ponds, streams; cavity nester	No
Ruddy Duck *Oxyura jamaicensis*	MIS S4	Freshwater marshes, lakes, and ponds with dense vegetation	No
Osprey *Pandion haliaetus*	MIS S4	Large snags associated with fish bearing water bodies	No
Black-backed[3] Woodpecker ***Picoides arcticus***	MIS, Landbird Focal Species S3	Lodgepole pine forests, burned forest	Yes[4]
Downy Woodpecker[3] *Picoides pubescens*	MIS S4	Riparian hardwood forest	No
Three-toed Woodpecker[3] ***Picoides tridactylus***	MIS S3	High elevation and lodgepole pine forest	Yes
Hairy Woodpecker[3] ***Picoides villosus***	MIS S4	Predominantly Douglas-fir and ponderosa pine forest. May also use lodgepole pine	Yes[4]
Horned Grebe *Podiceps auritus*	MIS S2B, S5N	Open water with emergent vegetation	No
Red-necked Grebe *Podiceps gisegena*	MIS S1B, S4N	Lakes, ponds, streams	No
Eared Grebe *Podiceps nigricollis*	MIS S4	Open water with emergent vegetation	No
Pied-billed Grebe *Podilymbus podiceps*	MIS S5	Edge of open water in lakes, ponds, slow-moving rivers, marshes	No
Red-naped Sapsucker[3] *Sphyrapicus nuchalis*	MIS S4	Ponderosa pine forests with nearby riparian broadleaf trees	No
Williamson's Sapsucker[3] *Sphyrapicus thryroideus*	MIS, Landbird Focal Species, BCC S4B, S3N	Mature or old-growth conifer forests with open canopy cover, typically Douglas-fir and ponderosa pine; weak excavator	No
Great Gray Owl ***Strix nebulosa***	MIS Survey & Manage S3	Mature and old growth forests associated with openings and meadows. In Oregon often selects Douglas-fir and ponderosa pine, though lodgepole pine may be used.	Yes, marginal quality[5]

Table 3-23 (cont'd). DNF Management Indicator Species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat Represented by Species	Habitat Present in the Project Area[2]
Mammals			
Elk ***Cervus canadensis***	MIS S5	Mixed habitats	Yes
American marten ***Martes americana***	MIS S3	Mixed Conifer or High Elevation late successional forests with abundant down woody material	Yes
Mule Deer ***Odocoileus hemionus***	MIS S5	Mixed habitats	Yes

[1]MIS = Management Indicator Species, BCC = Bird of Conservation Concern, NatureServe status for Oregon: S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure, S5 = Secure, B = Breeding, N = Non-breeding, NA = Not applicable, HB = Possibly extirpated.

[2]If habitat for a species is not present, there would be no impact on Forest-wide viability of that species.

[3]Primary excavator species.

[4]Although lodgepole pine is present in the project area, it occupies less than 0.1 acre, resulting in a low probability of occurrence for hairy and black-backed woodpeckers.

[5]See additional discussion on great gray owls under Survey and Manage species below.

Cooper's hawks are associated with mature, moderately dense forests with a continuous canopy (Rosenfield and Bielefeldt 1993). Mountain hemlock stands were not included as reproductive habitat in the DNF MIS habitat model, but mixed conifer stands containing pines and firs may be used. There are approximately 275,340 acres of potential Cooper's hawk reproductive habitat Forest-wide, 16,133 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor (Table 3-24). Although areas of potential reproductive habitat have been identified within the SUP area, these areas are all either downslope or on the opposite side of the mountain from the project area. Although there is no potential Cooper's hawk reproductive habitat in the project area, there may be other habitat that contributes to the species' Forest-wide viability.

Northern goshawks are associated with mature old-growth forests that have a dense, continuous canopy but lack a shrub canopy. Nesting habitat typically has between 60 and 90 percent canopy closure and is located near the bottom of moderate hills slopes (Squires and Reynolds 1997). On the DNF, northern goshawks primarily select for mixed ponderosa and lodgepole pine forests and may extend upwards to the white fir zone. Mountain hemlock forests are considered to be secondary habitat. There are an estimated 446,402 acres of potential northern goshawk reproductive habitat Forest-wide, 23,383 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. Within the project area, the 7.8 acres of Forest-identified potential reproductive habitat is located on the northern and eastern borders of the Nordic Center and at the easternmost extent of the proposed Eastside pod. However, the stands adjacent to the Nordic Center have a canopy cover of approximately 30 percent, which is not considered dense enough to be nesting habitat.

Sharp-shinned hawks are associated with mature and old-growth forests, especially those with high canopy closure and large trees. Sharp-shinned hawks may also inhabit young, dense, even-aged stands.

There are approximately 426,138 acres of potential sharp-shinned hawk reproductive habitat Forest-wide, 23,464 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. Habitat is located in the mountain hemlock and lodgepole pine stands in the south and east sides of the SUP area. Less than 0.1 acre exists in the project area.

Table 3-24. Acres of potential reproductive habitat for MIS.

Species[1]	Acres Forest-wide	Acres in 6th Field Subwatersheds	Acres in SUP Area	Acres in Project Area
Cooper's Hawk	275,340	16,133	351	0
Northern Goshawk	446,402	23,383	716	7.8
Sharp-shinned Hawk	426,138	23,464	599	<0.1
Red-tailed Hawk	192,492	6,500	805	178
Pileated Woodpecker	178,480	23,789	4,402	275
Black-backed Woodpecker	446,003	16,432	283	0
Three-toed Woodpecker	367,499	17,415	471	0.7
Hairy Woodpecker	507,921	4,149	12	0
Great Gray Owl	197,847	17,392	274	0.1
Elk	21,000	0	0	0
American marten	433,973	36,982	4,643	278
Mule Deer	715,226	58,719	599	497

[1]See Table 3-23 for scientific names.

Red-tailed hawks are associated with open woodlands with less than 55 percent canopy closure. Red-tailed hawks typically utilize habitat types that provide suitable perches (trees, utility poles, rock outcrops, etc.) and are open enough to permit the detection of ground-dwelling prey. There are approximately 192,492 acres of potential red-tailed hawk reproductive habitat Forest-wide, 6,500 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. Habitat is located in mountain hemlock stands on the northwest, east, and south slopes of Mt. Bachelor, including the easternmost extent of the proposed Eastside pod. A total of approximately 178 acres of potential red-tailed hawk reproductive habitat is located within the project area.

Pileated woodpeckers are associated with mature to old-growth mixed conifer forests that have either snags or downed logs for nest building and foraging. Although Douglas-fir and ponderosa pine are typically selected, other types of conifers can also be used as habitat (Bull and Jackson 1995). Snags greater than 2 feet dbh are generally used for nesting (NatureServe 2011). There are approximately 178,480 acres of potential pileated woodpecker reproductive habitat Forest-wide, and 23,789 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. A total of 275 acres of potential reproductive habitat is located within the project area.

Black-backed woodpeckers are associated with lodgepole pine forests and other forest stands which have burned and have either snags or downed logs for nest building and foraging. There are approximately 446,003 acres of potential black-backed woodpecker reproductive habitat Forest-wide, 16,432 acres of

which are in the four 6th-field subwatersheds originating on Mt. Bachelor. Although pockets of potential black-backed woodpecker reproductive habitat have been identified in the lodgepole pine stands around the Nordic Center and on the east and west edges of the SUP area, none exists within the project area.

Three-toed woodpeckers are associated with high-elevation and lodgepole pine forests that have either snags or downed logs for nest building and foraging. There are approximately 178,480 acres of potential three-toed woodpecker reproductive habitat Forest-wide, 17,415 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. Less than 1 acre of potential reproductive habitat is located within the project area.

Hairy woodpecker are associated with mixed conifer (i.e. Douglas-fir/ponderosa pine) and ponderosa pine forests that have either snags or downed logs for nest building and foraging (Sousa 1987). There are approximately 507,921 acres of potential hairy woodpecker reproductive habitat Forest-wide, 4,149 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. Although pockets of potential hairy woodpecker reproductive habitat have been identified in the lodgepole pine stands around the Nordic Center, none exists within the project area.

Great gray owl are associated with mixed conifer (i.e., Douglas-fir/ponderosa pine) though they may inhabit lodgepole pine/western larch stands (Quintana-Coyer et al. 2004). Forest stand composition has been found to be less important than the presence of nearby meadows and openings used for foraging (Duncan 1997). There are approximately 197,847 acres of potential great gray owl reproductive habitat Forest-wide, 17,392 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. A total of 0.1 acre of potential reproductive habitat has been identified within the project area and is located on the north end of the Nordic Center. As discussed in the Survey and Manage species section above, great gray owl habitat at Mt. Bachelor is marginal because of the presence of snow and human activity well into the nesting period. Open areas (ski trails) adjacent to forest stands that could be used for foraging are groomed and have a compacted layer of snow. This reduces the capability of the area to support rodents that the owls prey on. Any nesting owls in the area would have to expend considerable energy in search of enough prey to feed itself and its young.

Elk are associated with mixed habitats including both forested and open areas. Forested areas provide thermal and escape cover, while open areas are used for foraging. Forest-wide, there are an estimated 21,000 acres of elk hiding cover habitat, none of which exists within the project area. The matrix of forest patches and ski trails within the SUP area could be suitable habitat for elk, but elk have been sighted in the SUP area only on rare occasions. Grasses and forbs are limited on the ski trails, and it is unlikely that the scarce understory vegetation in the forested areas would provide adequate forage. As a result of the late-season snow pack in both forested and open habitats of the SUP area, this incidental elk use is limited to summer months. The lack of perennial water, aside from Todd Creek and Dutchman Creek, may further deter elk from inhabiting the SUP area.

American marten are associated with dense, mixed conifer or high-elevation, late successional forests that have an abundance of woody material on the forest floor. Snags and downed wood are important both as denning areas and to provide habitat for prey species. There are approximately 433,973 acres of American marten potential reproductive habitat Forest-wide, 36,982 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. American marten are commonly observed within the project area. A total of approximately 284 acres of potential American marten reproductive habitat is located within the project area.

Mule deer are also associated with mixed habitats including both forested and open areas. There are approximately 715,226 acres of mule deer summer range hiding cover habitat Forest-wide, 58,719 acres of which are in the four 6th-field subwatersheds originating on Mt. Bachelor. As discussed above for elk, the matrix of forest patches and ski trails in the SUP area provide suitable habitat, though use is generally

limited to summer months after the snow pack has melted. The distance to perennial water may further deter mule deer from inhabiting the SUP area. Mule deer are commonly observed in the project area, suggesting that the individuals present are accustomed to current levels of human disturbance, particularly during summer months. A total of 510 acres of mule deer summer range hiding cover habitat is present within the project area.

Migratory Bird Species, Including Landbird Focal Species, Birds of Conservation Concern, and High Priority Shorebirds

Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA). Executive Order 13186 (66 FR 3853, January 17, 2001) details the responsibilities of federal agencies to protect bald and golden eagles and other migratory birds. Each agency was encouraged to immediately develop a Memorandum of Understanding (MOU) with the FWS and to begin implementing the conservation measures specified in Sec. 3 (e) of the Executive Order, as appropriate and practicable.

In response to this Executive Order and subsequent compliance with the Migratory Bird Treaty Act, the DNF is currently following guidelines from the *Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington* (Altman 2000). This conservation strategy addresses key habitat types as well as biological objectives and conservation strategies for these habitat types found in the East Slope of the Cascades, and the focal species that are associated with these habitats. The conservation strategy lists priority habitats: (1) Ponderosa Pine; (2) Mixed Conifer (Late Successional); (3) Oak-Pine Woodland; and (4) Unique Habitats (Lodgepole Pine, Whitebark Pine, Meadows, Aspen, and Subalpine Fir). Again, the mixed conifer stands present at Mt. Bachelor include western white pine, whitebark pine, lodgepole pine, and mountain hemlock. The mixed conifer referred to by Altman is typically dominated by Douglas-Fir and ponderosa pine.

As shown in Table 3-25, the Landbird Focal Species with suitable habitat in the project area include Clark's nutcracker and blue grouse. Clark's nutcracker inhabit old growth whitebark pine stands. They have also been observed in nearby mountain hemlock and lodgepole pine stands at Mt. Bachelor. Conservation issues include reduction in cover, lack of regeneration of young whitebark pine, and disease and insect infestations that can affect whitebark pine. The habitat objective is to initiate actions in whitebark pine habitats to maintain or provide greater than 30 percent of the trees in late-successional stages with greater than 10 percent cover in early-seral stages (seedlings and saplings), where ecologically appropriate. The conservation strategy is to eliminate or restrict human access and livestock grazing in whitebark pine habitats, especially those that have previously been degraded. (Altman 2000).

Blue grouse inhabit conifer forests during winter months, and breeding habitat typically has a well-developed herb/grass/shrub stratum (Zwickel 1992). Blue grouse construct nests on the ground in places with overhead cover. Maximum habitat suitability occurs when trees are interspersed with more open habitat. Winter recreation may affect blue grouse at a time when energy expenditures can be a limiting factor. The current habitat objective is to maintain 15 to 55 percent coniferous cover, 10 to 40 percent shrub cover, and 35 to 80 percent herbaceous cover (Altman 2000). The existing shrub and herbaceous cover in forested portions of the project area do not meet those objectives. The conservation strategy is to limit livestock grazing and road building (Altman 2000).

The *Birds of Conservation Concern* (FWS 2008b) identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973. Birds of Conservation Concern (BCC) include nongame birds, game birds without hunting seasons, subsistence-hunted nongame species in Alaska, and ESA candidate, proposed, Endangered or Threatened, and recently delisted species. While all of the bird species considered BCC (FWS 2008b) are priorities for conservation action, the list makes no finding with regard to whether they warrant consideration for ESA listing. The goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and

conservations actions (FWS 2008b). From the FWS (2008b) BCC publication, Bird Conservation Regions (BCRs) were developed based on similar geographic parameters. The BCR encompassing the project area is BCR 9, Great Basin. None of the BCC in BCR9 have habitat within the project area (Table 3-26).

Table 3-25. DNF Landbird Focal Species. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat	Habitat Present in Project Area
Hermit Thrush *Catharus guttatus*	Landbird Focal Species S4	Multi-layered/dense canopy in mixed conifer (i.e., grand fir and Douglas-fir) forests	No
Brown Creeper *Certhia Americana*	Landbird Focal Species S4	Large trees in mixed conifer (i.e., grand fir and Douglas-fir) forests	No
Olive-sided Flycatcher *Contopus cooperi*	Landbird Focal Species S3B	Edges and openings created by wildfire in mixed conifer (i.e., grand fir and Douglas-fir) forests	No
Blue Grouse ***Dendragapus obscurus***	Landbird Focal Species S4	Sagebrush, ponderosa pine, Douglas-fir, and true firs; breeding requires well developed herb/grass/shrub stratum; non-breeding habitat includes mountain hemlock	Yes
Sandhill Crane *Grus Canadensis*	Landbird Focal Species S3	Open grasslands, marshes, marshy edges of lakes and ponds, and river banks	No
Ash-throated Flycatcher *Myiarchus cinerascens*	Landbird Focal Species S4	Large oaks with cavities	No
Clark's Nutcracker ***Nucifraga columbiana***	Landbird Focal Species S4	Old growth whitebark pine	Yes
Nashville warbler *Oreothlypis ruficapilla*	Landbird Focal Species S4	Early seral oak/pine forest with dense understory	No
Flammulated Owl *Otus flammeolus*	Landbird Focal Species BCC S3B	Interspersed grassy openings and dense thickets in mixed conifer forests. Most common in Douglas fir and ponderosa pine	No
Pygmy Nuthatch *Sitta pygmaea*	Landbird Focal Species S4	Mature ponderosa pine forests and snags	No
Chipping Sparrow *Spizella passerine*	Landbird Focal Species S4	Open understory ponderosa pine forests with regeneration	No

[1]BCC = Bird of Conservation Concern, NatureServe status for Oregon: S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure, S5 = Secure, B = Breeding, N = Non-breeding, NA = Not applicable, HB = Possibly extirpated.

Table 3-26. DNF Birds of Conservation Concern. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat	Habitat Present in Project Area
Sage Sparrow *Amphispiza belli*	BCC S4B	Sagebrush shrublands	No
Ferruginous Hawk *Buteo regalis*	BCC S3B	Open sagebrush flats; open country	No
Snowy Plover *Charadrius alexandrinus*	BCC, Highly Imperiled Shorebird S2	Sandy beaches	No
Yellow-billed Cuckoo *Coccyzus americanus*	BCC SHB	Riparian hardwoods	No
Black Swift *Cypseloides niger*	BCC S2B	Damp coastal cliffs	No
Willow Flycatcher *Empidonax traillii*	BCC S4	Brushy areas with willow and riparian shrubs	No
Pinyon Jay *Gymnorhinus cyanocephalus*	BCC S3, S4	Pinyon/juniper woodlands	No
Loggerhead Shrike *Lanius ludovicianus*	BCC S3B, S2N	Open habitat with scattered trees and shrubs	No
Black-rosy Finch *Leucosticte atrata*	BCC S2B	Alpine rocky, grassy areas of central US mountains including eastern Oregon; range does not extend to Cascades	No
Marbled Godwit *Limosa fedoa*	BCC, High Concern Shorebird SNA	Expansive mudflats and sandflats on beaches	No
Long-billed Curlew *Numenius americanus*	BCC, Highly Imperiled Shorebird S3B	Dry grasslands	No
Sage Thrasher *Oreoscoptes montanus*	BCC S4B	Juniper and sagebrush shrublands; mountain mahogany and aspen	No
Green-tailed Towhee *Pipilo chlorurus*	BCC S4B	Sagebrush shrublands	No
Black-chinned Sparrow *Spizella atrogularis*	BCC	Desert, shrubland/chapparal; range does not extend to Oregon	No
Brewer's Sparrow *Spizella breweri*	BCC S4B	Sagebrush shrublands	No

Table 3-26 (cont'd). DNF Birds of Conservation Concern. (Bold indicates species addressed in this analysis.)

Species	Status[1]	Habitat	Habitat Present in Project Area
Calliope Hummingbird *Stellula calliope*	BCC S4	Open montane forest, mountain meadows, and willow thickets; nests located in riparian areas or second growth forest; forages on wildflower nectar	No
Virginia's warbler *Vermivora virginiae*	BCC	Mountain mahogany; range does not extend to Oregon	No

[1]BBC = Bird of Conservation Concern, NatureServe status for Oregon: S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure, S5 = Secure, B = Breeding, N = Non-breeding, NA = Not applicable, HB = Possibly extirpated.

The FWS compiled a list of U.S. and Canadian shorebird populations that are covered by the MBTA and considered highly imperiled or of high conservation concern in August 2004 (FWS 2004). The conservation strategies for species included in the list are detailed in the *U.S. Shorebird Conservation Plan* (Brown et al 2000). The objective of the conservation plan is to ensure that stable and self-sustaining shorebird populations are distributed across their North American ranges and that demographic and genetic stability is maintained for each species so that populations will persist far beyond the next century. None of the High Priority Shorebirds in the 2004 list have habitat within the project area (Table 3-27).

Table 3-27. DNF High Priority Shorebirds. (Bold indicates species addressed in this analysis.)

Species	Status	Habitat	Habitat Present in Project Area
Surfbird *Aphriza virgata*	High Concern Shorebird SNA	Nests on barren gravel hilltops, winters on rocky shorelines	No
Ruddy turnstone *Arenaria interpres*	High Concern Shorebird SNA	Rocky and sandy shorelines	No
Black Turnstone *Arenaria melanocephala*	High Concern Shorebird SNA	Tundra, winters on rocky coastal shores	No
Upland sandpiper *Bartramia longicauda*	High Concern Shorebird S1B	Grassy fields (4-8" tall) with open patches	No
Sanderling *Calidris alba*	High Concern Shorebird SNA	Sandy beaches with wave action	No

Table 3-27 (cont'd). DNF High Priority Shorebirds. (Bold indicates species addressed in this analysis.)

Species	Status	Habitat	Habitat Present in Project Area
Dunlin *Calidris alpina*	High Concern Shorebird S5N	Sandy beaches and mudflats	No
Red Knot *Calidris canutus*	High Concern Shorebird SNA	Sandy beaches	No
Western sandpiper *Calidris mauri*	High Concern Shorebird SNA	Mudflats and sandy beaches	No
Rock sandpiper *Calidris ptilocnemis*	High Concern Shorebird S3N	Rocky shorelines	No
Piping Plover *Charadrius melodus*	Highly Imperiled Shorebird SNA	Rare in OR on sandy beaches	No
Mountain plover *Charadrius montanus*	Highly Imperiled Shorebird SNA	Shortgrass prairies	No
Wilson's plover *Charadrius wilsonia*	High Concern Shorebird SNA	Rare in OR on sandy beaches, sandflats or mudflats away from shoreline	No
Black oystercatcher *Haematopus bachmani*	High Concern Shorebird S3	Coastal rocks	No
American oystercatcher *Haematopus palliatus*	High Concern Shorebird SNA	Rare in OR on rocky coasts	No
Short-billed dowitcher *Limnodromus griseus*	High Concern Shorebird SNA	Mudflats and shallow muddy ponds along coast	No
Marbled godwit *Limosa fedoa*	High Concern Shorebird SNA	Prairie ponds, mudflats and sandflats	No
Hudsonian godwit *Limosa haemastica*	High Concern Shorebird SNA	Mudflats and shallow water; nests around spruce woods	No
Bar-tailed godwit *Limosa lapponica*	High Concern Shorebird SNA	Low tundra in western Alaska	No
Whimbrel *Numenius phaeopus*	High Concern Shorebird SNA	Grassy marshes and tidal flats	No
Bristle-thighed curlew *Numenius tahitiensis*	High Concern Shorebird SNA	Rare in OR in marshes or beaches. Nests in Alaska tundra	No
Wilson's Phalarope *Phalaropus tricolor*	High Concern Shorebird S4	Shallow ponds within grassy marshes	No

Table 3-27 (cont'd). DNF High Priority Shorebirds. (Bold indicates species addressed in this analysis.)

Species	Status	Habitat	Habitat Present in Project Area
American Golden Plover *Pluvialis dominica*	High Concern Shorebird SNA	Upland tundra, dry mudflats, fields, and pastures	No
American woodcock *Scolopax minor*	High Concern Shorebird SNA	Damp, brushy woods	No
Solitary Sandpiper *Tringa solitaria*	High Concern Shorebird SNA	Small, freshwater mudflats	No
Buff-breasted sandpiper *Tryngites subruficollis*	Highly Imperiled Shorebird SNA	Nests in tundra, forages on shortgrass prairie	No

NatureServe status for Oregon: S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure, S5 = Secure, B = Breeding, N = Non-breeding, SNA = Not applicable, HB = Possibly extirpated.

The bird MIS discussed above are also protected as migratory birds (FWS 2011b) and are associated with the habitats found within the project area. As these bird species are migratory and, in their role as MIS, represent the status of a range of other migratory species associated with the habitats they represent (Table 3-23), the pertinent results of the MIS analysis provide a secondary indicator of the effects on migratory birds in this analysis.

3.4.5.3 Direct and Indirect Effects

3.4.5.3.1 No-Action Alternative

Wildlife Habitat

Under the No-Action Alternative, construction would be confined to developed areas that are not considered wildlife habitat. The amount of key and connecting habitat for wide-ranging species would generally remain unchanged. However, on-going ski area maintenance operations would prevent forested regeneration on existing lift corridors and ski trails and maintain them as clearings, and hazard trees would be felled as indicated in the *Mt. Bachelor Inc., Operating Plan*. Hazard tree removal would be concentrated along ski trails, lifts, powerlines, and other locations where human activity is concentrated, but would not extend into other areas. Ongoing removal of hazard trees might have a small, incremental effect on dead wood habitat.

Since the administration building would be constructed at a central location in West Village, there would be no change in the pattern of human activity. However, there would be a temporary increase in noise near the construction site.

Skiers would continue to use existing trails. The level and distribution of dispersed skiing above the existing catchline would likely remain unchanged, and the catchline would continue to function as a soft boundary to skiing further downslope. There would likely be no increase in the amount of dispersed skiing below the existing catchline.

In short, wildlife habitats would essentially remain as described in section 3.4.5.2.1. Natural factors (e.g., avalanche, insects, disease, and fire) would continue to act on the forest and might alter wildlife habitat by creating small openings and patches.

Special Status Species

Since, with the minor exceptions noted above, there would be no disturbance of existing wildlife habitat or increase in human activity, the No-Action Alternative would have no measurable direct or indirect effects on federally listed wildlife species and no measurable direct or indirect impacts on Forest Service Sensitive, Management Indicator, Survey and Manage, or migratory bird species.

3.4.5.3.2 Proposed Action

Wildlife Habitat

The Proposed Action would result in disturbance of the project-area land cover types described previously (section 3.4.4.2.1) due to selective tree removal, glading, clearing, grading, and excavation. Table 3-2 discloses the impact each element or class of elements comprising the Proposed Action would have on the various land cover types by type of disturbance. Table 3-19 shows these impact acreages as percentages of the total acreage in that land cover type in the SUP area. The effects of each type of disturbance on the land cover and forest structure were also discussed previously (section 3.4.4.3.2). With this background information in place, the effects of these disturbances on key wildlife habitat, habitat connectivity, and timing and location of human noise are discussed below.

The Proposed Action would not affect designated northern spotted owl CHUs or mapped NRF habitat. It would affect a total of approximately 143.2 acres of northern spotted owl dispersal habitat. The affected dispersal habitat represents less than 3 percent of dispersal habitat in the SUP area. None of the affected dispersal habitat would be located within the 0.5-mile-radius core area, but approximately 1.3 acres of affected dispersal habitat would be located within the 1.2-mile-radius activity center. This 1.3 acres of impacted dispersal habitat is distributed as follows: .

- Constructing the proposed bike trails would increase human activity on approximately 4.63 acres of dispersal habitat including 1.3 acres located within the activity center. However, the proposed bike trails would equate to a new disturbance source rather than a conversion of habitat. The proposed bike trails would be only 3 to 5 feet wide and would not require removing trees. The bike trails would be beneath the snowpack until the latter part of the critical nesting period, and trail use would not likely occur during night-time hours when spotted owls are foraging. Furthermore, the dispersal habitat is already bisected by multiple 30-foot-wide Nordic ski trails and 150-foot-wide downhill ski trails. Based on these factors, bike trail development and use could potentially affect activity at a given nest site (e.g., due to riders passing beneath occupied nest) but would not alter the suitability of the habitat.
- Constructing the improvements at Bob's Bungalow would convert less than 0.1 acre of dispersal habitat into a developed condition.

The remainder of the disturbances to dispersal habitat would be concentrated in small areas outside of the activity center.

The Proposed Action would not directly impact any of the fawning and calving habitat for mule deer and elk. The elements located closest to fawning and calving habitat are the improvements at Bob's Bungalow and the southeast extent of the Eastside pod. Both of these elements are located approximately 600 feet upslope from the fawning and calving habitat along Todd Creek and Dutchman Creek, respectively. The Proposed Action may have a beneficial effect on the fawning and calving habitat adjacent to Dutchman Creek by increasing the amount of open, meadow-like conditions where deer and elk could forage during summer months. Connectivity between these two areas of key habitat would

decrease as a result of the Proposed Action. However, the change would be minor because these two areas are already separated by approximately 3.2 miles of predominantly developed land.

The Proposed Action would impact dead wood habitat. The projects that involve clearing, grading, and excavation would disturb approximately 147 acres of forest stands, including dead wood habitat. An additional, small amount of dead wood habitat would be impacted by ongoing hazard tree removal as discussed above (section 3.4.5.3.1). Hazard tree removal would be concentrated along ski trails, lifts, powerlines, and other locations where human activity is concentrated, but would not extend into other areas. Removal of dead wood habitat would be conducted according to the guidance outlined in the *Deschutes National Forest Wildlife Tree and Log Implementation Strategy* (Forest Service 1994). The projects that involve glading and selective tree removal would not result in notable impacts on dead wood habitat. These prescriptions would predominantly remove trees less than 8 inches dbh (section 3.2) and which are too small to be considered snags.

Under the Proposed Action, glading, grading, clearing, and excavation would decrease connectivity of mountain hemlock and mixed conifer stands by converting approximately 211.8 and 44.1 acres, respectively, to either developed or ski trail land cover. The decrease in connectivity would be most pronounced in the Eastside pod where the forest stands are relatively contiguous. In other portions of the project area, stands are relatively disconnected into long, narrow islands or relatively open patches. In these discontinuous forest habitats, the change in connectivity would not be as pronounced. Wildlife species selecting the tree island habitats are likely those that prefer edge habitat as opposed to interior forest habitat. Since the selective tree removal treatments would remove chokepoints in otherwise skiable terrain but would not convert land cover types (section 3.2), it would not affect habitat connectivity.

The Proposed Action would affect noise and human activity during both the construction and operation phases. Since construction of most elements would require snow-free conditions, construction-related noise and human activity would be limited to summer and fall months. Therefore, the function of habitat which is used by year-round or summer resident wildlife species would be most impacted. A combination of helicopters, heavy equipment, small equipment, and hand tools would be used such that the noise disturbance would vary according to the element.

If the northern spotted owl surveys locate an activity center within the project area, then the effects of construction on habitat function could be mitigated by avoiding work during the critical nesting period (March 1 – September 30) as indicated in the Programmatic BA (Forest Service 2010b). Habitat suitability for pacific fisher and wolverine would also be impacted by construction, as both species avoid areas with human activity. However, since the SUP area already has considerable human activity and lacks a dense understory canopy, it is considered marginal habitat for these species. As a result, the incremental impact on habitat function would be minimal.

The helicopters (Sikorsky S-64 Skycranes or similar) used to transport and install the lift towers would generate between 95 and 105 dba at a distance of 300 feet (True et al. 1977). They would be used during daylight hours, and only for 1 or 2 days over the course of the next 10 years. The use of helicopters may temporarily disturb wildlife, though research suggests that some raptors may not respond to helicopters operating between 325 and 2,600 feet from occupied nest sites (Grubb et al. 2010). Helicopter use beyond transporting and installing lift towers is not anticipated. The heavy equipment and hand tools used during construction would generate noise levels as described above in section 3.4.5.2.1. for loaders, backhoes, and chainsaws.

During the operation phase of the Proposed Action, noise and human activity would both follow the existing patterns and distributions (section 3.4.5.2.1) and extend onto the new network of ski trails in the Eastside pod, tubing hill, Nordic Center, bike and hiking trails, and the zipline course. Dispersed skiing in the Eastside pod between the existing and proposed catchlines would increase, which would further

lower the habitat value of that area during the ski season. Although many of the proposed bike and hiking trails and the zipline course would be constructed across previously disturbed habitats, these areas have experienced a low level of human activity during summer months. Use of these elements would increase human activity and noise, potentially decreasing habitat suitability for summer resident wildlife. The introduction of human activity and noise in zipline course segments that pass through the canopy of tree islands could also decrease habitat suitability for nesting birds and small mammals.

Special Status Species

A biological assessment providing more detailed analysis of potential effects on federally listed species and a biological evaluation addressing Forest Service Sensitive species have been prepared. These documents are included in the project record and included by reference in this EIS.

Federally Listed Species

The Proposed Action **may affect but is not likely to adversely affect the northern spotted owl**. There would be no effect on designated northern spotted owl CHU or NRF habitat. The proposed projects that lie within dispersal habitat and are thus of greatest concern are the tubing hill, segments of the proposed bike trails, realignment of Blue Jay's Way, and the new Nordic Center access trail. Each of these projects would result in minimal and/or localized alteration of dispersal habitat, as discussed above. Although no northern spotted owl nests have been identified during the surveys conducted for this EIS, a new activity center has been identified which qualifies as a Resident Single Status. None of the detections occurred near the sites of any of these four projects; in fact none were in the project area at all, but in the remote northern and western portions of the SUP area. Based on these considerations, potential effects on this species cannot be dismissed entirely but likely would be minor.

Forest Service Sensitive Species

The Proposed Action **may impact wolverine individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability to the population or species**. As discussed above, there is no wolverine reproductive habitat in the SUP area (section 3.4.5.2.2) but marginal habitat for other types of wolverine use may occur. And as pointed out above under Wildlife Habitat, the site of the Eastside pod in particular exhibits some attributes of wolverine habitat. However, although that site is somewhat removed from existing patterns of human disturbances, skiing currently occurs in the area, especially above timberline and in sparsely forested zones. As a result, wolverine may disperse through the area (e.g., to potential reproductive habitat in the Three Sisters Wilderness), but occupancy is highly unlikely.

The Proposed Action **would not impact American peregrine falcon individuals or habitat**. As discussed above, this area experiences a high level of human disturbance during the winter and extending into the summer for as long as the snow pack persists and is unlikely to be used by peregrine falcons (section 3.4.5.2.2). Furthermore it lacks the cliff and ledge features required for nesting.

The Proposed Action **may impact Pacific fisher individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability to the population or species**. This determination is based on the lack of known occurrences of fisher within the SUP area, the non-expanding status of the two known populations of fisher in Oregon, and the low quality of habitat in the SUP area (section 3.4.5.2.2). Fishers generally avoid areas were the understory is not robust enough to support a prey base of small mammals or where human disturbance is high (Aubry and Lewis 2003), both of which characterize the project area. As a result, fishers may disperse through the area, but occupancy is highly unlikely.

The Proposed Action **may impact Townsend's big-eared bat individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability to the population or species**.

Potential impacts on Townsend's big-eared bat are associated with the grading and excavation treatments. Grading would occur on approximately 191 acres for the creation of ski trails and the lower catchline in the Eastside pod. Grading activities would disturb soil surfaces to depths generally less than 1 foot and would likely not contact any subsurface lava tubes or caves that may be present. Excavation would occur on approximately 22 acres, to a depth of 3 feet or contact with bedrock, and would have a higher potential to penetrate any lava tubes or caves. If these features were encountered during excavation, trenches or building footprints would need to be relocated to avoid impacts on potential bat habitat. As discussed above (section 3.4.5.2.2), there are two known lava tubes near the Rainbow lift, neither of which is considered habitat for Townsend's big-eared bat.

Survey and Manage Species

As discussed in section 3.4.5.2.2, there are no known sites for Survey and Manage wildlife species either within the project area or in a 0.25-mile buffer around the project area. The Proposed Action would have no impact on evening fieldslug, Crater Lake tightcoil or great gray owl, the Survey and Manage species potentially occurring in closest proximity to the project area.

Management Indicator Species

As discussed in section 3.4.4.3.2 and shown in Table 3-2, grading, clearing, and excavation associated with the Proposed Action would disturb approximately 147 acres of mountain hemlock, mixed conifer, and lodgepole pine land cover. Of the 147 acres, approximately 23 would be permanently converted to developed land cover type, 2 acres would be converted temporarily to developed land cover type, and the remaining 122 acres would be converted permanently to ski trails or other meadow-like land cover types.

As explained in section 3.4.5.3.2, the 147 acres of disturbance would include dead wood habitat, and hazard tree removal would create a small, incremental disturbance of this habitat in specific areas. This could impact both cavity nesters and American marten. Glading and selective tree removal could minimally alter stand canopy cover but would not result in any permanent type conversions of potential reproductive habitat since only limited numbers of small-diameter trees would be removed.

The amount of potential reproductive habitat impacted by the Proposed Action is less than 147 acres for any given MIS, since not all of impacted area would meet that species' requirements. Potential reproductive habitat of some MIS would not be impacted (Table 3-28), as none occurs in the project area. For those that would be impacted, the range of acreages impacted is from less than 0.1 acre of potential three-toed woodpecker habitat (the least of the impacted species) to 134.5 acres of potential mule deer summer hiding cover (the most of impacted species).

The Proposed Action would have a small negative impact on potential reproductive habitat of northern goshawk, sharp-shinned hawk, red-tailed hawk, pileated woodpecker, three-toed woodpecker, great gray owl, American marten, and mule deer. The amount of potential reproductive habitat impacted by the Proposed Action, relative to the amount present on the DNF, is extremely small (Table 3-28), ranging from 0.002 percent (northern goshawk) up to 0.05 percent (pileated woodpecker). The impact on potentially reproductive habitat, relative to the amount present within the four 6th-field subwatersheds originating on Mt. Bachelor, would also be small, ranging from 0.001 percent (three-toed woodpecker) up to 0.4 percent (pileated woodpecker). Considering the small amount of potential reproductive habitat impacted for these eight species, the Proposed Action would result in a small negative trend of habitat. The loss of habitat would be insignificant at the Forest scale.

The Proposed Action would not contribute to a negative trend on Forest-wide viability of American peregrine falcon. The Proposed Action would not affect potential reproductive habitat of Cooper's hawk, black-backed woodpecker, hairy woodpecker, or elk and would not impact the Forest-wide viability of these four MIS species.

Table 3-28. Acres of potential reproductive habitat for MIS impacted by the Proposed Action and Alternative A.

Species[1]	Acres of MIS Habitat Impacted by Proposed Action	Percent of Forest-Wide Habitat Impacted by Proposed Action	Acres of MIS Habitat Impacted by Alternative A	Percent of Forest-Wide Habitat Impacted by Alternative A
Cooper's Hawk	0	0	0	0
Northern Goshawk	7.1	<0.01	6.0	<0.01
Sharp-shinned Hawk	<0.1	<0.01	<0.1	<0.01
Red-tailed Hawk	22.6	0.01	20.0	0.01
Pileated Woodpecker	89.8	0.05	84.5	0.05
Black-backed Woodpecker	0	0	0	0
Three-toed Woodpecker	0.1	<0.01	<0.1	<0.01
Hairy Woodpecker	0	0	0	0
Great Gray Owl	0.1	<0.01	0.1	<0.01
Elk	0	0	0	0
American marten	92.6	0.02	87.3	0.02
Mule Deer	121.2	0.02	114.4	0.02

[1]See Table 3-23 for scientific names.

Migratory Bird Species

The Proposed Action could have a small negative impact on migratory birds, specifically on Clark's nutcracker and blue grouse. These are the only two Landbird Focal Species with habitat identified in the project area (Table 3-25). There is no habitat for BCC or High Priority Shorebirds in the project area (Tables 3-26, 3-27). Similar to the impacts on MIS, projects involving grading, clearing, and excavating would disturb approximately 147 acres of potential migratory bird habitat. Again, the 147 acres of disturbance is a conservative estimate, and the disturbance would likely be less since not all of the mountain hemlock and mixed conifer land cover meets the habitat requirement for Clark's nutcracker or blue grouse. Projects involving glading and selective tree removal would minimally alter stand canopy cover but would not result in a permanent habitat conversion. Their impact on these two migratory bird species would be small, and in the case of blue grouse, would be offset to some degree, by the creation of more open foraging areas. The Proposed Action would not include removal of late-successional whitebark pine, except for hazard trees (Section 2.2.6), and any removed whitebark seedlings/saplings would constitute a small amount of those present (Section 3.4.4.3.2). The Proposed Action would not increase livestock grazing or road contruction in high quality grouse habitat. Consequently, the Proposed Action would be in compliance with conservation strategies of both species.

The American peregrine falcon and black-backed woodpecker are the only other species listed as either Landbird Focal Species, BCC, or High Priority Shorebirds which have habitat identified either in or adjacent to the project area. As discussed above, there is low likelihood that adequate peregrine falcon habitat is present, and no potential black-backed woodpecker reproductive habitat exists within the project area. As a result, there would be no anticipated impacts on either of these migratory bird species.

Summary

The Proposed Action would not reduce northern spotted owl NRF habitat or impact designated CHUs. The Proposed Action would affect 531.1 acres of northern spotted owl dispersal habitat, including 130.8 acres that would be permanently converted through clearing, excavation, and grading. Much of the 130.8 acres of permanently converted dispersal habitat would be displaced by narrow, linear features. These converted corridors would fragment the existing blocks of dispersal habitat but are unlikely to alter the overall characteristics of these areas to the degree that they no longer meet the criteria established in the Programmatic BA. None of the dispersal habitat located within the 0.5 mile-radius of the newly identified core area would be impacted by the Proposed Action and only 1.3 acres of dispersal habitat in the 1.2-mile radius of the newly identified activity center would be impacted. Those impacts consist of proposed bike trails and improvements at Bob's Bungalow, neither of which would significantly alter the physical characteristics of the stands they are located in.

The Proposed Action would also impact some dead wood habitat within the 147 acres disturbed by grading, clearing, and excavating.

Connectivity of mountain hemlock and mixed conifer stands would be adversely affected by approximately 211.8 and 44.1 acres, respectively, of conversion to either developed or ski trail land cover. The decrease in connectivity would be most pronounced in the Eastside pod where the relatively contiguous forest stands provide better, though still marginal, habitat for interior-forest-dwelling wildlife.

The Proposed Action would affect noise and human activity during both the construction and operation phases. However, since the SUP area already has considerable human activity, the incremental impact on habitat function would be minimal. The impact of human activity may be greatest in the proposed selective tree removal area on the south side of Mt. Bachelor.

In terms of special status wildlife species, the Proposed Action:

- May affect but is not likely to adversely affect the northern spotted owl.
- May impact wolverine, Pacific fisher, or Townsend big-eared bat individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability of the population or species; no impact on American peregrine falcon or Oregon spotted frog.
- Would not impact Crater Lake tightcoil and is unlikely to impact great gray owl.
- Would have a small negative effect on potential reproductive habitat of eight MIS species: sharp-shinned hawk, northern goshawk, red-tailed hawk, three-toed woodpecker, pileated woodpecker, great gray owl, American marten, and mule deer; no effect on potential reproductive habitat of Cooper's hawk, black-backed woodpecker, hairy woodpecker, or elk.
- Would have a small negative impact on migratory birds, specifically Clark's nutcracker and blue grouse; no impact on other Landbird Focal Species, Birds of Conservation Concern, or High Priority Shorebirds.

The effects of the Proposed Action on these special status wildlife species would result from impacts on potentially suitable habitat.

3.4.5.3.3 Alternative A-No New Catchline

Under Alternative A, the proposed lower catchline would not be built, and selective tree removal between the existing and proposed catchlines would not occur. This would reduce the overall direct disturbance area by approximately 403 acres across mountain hemlock, mixed conifer, and natural non-forested land cover types as indicated on Table 3-20. This represents a 6 percent reduction in area affected by grading

and an 89 percent reduction in area affected by selective tree removal. The acreages of habitat affected by glading, clearing, and excavation would remain similar to the Proposed Action.

Relative to the Proposed Action, Alternative A would reduce the disturbance of key habitats by a small amount. The only key habitat that exists in the area affected by the lower catchline and selective tree removal is dead wood habitat. Dead wood habitat would be impacted by grading of the catchline but not by selective tree removal. Grading would decrease by approximately 9 acres. Since not all of the graded area is comprised of dead wood habitat, the impact reduction on dead wood habitat would be considerably less than 9 acres.

Alternative A would reduce the disturbance of connecting habitat by 9 acres, all of which is attributed to not grading the new catchline. As indicated in the Proposed Action discussion above, selective tree removal would only create small-scale openings in forested stands that are naturally open and discontinuous, and thus would not alter habitat connectivity. Therefore, reducing the amount of selective tree removal would not notably affect habitat connectivity.

Alternative A would not change the timing of construction noise and human activity relative to the Proposed Action, and construction would still occur during the snow-free period of summer and fall. The timing of non-construction related noise and human activity would also be similar to the Proposed Action. However, Alternative A would reduce the extent of construction noise and human activity by removing those disturbances from 403 acres below the existing catchline. Post-construction disturbances associated with human activity in this area would follow the current pattern. Dispersed skiing would likely continue above the existing catchline but generally would not extend further downslope.

Effects on federally listed species, and impacts on Forest Service Sensitive species and Survey and Manage species, would remain unchanged from the Proposed Action. Impacts on MIS and migratory birds would be reduced as a result of the decrease in disturbance of potential habitat (Table 3-28). The impacts of grading, clearing, and excavating on potential MIS and migratory bird habitat in the mountain hemlock and mixed conifer land cover types would decrease from 147 acres to approximately 138 acres. Of the 138 acres, approximately 22 would be permanently converted to developed land cover type, 2 acres would be converted temporarily to developed land cover type, and the remaining 113 acres would be converted permanently to ski trails or other meadow-like land cover.

3.4.5.4 Cumulative Effects

The cumulative effects are defined as the contribution of the direct and indirect impacts of the Proposed Action or Alternative A on special status wildlife species and habitat (see summary of section 3.4.5.3.2). Since the Proposed Action and Alternative A would have no direct or indirect effect on American peregrine falcon, Oregon spotted frog, Crater Lake tightcoil, Cooper's hawk, black-backed woodpecker, hairy woodpecker, elk, Landbird Focal Species (excepting Clark's nutcracker and blue grouse), Birds of Conservation Concern, or High Priority Shorebirds, there would be no contribution to cumulative effects on these species.

The Proposed Action and Alternative A may have a small direct or indirect effect on northern spotted owl, wolverine, Pacific fisher, Townsend's big-eared bat, sharp-shinned hawk, northern goshawk, red-tailed hawk, three-toed woodpecker, pileated woodpecker, great gray owl, American marten, mule deer, Clark's nutcracker, and blue grouse. However, as discussed above (section 3.4.5.3.2), the effects typically result from impacts to a relatively small amount of potential habitat available on the Forest and within the four 6th field subwatersheds originating on Mt. Bachelor. Therefore, any contribution of the Proposed Action or Alternative A towards cumulative effects on these species would be diminutive.

The cumulative actions considered in this analysis include past projects, ongoing projects, and projects that are anticipated in the reasonably foreseeable future that are located within either the Soda Creek,

Dutchman Creek, Quinn Creek, or Snow Creek/Deschutes River subwatersheds (Table 3-5 and Figure 3-1). These subwatersheds are collectively referred to as the analysis area. The cumulative effects are as follows:

1. Sparky Vegetation Management Project

The Sparky Vegetation Management Project consisted of hazard tree removal and thinning on a total of 1,894 acres adjacent to Hwy. 46. Since trees were thinned rather than cleared, this project did not represent a permanent change in land cover type, but it did temporarily alter stand structure and canopy closure and reduce snags and dead wood in the longer term. Subsequent use of firewood collection areas by the public further reduces dead wood habitat and increases noise and human activity. Due to the proximity of the project to a highway corridor, these changes are unlikely to affect special status wildlife species which generally avoid areas of high human activity.

The Proposed Action and Alternative A would also affect dead wood habitat and the timing and location of construction noise and human activity (section 3.4.5.3.2), resulting in cumulative effects in the analysis area. Species dependent on dead wood as potential reproductive habitat (e.g., three-toed and pileated woodpeckers and American marten) would be affected by the Proposed Action or Alternative A but, as shown in Table 3-28, the Proposed Action and Alternative A would contribute a very small impact relative to the amount of reproductive habitat on the Forest. The amount of potential reproductive habitat present in the 6th field subwatersheds (Table 3-24) also suggest that such habitat is not limiting. In terms of potential human disturbance, the effects of both projects would be localized, affecting separate and relatively small portions of the analysis area. Based on these factors, cumulative impacts are projected to be minor.

2. Existing Winter and Summer Trail Systems

The approximately 240 miles of existing Forest-administered trails in the analysis area have altered wildlife habitat values. These trails permanently convert narrow corridors of vegetation to developed land cover and, more importantly, increase the level of dispersed human activity and noise. The trails within the analysis area have been designated for all-terrain vehicles (ATVs), bicycle, hiker/pedestrian, equestrian, snowmobile, snowshoe, and Nordic skiing. In addition to recreation use, ongoing maintenance includes brushing, grooming, and removal of hazard trees. Overall, the human activity associated with these trail systems likely has the greatest impact on reclusive wildlife species in the analysis area, including a number of special status species such as wolverine and Pacific fisher.

The Proposed Action and Alternative A would contribute incrementally to human activity in the analysis area. However, the increase would occur in an intensive recreation area where activity levels are already relatively high. The trail construction under the Proposed Action and Alternative A would add to effects on connecting habitat (section 3.4.5.3.2). Based on the current high level of human activity and habitat fragmentation, the analysis area does not provide high quality connecting habitat or habitat for reclusive species. These cumulative impacts would constitute an incremental decrease in habitat value for such species. Species more tolerant of human activity would be less affected.

3. Existing Summer Recreation Sites

The 27 existing summer recreation sites have converted wildlife habitat to developed land cover, marginally reducing the pre-development habitat types on those sites. Construction and use of existing summer recreation sites may impact key wildlife habitat. These 27 sites include trailheads, picnic areas, campgrounds, horse camps, boating sites, and a small, privately-owned resort. Combined they have a capacity of approximately 1,793 recreationists. Dead wood habitat, including hazard trees, was likely cleared away during construction and may be removed during ongoing maintenance. Fawning and calving habitat for mule deer and elk near Todd Creek and other aquatic sites are also affected by existing

summer recreation sites. Ongoing use and maintenance of summer recreation sites increase human activity and noise.

The Proposed Action and Alternative A would also affect dead wood habitat and the timing and location of human activity (section 3.4.5.3.2), resulting in cumulative effects in the analysis area. Species dependent on dead wood as potential reproductive habitat (e.g., three-toed and pileated woodpeckers and American marten) would be affected by the Proposed Action or Alternative A but, as shown in Table 3-28, the Proposed Action or Alternative A would contribute a very small impact relative to the amount of reproductive habitat on the Forest. The amount of potential reproductive habitat present in the 6th field subwatersheds (Table 3-24) also suggest that such habitat is not limiting. The Proposed Action or Alternative A would not impact fawning and calving habitat because no new activities would occur in those areas. The increase in human activity as it pertains to summer recreation would be most pronounced in the Pine Marten and West Village base areas, in an intensive recreation area where activity levels are already high. Based on these factors, cumulative impacts are expected to be minor.

4. Existing Sno-Parks

The three existing sno-parks in the analysis area (Dutchman Flat, Vista Butte, and Edison) provide parking and access for winter recreationists using the winter trail system discussed above as well as traveling cross country. Combined, these sno-parks have a capacity of 530 recreationists. Construction and use of existing sno-parks may impact key wildlife habitat. Dead wood habitat, including hazard trees, was likely cleared away during construction and may be removed during ongoing maintenance. In addition, increased human activity at the sno-parks further decreases habitat suitability for reclusive species. Since sno-parks are located along well-traveled county roads, the impact of increased human activity would be less than if these disturbances occurred in new areas.

The Proposed Action or Alternative A would also affect dead wood habitat and the timing and location of human activity (section 3.4.5.3.2) and would result in a cumulative effect. However, either the Proposed Action or Alternative A would only contribute to relatively small impacts on potential reproductive habitat of three-toed woodpecker, pileated woodpeckers, and American marten on the Forest and in the analysis area. Furthermore, the increase in human activity would occur in an area of intensive recreation that already experiences high levels of human activity. Based on these factors, the cumulative impacts would be minor.

5. County Road Maintenance

Road maintenance includes grading, hazard tree removal along Hwys. 45 and 46, and snow removal on Hwy. 45. Hazard tree removal impacts dead wood habitat within the road corridor and adjacent clear zone. The operation of machinery involved in road maintenance and snow removal increases the noise and physical disturbance along the road corridor. Thrown snow, as opposed to plowed snow, creates a physical disturbance in habitat adjacent to these highways. Since these disturbances occur on well-traveled roads, the noise associated with maintenance may represent a greater disturbance than the actual human presence.

The Proposed Action or Alternativ A would also affect both dead wood habitat and the level of human activity and noise (section 3.4.5.3.2), resulting in cumulative effects. Species dependent on dead wood as potential reproductive habitat (e.g., three-toed and pileated woodpeckers and American marten) would be affected by either the Proposed Action or Alternative A but, as shown in Table 3-28, the Proposed Action or Alternative A would contribute a very small impact relative to the amount of reproductive habitat on the Forest. The amount of potential reproductive habitat present in the 6th field subwatersheds (Table 3-24) also suggest that such habitat is not limiting. The increased disturbance associated with snow removal and road maintenance would be continue to be localized and within areas of existing high disturbance. For these reasons the cumulative impacts are expected to be minor.

6. Alternative Transportation Planning

Alternative Transportation Planning to date consists of Bend Area Transit providing bus transportation to the ski area in place of busing currently provided by Mt. Bachelor. Changing bus providers would have no notable effect on wildlife habitat or special status species and thus no potential for cumulative impacts.

7. Travel Management Plan

The travel management plan will prohibit motorized travel off of existing designated routes, with the exception of over-snow travel. This will decrease human activity and noise away from designated routes during the summer. Wildlife disturbance during winter months would remain unchanged. By reducing summer wildlife disturbance, the travel management plan would have a positive net cumulative effect on wildlife when considered in conjunction with localized disturbance associated with the Proposed Action or Alternative A.

8. Invasive Plant Treatments

Invasive plant treatments will improve habitat conditions for wildlife species and result in a positive cumulative effect when considered in conjunction with localized disturbance associated with the Proposed Action or Alternative A.

9. Kapka Butte Sno-Park

The Kapka Butte sno-park improvements will include construction of new parking and restroom facilities and some new trails. The new sno-park will permanently convert some wildlife habitat and increase both localized and dispersed human activity and noise during the winter months. Since the sno-park will be built adjacent to the intersection of Hwys. 45 and 46, it is unlikely to adversely affect special status wildlife species, which generally avoid areas of high human activity. The sno-park and trails are located near two patches of NRF habitat and may also impact northern spotted owl dispersal. In addition to motorized and non-motorized recreation use, ongoing maintenance of the trail system is anticipated to include brushing, grooming, and removal of hazard trees. As noted above, the human activity associated with recreation trails likely has the greatest impact on reclusive wildlife species in the analysis area, including a number of special status species.

The Proposed Action or Alternative A would both contribute incrementally to human activity in the analysis area. However, the increase would occur in an intensive recreation area where activity levels are already high. Trail construction would not affect NRF connectivity and would generally have a small effect on forest stand structure. Based on the current high level of human activity, the analysis area does not provide high quality habitat for reclusive species. These cumulative impacts would constitute an incremental decrease in habitat value for such species. Species more tolerant of human activity would be less affected.

10. Fish Passage Improvements

As neither the Proposed Action nor Alternative A would affect aquatic resources, the only potential for cumulative effects would be disturbance during construction of the fish passage improvements. Installation of the culverts could contribute temporarily to human activity and noise in the analysis area, though at a distance from disturbance associated with the Proposed Action or Alternative A.

11. Nordic Center Hazard Tree Removal

This cumulative action will remove trees that pose a hazard to Nordic ski operations. It is anticipated that some of the hazard trees that will be removed provide dead wood habitat. Removal of the trees will also temporarily increase human activity and noise.

Both the Proposed Action and Alternative A would affect dead wood habitat and the timing and location of construction noise and human activity (section 3.4.5.3.2), resulting in cumulative effects. Species

dependent on dead wood as potential reproductive habitat (e.g., three-toed and pileated woodpeckers and American marten) would be affected by either the Proposed Action or Alternative A but, as shown in Table 3-28, the Proposed Action or Alternative A would contribute a very small impact relative to the amount of reproductive habitat on the Forest. The amount of potential reproductive habitat present in the 6th field subwatersheds (Table 3-24) also suggest that such habitat is not limiting. In terms of potential human disturbance, the effects of both projects would be localized, affecting separate and relatively small portions of the analysis area. Based on these factors, cumulative impacts are projected to be minor.

12. Dutchman Cinder Pit Expansion

The Dutchman Cinder Pit expansion will increase the existing pit from 13 to 17.5 acres over the next 5 – 10 years and will include vegetation clearing and excavation. The expansion will result in a permanent conversion of forested habitat to a developed land cover, impact dead wood habitat, and increase the human activity in noise. Since the pit expansion will be contiguous to the existing pit, it is unlikely to affect special status wildlife species, which generally avoid areas of high human activity.

Both the Proposed Action and Alternative A would convert forested habitat to a developed land cover type, affect dead wood habitat, and alter the timing and location of construction noise and human activity (section 3.4.5.3.2), resulting in cumulative effects. Species dependent on dead wood as potential reproductive habitat (e.g., three-toed and pileated woodpeckers and American marten) would be affected by the either the Proposed Action or Alternative A but, as shown in Table 3-28, the Proposed Action and Alternative A would contribute a very small impact relative to the amount of reproductive habitat on the Forest. The amount of potential reproductive habitat present in the 6th field subwatersheds (Table 3-24) also suggest that such habitat is not limiting. In terms of potential human disturbance, the effects of both projects would be localized, affecting separate and relatively small portions of the analysis area. Based on these factors, cumulative impacts are projected to be minor.

Conclusions

Overall, the most important cumulative effects on wildlife habitat and special status species are likely associated with the relatively high levels of human disturbance in the analysis area. Dispersed recreation, particularly on established and informal trails, summer and winter, may have the most impact on reclusive species that might otherwise utilize habitats in the analysis area. The Proposed Action would contribute to the effects of nearly all the cumulative actions discussed above in this regard, but its contribution would be localized rather than dispersed, occurring adjacent to areas of intensive recreational development and use within the established SUP (section 3.4.5.3.2).

Other notable cumulative effects include reduction in dead wood habitat at project sites throughout the analysis area. However, this cumulative effect is mitigated by the presence of dead wood, potential reproductive habitat on both the Forest scale and subwatershed scale (Tables 3-24 and 3-28). Some cumulative reduction in connecting habitats is also projected but again human activity, as opposed to physical disturbance, is the biggest impediment to wildlife movement. Physical habitat impacts of the Proposed Action and cumulative actions are generally small scale, dispersed, and localized.

The No-Action Alternative would have no measurable direct or indirect effects on wildlife habitat or special status species other than an incremental impact on dead wood habitat due to routine hazard tree removal (section 3.4.5.3.1). As noted, due to insect disease and mortality in the analysis area, this habitat is not limiting. Therefore, the cumulative effect would be minor.

The cumulative effects of Alternative A would be similar to those outlined above for the Proposed Action with minor exceptions. Elimination of the lower catchline would reduce the disturbance of connecting habitat in the analysis area. This alternative would also result in less skiing below the existing catchline, avoiding this potential increase in the overall level of human disturbance in the analysis area (section 3.4.5.3.3).

3.4.5.5 Forest Plan Compliance

As mentioned above (section 1.6), Mt. Bachelor is administratively withdrawn from the NWFP, and only the standards and guidelines addressing Survey and Manage species are applicable to this analysis of effects on wildlife.

- Survey and Manage species standards and guidelines (from 2001 Survey and Manage ROD, pp. 7 – 14; direction is too extensive to reiterate here.)

  Discussion: This assessment indicates that the Proposed Action and Alternative A would be fully compliant with all NWFP direction regarding Survey and Manage species (section 3.4.5.3.2): there are no known sites for Survey and Manage species either within the project area or in a 0.25-mile buffer around the project area. The Proposed Action would have no impact on Crater Lake tightcoil or great gray owl, the Survey and Manage species potentially occurring in closest proximity to the project area

Beyond that, the Proposed Action and Alternative A have been assessed for compliance with pertinent wildlife standards and guidelines in the Forest LRMP as follows:

- WL-1. Management areas have been established for [bald eagle and northern spotted owl]. Should one of these species be encountered outside of the Management Area, the following process will apply.

  1. A Biological Evaluation will be conducted or reviewed by a journey-level wildlife biologist to determine if a species use of the area is incidental or essential.

  2. If it is determined to be essential habitat, protect it from adverse modification through curtailment of conflicting activities, seasonal restriction of activities, or avoidance of the area. Request a formal consultation with the Endangered Species Branch of the USDI Fish and Wildlife Service on any proposed action which may affect the species.

  3. For newly discovered essential habitat, conduct an environmental analysis under the NEPA process to determine if it is necessary to designate the area as essential habitat. If so, the Forest Plan will be amended and the essential habitat designation will supersede previous land allocations, or can be substituted for other habitat allocated to Threatened or Sensitive species.

  Discussion: A biological assessment was prepared as part of this NEPA review, as noted in section 3.4.5.3.2. It addresses the northern spotted owl occurrences documented during the protocol surveys conducted for this analysis. It provides more detailed analysis supporting a conclusion that the Proposed Action may affect but is unlikely to adversely affect the northern spotted owl. Informal consultation was completed between the DNF and the FWS on April 13, 2012. Section 2.2.6 notes two measures regarding seasonal restrictions on activity around the new activity center and calling for spot check surveys in 2013 and 2014. These measures will be made a condition of approval in the DNF decision based on this EIS.

- WL-37. In coniferous forest, sufficient snags will be maintained to provide 40 percent of population levels of cavity nesting species within even-aged harvest units of the General Forest, visual areas (retention, partial retention, and middle ground), and Deer Management Area allocations. In uneven-aged harvest units, within the management areas noted above, live replacement trees will be left during any harvest to assure 60 percent of cavity nesting potential through the rotation, except where natural deficits occur in diameter classes. In both even and uneven-aged management, groupings of green replacements will be the preferred implementation

technique. Compliance will be based on the harvest unit area rather than an individual acre evaluation. In all other management areas, at least 60 percent of cavity nesting species potential population needs will be provided.

Discussion: Since Mt. Bachelor is not in the specified management areas, only the last sentence is applicable. Sufficient cavity nesting material will be maintained. As mentioned in section 3.4.5.2.1, forest stands in the SUP area have been affected by insects and disease, resulting in a high density of snags and some down wood. Except for hazard trees, snags would generally not be removed in the areas of prescribed selective tree removal or glading. Although snags located within project footprints involving clearing, grading, or excavating would be removed, the 60 percent of cavity nesting species potential population would be provided by retaining snags adjacent to the project area.

- WL-38. Specific guidance will be provided by the Deschutes National Forest Wildlife Tree Implementation Plan.

  Discussion: As indicated in section 3.4.5.3.2, removal of dead wood habitat would be completed according to the DNF Wildlife Tree Implementation Plan.

- WL-40. Reported [Wolverine] sightings will be evaluated for authenticity. In cooperation with Oregon Department of Fish and Wildlife and the Endangered Species Branch of the [FWS], verification of the presence of the species will be pursued.

  Discussion: As indicated in section 3.4.5.2.2, there have been no recent documented wolverine sightings on the DNF. In accordance with this direction, any wolverine sightings reported in the future will be evaluated for authenticity, and verification of the presence of the species will be pursued in cooperation with the above agencies.

- WL-41. In areas of suspected [Wolverine] occupancy, the following process will apply.

  A Biological Evaluation will be conducted or reviewed by a journey-level wildlife biologist to determine if species use of the area is incidental or essential.

  If it is determined to be essential habitat, protect it from adverse modification through curtailment of conflicting activities, modification of activities, seasonal restriction of activities, or avoidance of the area.

  For newly discovered essential habitat, conduct environmental analysis under the NEPA process to determine if it is necessary to designate the area as essential habitat. If so, the Forest Plan will be amended and the essential habitat designation will supersede previous land allocations or can be substituted for other habitat allocated to Threatened or Sensitive species.

  Discussion: See discussion under WL-1 and WL-40 above. If wolverine occupancy is suspected in the future, this direction will be implemented.

- WL-62. [Pine Marten] habitat will be available in management areas emphasizing Old Growth (MA 15), Wilderness (MA 6), Undeveloped Recreation (MA 12), Research Natural Areas (MA 2), Spotted Owls (MA 4), Bend Municipal Watershed (MA 10), and the Oregon Cascade Recreation Area (MA 14), Metolius Special Interest (MA 23), Research Natural Areas (MA 24), Metolius Spotted Owl (MA 25), Metolius Old Growth (MA 27), and Metolius Wild & Scenic Rivers (MA 28). Some Special Interest Areas (MA 1), Bald Eagle (MA 3), Osprey (MA 5), Winter Recreation (MA 13), Wild & Scenic Rivers (MA 17), Metolius Wildlife-Primitive (MA

20), and big game cover areas located within management areas not mentioned above may also provide suitable habitat.

Discussion: The project area is located in an Intensive Recreation Management Area (MA 11) where this direction does not apply.

- WL-63. In preferred forest types [extensive stands of relatively dense lodgepole pine, mixed conifer, or mountain hemlock forest containing abundant dead woody material as habitat for rodent prey], concentrations of down woody material (logging slash, cull logs, fallen trees, etc.) will be left at an average rate of approximately one per acre after any timber harvest. Concentrations incorporating high tree stumps, logs, or snags are especially desirable. This structure will simulate naturally-occurring leaning trees, large fallen logs, and other debris protruding above winter snow in an uncut forest. Such structure provides resting-site locations, an entry-point for foraging below crusted snow, and habitat for rodent prey as the stand returns to suitability for marten occupancy.

  Discussion: The timber harvest associated with the Proposed Action and Alternative A would follow this standard in conjunction with the objectives specific to this Management Area (M11-31; e.g., safety, scenic integrity, and fuel management). See sections 2.2.6 and 3.4.

- WL-72. Fallen trees and other woody debris will be retained in sufficient quantity, distribution, and physical characteristics to provide habitat for viable populations of dependent wildlife species over time.

  An average of at least 3 cull logs-per-acre, plus 3 additional logs-per-acre in more advanced stages of decomposition, will be retained after timber management activities. Minimum qualifying sizes are 10 inches in diameter at the small end and 15 feet long, but larger sizes should be selected if present. Charring of logs should be minimized.

  Discussion: See preceding discussion under WL-63.

- WL-73. Where logs of the recommended size and density are not available, an average of 1 slash pile (approximately 100 square feet) or concentration (approximately 200 square feet) per acre will be retained to supplement qualifying logs.

  Discussion: See preceding discussion under WL-63.

- Wl-75. Habitat for species associated with springs, seeps, cliffs, and talus slopes will be protected during project development.

  Discussion: These habitat types have not been identified in the project area (section 3.4.5.2.1), and are thus protected. The potential for springs and seeps is extremely limited due to the porosity of soils. The cliffs that occur on Mt. Bachelor lie above the project area, and talus slopes are not characteristic of Mt. Bachelor's geology. As a result, this direction does not apply.

3.5 HUMAN ENVIRONMENT

3.5.1 UNDEVELOPED LAND

3.5.1.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this Undeveloped Land analysis:

Issue 1: Development of the Eastside pod and lower catchline may directly affect the extent of Potential Wilderness Area (PWA), as it may occur in an unroaded and unlogged area contiguous with an Inventoried Roadless Area (IRA).

Indicators: Assessment of the number and acreage of inventoried PWA polygons within and surrounding the Mt. Bachelor SUP area under existing conditions and under the Proposed Action and alternatives. Assessment of any changes in development or activity within inventoried polygons, and a description of how such changes would affect the PWA inventory.

Analysis Area: Direct and indirect impacts are addressed at the scale of the Mt. Bachelor SUP area plus a 1-mile buffer. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

Issue 2: Noise associated with construction and subsequent operation of proposed facilities may indirectly affect the experience of recreationists in adjacent Wilderness, IRAs, and other unroaded and undeveloped lands that would not be directly affected by changes in development or use. Noise impacts on inventoried PWA are addressed under the first issue.

Indicators: Noise levels associated with construction and operation within the 1-mile buffer around the SUP boundary.

Analysis Area: Direct and indirect impacts are addressed at the scale of the Mt. Bachelor SUP area plus a 1-mile buffer. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

Note that potential impacts on air quality in the Class 1 airshed associated with the nearby Wilderness are addressed in section 3.4.1. Noise impacts on wildlife in areas adjacent to the ski area are discussed in section 3.4.5. That discussion quantifies noise levels associated with various facilities and activities at the ski area, during construction and routine operations (section 3.4.5.2.10). That section should be referenced as necessary for more details to augment the discussion of noise impacts on recreation in this section.

Table 3-29 provides a brief summary of the land categories considered in this analysis and their definitions.

Table 3-29. Land categories considered in the Undeveloped Lands analysis.

Land Designation	Regulation or Policy Reference	Definition
Potential Wilderness Area (PWA)	36 CFR 219.17 FSH 1909.12 Chapter 71	Areas are identified as PWA following inventory and evaluation procedures in the Forest Service Handbook. PWA is not a land designation, and no particular management direction or protection is implied. Typically PWA overlaps or is contiguous with IRAs.
Wilderness	Wilderness Act of 1964 and other wilderness acts Forest LRMP, p. G-16	A Wilderness is designated by congressional action. Wilderness is undeveloped federal land retaining primeval character and influence without permanent improvements or human habitation. Wilderness legislation as well as Forest Service policy and regulation provide direction for Wilderness management and protection.
Inventoried Roadless Area (IRA)	2001 Roadless Area Conservation Rule Roadless Area Conservation Final Environmental Impact Statement, Volume 2, November 2000 1982 Planning Rule (36 CFR 219.17)	These areas were set aside through administrative rulemaking and have provisions, within the context of multiple use management, for their management and protection.
Other unroaded and undeveloped lands	None	These lands have no apparent history of harvest activity, do not contain Forest Roads[1], and are not designated as Wilderness or inventoried as PWA.

[1]Forest Road – A road wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. Road – A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR § 212.1).

3.5.1.2 Affected Environment

Most of the analysis area, defined above as the Mt. Bachelor SUP area and a 1-mile buffer around it, has not been subject to timber harvest. A minor exception is the easternmost part of the 1-mile buffer area. Road building, aside from Hwys. 45 and 46, and tree removal have generally been associated with development of the ski area, though a network of recreational roads has been established east of the SUP area. The area adjoining the developed ski area remains in a generally natural state, maintaining the resources or features that are often present in and characterize roadless areas, including the following (36 CFR 294.21):

1. High quality or undisturbed soil, water, and air.
2. Sources of public drinking water.
3. Diversity of plant and animal communities.
4. Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land.

5. Primitive, semi-primitive, non-motorized and semi-primitive motorized classes of dispersed recreation.
6. Reference landscapes.
7. Natural-appearing landscapes with high scenic quality, natural integrity, and apparent naturalness, solitude and remoteness.
8. Traditional cultural properties and sacred sites.
9. Other locally identified unique characteristics or special features.

3.5.1.2.1 Potential Wilderness Inventory

In brief, the methodology employed for this analysis entailed completing a current PWA inventory in accordance with established agency procedures (FSH 1902.12, Chapter 71), which identified polygons that met inventory criteria as well as other unroaded and undeveloped lands that do not meet these criteria. This process was then repeated on the basis of the Proposed Action and Alternative B scenarios. The No-Action Alternative scenario matches current conditions and therefore does not require separate analysis. The following sections describe this methodology and results in more detail.

PWA Management Direction

The PWA inventory criteria reflect the statutory definition of Wilderness (FSH 1909.12, sec. 7) but apply to areas that have not been designated as such. If a land polygon meets inventory criteria, it may then be evaluated for designation as PWA. To be included in the inventory, a polygon must meet either 1 and 3 or 2 and 3 of the following criteria (FSH 1902.12, sec. 71.1):

1. Areas contain 5,000 acres or more.
2. Areas contain less than 5,000 acres, but can meet one or more of the following criteria:
    a. Areas can be preserved due to physical terrain and natural conditions.
    b. Areas are self-contained ecosystems, such as an island, that can be effectively managed as a separate unit of the National Wilderness Preservation System.
    c. Areas are contiguous to existing Wilderness, primitive areas, Administration-endorsed Wilderness, or potential Wilderness in other Federal ownership, regardless of their size.
3. Areas do not contain Forest Roads … or other permanently authorized roads…

Typically, PWAs substantially overlap, and/or are contiguous with IRAs. PWAs may also be contiguous with designated Wilderness. Some newly inventoried PWAs may be stand-alone areas that were not identified as roadless areas in Appendix C of the Forest LRMP or as IRAs in a set of maps in the 2001 Roadless Area Conservation Rule (RACR). PWAs overlap IRAs only where the lands in question meet inventory criteria (FSH 1909.12, Chapter 71), and inventoried areas may extend beyond IRA and Wilderness boundaries consistent with inventory criteria.

The identification of PWA is not a land designation decision and does not imply or impart any particular level of management direction or protection. Inventory of PWA is not an evaluation of potential Wilderness (FSH 1909.12, sec. 72), and inventory as PWA is not a preliminary administrative recommendation for Wilderness designation (FSH 1909.12, sec. 73). A PWA inventory does not change the administrative boundary of any IRAs, any congressionally established Wilderness, or any LRMP management area designation.

PWA Inventory

The inventory process incorporated GIS analyses and local knowledge regarding unique, site-specific conditions in each area being considered. The inventory area included the Mt. Bachelor SUP boundary plus a 1-mile buffer. This buffer allowed consideration of contiguous undeveloped lands adjacent to the boundary where timber harvest and road construction are not evident. The analysis steps were as follows:

Step 1 - Remove non-federal lands.

Step 2 - Remove areas with stump producing activities.

Step 3 - Remove areas adjacent to roads[1] with evidence of stumps.

Step 4 - PWA Inventory - Stage 1.

Step 5 - Perform manual edits to identify final PWA inventory.

Appendix C includes figures showing the results of this five-step inventory process for the current condition/No-Action Alternative, Proposed Action, and Alternative A. Key conclusions are discussed below.

Figure 3-3 illustrates the results of the PWA inventory for the analysis area, and Table 3-30 summarizes those results. Note that all polygons identified through this inventory method meet the third criterion listed above as they include no Forest Roads or other permanently authorized roads. As a result, conformance with criteria 1 or 2 a – c is the issue addressed in this analysis (see PWA Management Direction above). Also note that the numbering of polygons in Figure 3-3 and the following figures is not continuous due to the nature of the GIS-based analysis.

Based on this analysis, there are a total of 17 polygons lying all or in part within the inventory area. Of these 17, four were removed from the inventory because they are separated from larger inventoried polygons by existing roads or trails (see Polygons 1, 2, 19 and 20)[2]. Eight of the remaining polygons were removed from the inventory as a result of ski area development (see Polygons 3 – 8, 12 and 22). The remaining five polygons meet inventory criteria (see Polygons 10, 11, 13, 14, and 21). The total size of these five polygons is 13,296.5 acres as shown in Table 3-31. These 5 polygons comprise the inventoried area that has the potential to be affected by development under the Proposed Action or Alternative A.

Polygon 2 is located within the Bend Watershed IRA but is separated from the contiguous portion of the IRA by a Nordic Trail (see section 3.5.1.2.2). Polygon 2 is therefore analyzed as a part of the IRA. Polygons 19 and 20 are unroaded and undeveloped areas that are not included in Wilderness or IRA and

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[1] In the case of Mt. Bachelor's SUP area, the existing Rescue Road, catchline and Nordic trails were buffered 300 feet and treated as roads (see Figure 3-3). The Rescue Road, which is actually not a road but a snowcat track that is only passable by tracked vehicles over the snow, separates PWA Polygons 11 and 21. The existing catchline separates PWA Polygons 10 and 11. A Nordic trail separates Polygon 2 from other PWA altogether. Polygon 2 is located in the Bend Watershed IRA and is analyzed as IRA.

[2] Note that Polygons 19 and 20 are part of a larger, contiguous undeveloped parcel to the west of the analysis area. Considered as a whole, these polygons and the contiguous undeveloped land would meet inventory criteria. However, this analysis focuses on the polygons within 1 mile of the SUP boundary, resulting in the elimination of Polygons 19 and 20 from the analysis. These two areas are considered "other unroaded and undeveloped lands" for purposes of this analysis.

have the potential to be affected by ski area development (see section 3.5.1.2.2). They are described below under Other Unroaded and Undeveloped Lands.

Table 3-30. PWA inventory analysis for the existing condition and No-Action Alternative.

Polygon	PWA?	Comment	Criteria from FSH 1902.12, sec. 71.1				Area[a] (acres)
			1	2a	2b	2c	
1	N	Removed - Separated by road.	N	N	N	N	10.7
2	N	Removed - Separated by Nordic trail.	N	N	N	N	43.7
3	N	Removed – Mt. Bachelor trails.	N	N	N	N	344.0
4	N	Removed – Mt. Bachelor trails.	N	N	N	N	8.0
5	N	Removed – Mt. Bachelor trails.	N	N	N	N	4.4
6	N	Removed – Mt. Bachelor trails.	N	N	N	N	5.2
7	N	Removed – Mt. Bachelor trails.	N	N	N	N	36.9
8	N	Removed – Mt. Bachelor trails.	N	N	N	N	25.9
10	**Y**	Physical terrain and natural conditions.	N	**Y**	N	N	1,026.3
11	**Y**	Physical terrain and natural conditions.	N	**Y**	N	N	1,442.2
12	N	Removed - Separated by road.	N	N	N	N	4.0
13	**Y**	Over 5,000 acres (portion of IRA).	**Y**	-	-	-	1,936.9
14	**Y**	Adjacent to Wilderness.	N	N	N	**Y**	508.5
19	N	Removed - Separated by road.	N	-	-	-	12.2
20	N	Removed - Separated by road.	N	-	-	-	1.2
21	**Y**	Over 5,000 acres (portion of IRA).	**Y**	-	-	-	8,382.6
22	N	Removed – Mt. Bachelor trails.	N	N	N	N	2,297.5

[a]Acreage reflects portion of polygon within the inventory area; total polygon may be larger.

Table 3-31. PWA polygons under the existing condition and No-Action Alternative.

PWA Polygon	Area Within the Analysis Area (acres)	PWA Within the Analysis Area plus Adjacent IRA and Wilderness (acres)
10	1,026.3	1,026.3
11	1,442.2	1,442.2
13	1,936.9	14,738.0
14	508.5	96,531.1
21	8,382.6	27,419.1
Total	**13,296.5**	**141,188.7**

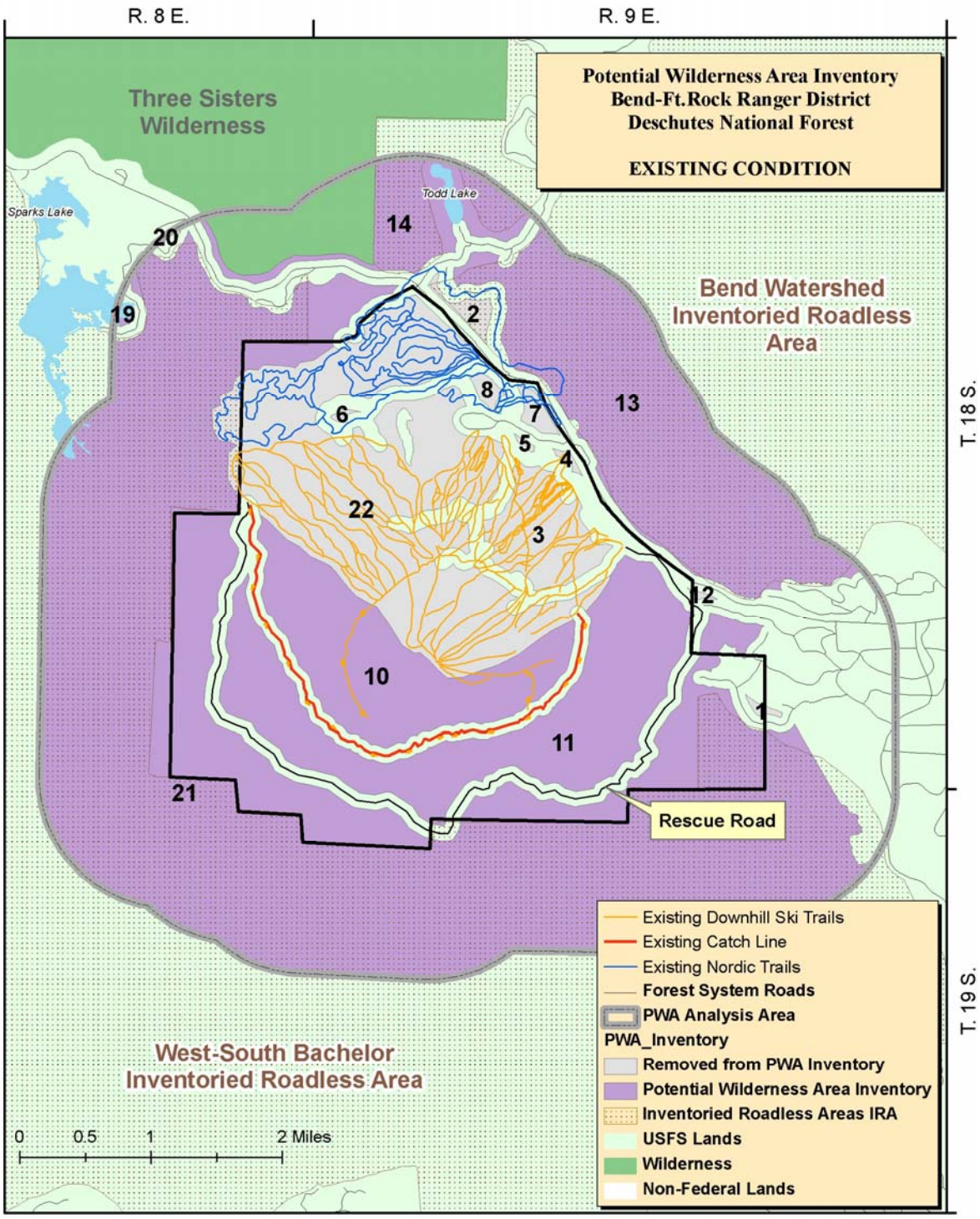

Figure 3-3. Inventories polygons, current condition and No-Action Alternative.

3.5.1.2.2 Wilderness, Inventoried Roadless Area, and Other Unroaded and Undeveloped Land

Wilderness

A Wilderness is designated by congressional action under the Wilderness Act of 1964 and other wilderness acts. Wilderness is undeveloped federal land retaining primeval character and influence without permanent improvements or human habitation (Forest LRMP, p. G-16). The Three Sisters Wilderness was designated by Congress through the Oregon Wilderness Act of 1964 (Public Law 88-577) and expanded through the Oregon Wilderness Act of 1984 (Public law 98-328) to a total of 281,190 acres, with 95,600 acres located on the DNF and the remainder on the Willamette National Forest. The Three Sisters Wilderness is located north of the Mt. Bachelor SUP area between the Bend Watershed IRA and the West-South Bachelor IRA. Its southernmost boundary extends into the 1-mile buffer around the ski area SUP that is part of this analysis area (see Figure 3-3). At its nearest point, it is roughly 1 mile from the project area (i.e., the disturbance footprint of proposed projects). The portion of the Wilderness within the 1-mile buffer has the potential to be affected indirectly by ski area construction and operational noise

Inventoried Roadless Area

IRAs are areas identified in the 2001 RACR and in a set of inventoried roadless area maps contained in *Forest Service Roadless Area Conservation Final Environmental Impact Statement*, Volume 2, dated November 2000, which are held at the Forest Service national headquarters, or any subsequent update or revision of those maps (36 CFR 294.11). These areas were set aside through administrative rulemaking and have provisions, within the context of multiple-use management, for the protection of IRAs. Most IRA boundaries are substantially identical to those identified as Roadless Areas in the 1982 planning rule (36 CFR 219.17) and identified in the Forest LRMP, Appendix C; however, some localized, minor differences in boundaries may exist.[3]

As shown in Figure 3-3, the Bend Watershed IRA is located northeast of the Mt. Bachelor SUP area and east of the Three Sisters Wilderness. The West-South Bachelor IRA is located west and south of the Mt. Bachelor SUP area and south of the Three Sisters Wilderness. The boundaries of both lie at least 1 mile from the project area at their nearest points. Portions of these IRAs within the 1-mile buffer have the potential to be affected indirectly by ski area construction and operational noise.

Five of the polygons identified in Table 3-29 and Figure 3-3 are included in IRAs. Within the Bend Watershed IRA, Polygons 2 and 12 are excluded from the PWA inventory due to existing ski area development. Polygon 13 is included in the inventory specifically because it is over 5,000 acres and contiguous with the IRA, while Polygon 14 is included in the inventory because it is adjacent to the Three Sisters Wilderness. Within the West-South Bachelor IRA, Polygon 21 is included in the inventory due to its size and contiguity with the IRA.

The conservation group Oregon Wild, formerly the Oregon Natural Resources Council, submitted a roadless inventory they prepared independently to the Forest Service. It identified an area near Mt. Bachelor as the Tumalo Butte Roadless Area. This area generally overlaps with the Bend Watershed IRA. For purposes of this analysis, Polygon 13 and the Bend Watershed IRA represent the same area as Oregon Wild's Tumalo Butte Roadless Area. Therefore, the effects analysis presented below for the Bend Watershed IRA also addresses the Tumalo Butte Roadless Area.

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[3] For instance, at the very southern portion of the SUP area, the existing Rescue Road, which is not actually a road but a snowcat track that is only passable by tracked vehicles over the snow, is depicted as entering the West-South Bachelor IRA. It is the intention of the IRA mapping that the IRA boundary coincide with the SUP boundary. This is common among ski area SUP boundaries that are near IRAs and is a result of SUP area mapping at a relatively small scale and IRA mapping at a large scale.

Other Unroaded and Undeveloped Lands

Other unroaded and undeveloped lands were identified as an outcome of the PWA inventory process (see Table 3-29 and Figure 3-3). These polygons did not meet PWA inventory criteria and they are not included in IRAs or Wilderness. For purposes of this analysis, Polygons 19 and 20 were identified as other unroaded and undeveloped lands. They demonstrate the resources and features characteristic of unroaded areas, described above (section 3.5.1.2) and have the potential to be affected indirectly by ski area construction and operational noise. Both are at least 1 mile from the project area at their nearest point.

3.5.1.3 Direct and Indirect Effects

3.5.1.3.1 No-Action Alternative

Potential Wilderness Area

As noted above, the No-Action Alternative would not result in any changes from the existing condition described above (section 3.5.1.2.1). Beyond that, PWA Polygons 10 and 11 represent over 2,400 acres within the Mt. Bachelor SUP area that meet PWA Criterion 2a – lands under 5,000 acres in size that can be preserved due to physical terrain and natural conditions. These two polygons are separated by the existing catchline such that Polygon 10 realizes substantial use during the winter as skiers descend from the top of Mt. Bachelor to the catchline. This use could vary due to climatic and economic conditions under the No-Action Alternative. The continued skier use associated with Polygon 10 would not preclude its classification as PWA. Polygon 11, located between the catchline and the Rescue Road, experiences very little skiing pressure as no ski trail is available for a gliding return to the lifts and other facilities. During the non-skiing season, PWA Polygons 10 and 11 would continue to support undeveloped characteristics similar to those in IRAs or other unroaded and undeveloped areas.

PWA Polygons 13 and 14 are located outside of the Mt. Bachelor SUP area and would therefore not be directly affected by ski area operations and maintenance. PWA Polygon 21 is located partially within the SUP area, but below the existing Rescue Road. As a result, PWA Polygon 21 would continue to see little activity associated with the ski area and would therefore retain the characteristics similar to IRA or unroaded areas. Some noise generated by routine ski area operations (e.g., lift operation, grooming, skier activity, and snow removal along Hwy. 46) would remain audible in these polygons, but it would be attenuated by distance. There would be no change to the PWA inventory under the No-Action Alternative.

Overall, the existing unroaded resources and features would be unaffected, and the acreage of PWA in the analysis area would remain as described in Table 3-31.

Wilderness, Inventoried Roadless Area, and Other Unroaded and Undeveloped Land

Wilderness

Under the No-Action Alternative, no additional facilities would be developed at Mt. Bachelor. The current sounds of year-round operations and maintenance would continue to be perceptible from the southern-most limits of the Three Sisters Wilderness, along Hwy. 46. Hwy. 46 would continue to provide a consistent source of noise to those in the Wilderness within range of the road itself during the summer. During the winter, closure of the highway at Mt. Bachelor would continue to prevent highway-related noise from reaching the Wilderness.

Inventoried Roadless Area

Under the No-Action alternative, the current operation and maintenance activity at Mt. Bachelor would continue. During the winter operation, the sounds of routine operations and maintenance would be perceptible from both the Bend Watershed and West-South Bachelor IRAs. During the summer, the

limited ski area activities would be perceptible within the Bend Watershed IRA, particularly along the Hwy. 46 corridor. The highway itself would be the most consistent and noticeable source of noise in this IRA. The operations and maintenance at Mt. Bachelor, as well as traffic on Hwy. 46 would be barely perceptible from the West-South Bachelor IRA because the undeveloped portion of Mt. Bachelor faces south and west into the IRA (see Figure 3-3) and, aside from trail mowing in the Outback and Northwest Territory pods, no maintenance or operations would be notice able in the northwest portion of the IRA.

Other Unroaded and Undeveloped Land

Effects on the unroaded Polygons 19 and 20 under the No-Action Alternative would be negligible, similar to those described above for the northwest portion of the West-South Bachelor IRA.

3.5.1.3.2 Proposed Action

Potential Wilderness Area

Figure 3-4 illustrates the change in inventoried PWA polygons under the Proposed Action, and Table 3-32 summarizes the change in acreage as compared to the existing condition.

Under the Proposed Action, acreage would be removed from the PWA inventory due to the development of the Eastside pod (see Polygons 10b and 11b in Figure 3-4). Development of the proposed catchline would also remove acreage from the inventory (see Polygon 11e in Figure 3-4). In total, the Proposed Action would result in 447.5 acres no longer meeting inventory criteria for potential wilderness due to ski area development, as compared to the No-Action Alternative (see Table 3-32). The affected acreage would lie completely within the ski area SUP boundary and are primarily within the mountain hemlock and natural non-forested land cover types. Developing the catchline and creating gladed ski areas will remove trees, leaving stumps. The acreage of PWA Polygons 13, 14, and 21 (PWA within IRAs) would remain as described for the existing condition.

Table 3-32. Effects on PWA polygons under the Proposed Action.

PWA Polygon	Current Area (acres)	Proposed Action Area (acres)	Change (acres)	Comment
10	1,026.3	967.4	-58.9	10b would be eliminated from inventoried PWA.
11	1,442.2	1,053.6	-388.6	11b and 11e would be eliminated from inventoried PWA.
13	1,936.9	1,936.9	0.0	13 would continue to meet inventory criteria.
14	508.5	508.5	0.0	14 would continue to meet inventory criteria.
21	8,382.6	8,382.6	0.0	21 would continue to meet inventory criteria.
Total	**13,296.5**	**12,849.0**	**-447.5**	-

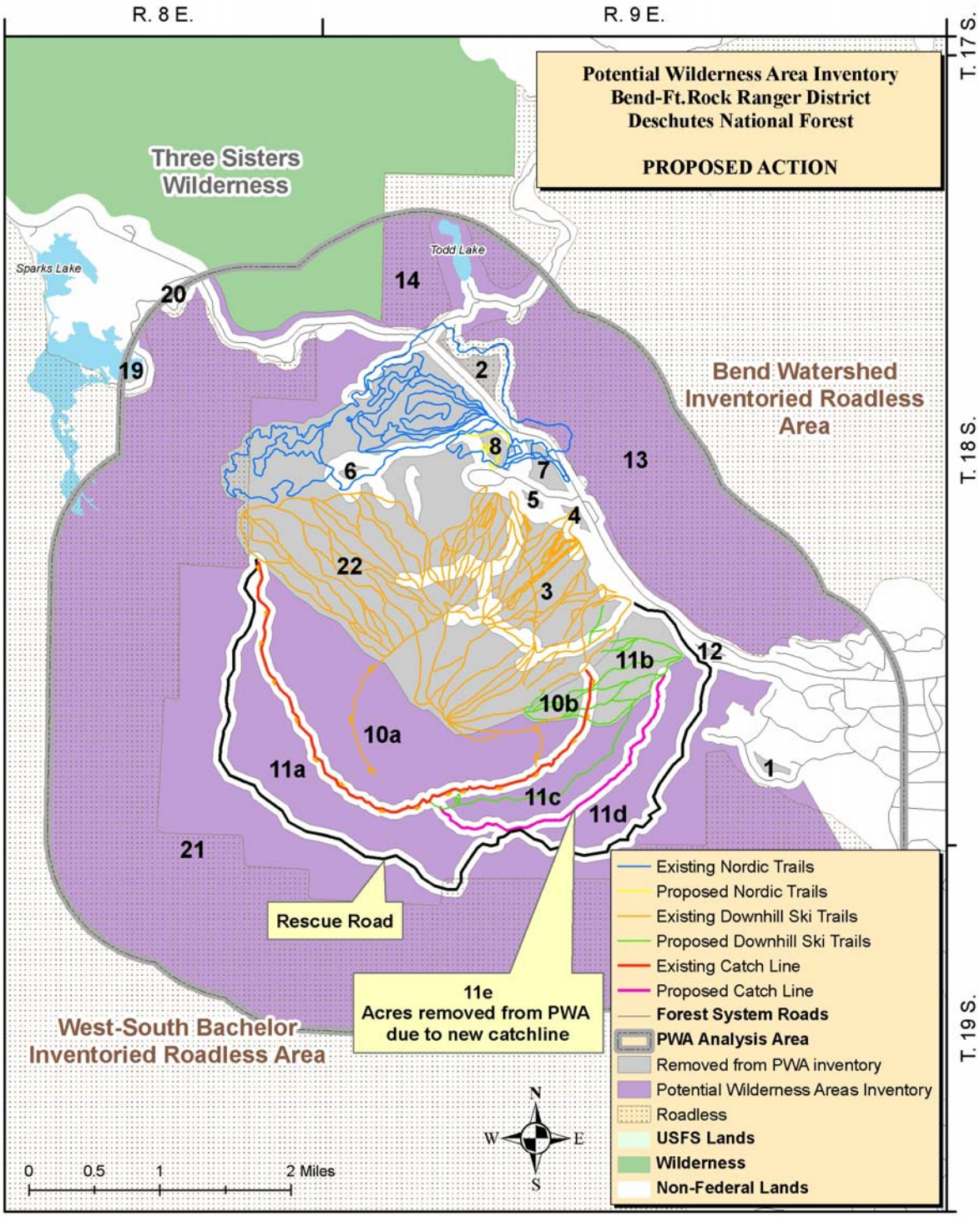

Figure 3-4. Effects on PWA polygons under the Proposed Action.

In addition to the loss of acreage in the PWA inventory, the Proposed Action would cause increased fragmentation in the remaining PWA inventory acreage. The undeveloped portion of PWA Polygon 10 (see Polygon 10a in Figure 3-4) would remain intact. However, the remaining portions of PWA Polygon 11would be divided into three smaller polygons by the proposed catchline (see Polygons 11a, 11c and 11d in Figure 3-4). These smaller polygons would still meet inventory criterion 2a for PWA; however, the area would see an increase in skier use compared to the existing condition. Most notably, PWA Polygon 11c would undergo selective tree removal to improve tree skiing conditions. This treatment would remove scattered trees less than 8 inches in diameter, resulting in improved ski terrain while maintaining the characteristics that include it in the PWA inventory.

During the non-skiing season, the remaining portions of current PWA inventory Polygons 10 and 11 would continue to exhibit many of the undeveloped characteristics described for the existing condition, despite the increased fragmentation from the construction of the catchline.

The remaining PWA polygons in the analysis area are located outside of the Mt. Bachelor SUP area and would therefore not be directly affected by ski area operations and maintenance. No activity would affect fragmentation in PWA Polygons 13 and 14 because they are located outside of the SUP area. The increase in summer operations would result in perceptible slight noise to those within PWA Polygons 13 and 14. Any increase in traffic associated with the summer operation would be noticeable from Polygon 13, but these additional vehicles would exit Hwy. 46 at the West Village, prior to reaching Polygon 14. During the construction season, construction noise would be present in these polygon areas for the duration of the construction (e.g., chainsaws, heavy equipment, and potentially a helicopter for a day or two during lift installation).

PWA Polygon 21, which is located partially within the SUP area, would not be directly affected under the Proposed Action because the polygon is outside the project area. The summer operation, primarily out of the West Village base area over 2 miles away, would not be perceptible. Construction of the Eastside pod would introduce new noise from chainsaws and heavy equipment moving downed trees and contouring the ski trail surfaces, and perhaps a helicopter. This new impact would last through the construction season.

Wilderness, Inventoried Roadless Area, and Other Unroaded and Undeveloped Land

Wilderness

Under the Proposed Action, additional facilities would be developed at Mt. Bachelor increasing both the summer and winter operations. The year-round operations and maintenance would continue to be perceptible from the southern-most limits of the Three Sisters Wilderness, along Hwy. 46. The addition of a formal summer operation in the West Village would increase the level of activity and noise that may be perceptible from the Wilderness. Construction of the Eastside pod would not be perceptible from the Wilderness due to both topography and the distance to the Wilderness (at least 3 miles). As with the No-Action Alternative, Hwy. 46 would continue to provide the most consistent source of noise to those in the Wilderness within hearing range of the road itself during the summer. Any increase in traffic associated with the summer operation would culminate at the West Village entrance, approximately 1.5 miles from the Wilderness. Therefore the increase in traffic would not increase the level of noise on the highway adjacent to the Wilderness.

Inventoried Roadless Area

Within the Bend Watershed IRA (including Polygon 2), the effects of the Proposed Action would be similar to those described for PWA Polygons 13 and 14, described above. Within the West-South Bachelor IRA, the effects would be as described for PWA Polygon 21.

Other Unroaded and Undeveloped Land

Under the Proposed Action, unroaded Polygons 19 and 20 would not realize any increased use as a result of the increased summer operation, nor would the sounds of summer operations be perceptible from these areas. It is possible that construction-related noise could be heard by those in these areas (e.g., chainsaws and perhaps a helicopter) during the construction season.

3.5.1.3.3 Alternative A – No New Catchline

Potential Wilderness Area

Figure 3-5 illustrates the changes to the inventory of PWA polygons resulting from Alternative A, and Table 3-33 summarizes the change in acreage compared to the existing condition.

Under Alternative A, PWA acreage would be eliminated from the inventory due to the development of the Eastside pod (see Polygons 10b and 11b in Figure 3-5) in the same manner as the Proposed Action. Alternative A, however, would not include the development of the new catchline. In total, Alternative A would result in the loss of 279.8 acres of PWA compared to the No-Action Alternative. The affected acreage would lie completely within the ski area SUP boundary. The acreage of PWA Polygons 13, 14, and 21 (PWA and IRA) would remain as described for the existing condition.

Without development of the new catchline, Alternative A would not result in the fragmentation described for the Proposed Action. The undeveloped portion of PWA Polygon 10 (see Polygon 10a in Figure 3-5) would remain intact, similar to the Proposed Action. Unlike the Proposed Action, the remaining portion of PWA Polygon 11 would also remain in its current condition, with no additional fragmentation or selective tree removal. As described for the Proposed Action, during the non-skiing season, the remaining portions of PWA Polygons 10 and 11would continue to exhibit many of the undeveloped characteristics described above.

Table 3-33. Effects on PWA polygons under Alternative A – No New Catchline.

PWA Polygon	Current Area (acres)	Alternative A (acres)	Change (acres)	Comment
10	1,026.3	967.4	-58.9	10b is eliminated from PWA
11	1,442.2	1,221.3	-220.9	11b is eliminated from PWA
13	1,936.9	1,936.9	0	13 would continue to meet inventory criteria.
14	508.5	508.5	0	14 would continue to meet inventory criteria.
21	8,382.6	8,382.6	0	21 would continue to meet inventory criteria.
Total	**13,296.5**	**13,016.7**	**-279.8**	-

Effects on PWA Polygons 13, 14, and 21 would be as described for the Proposed Action.

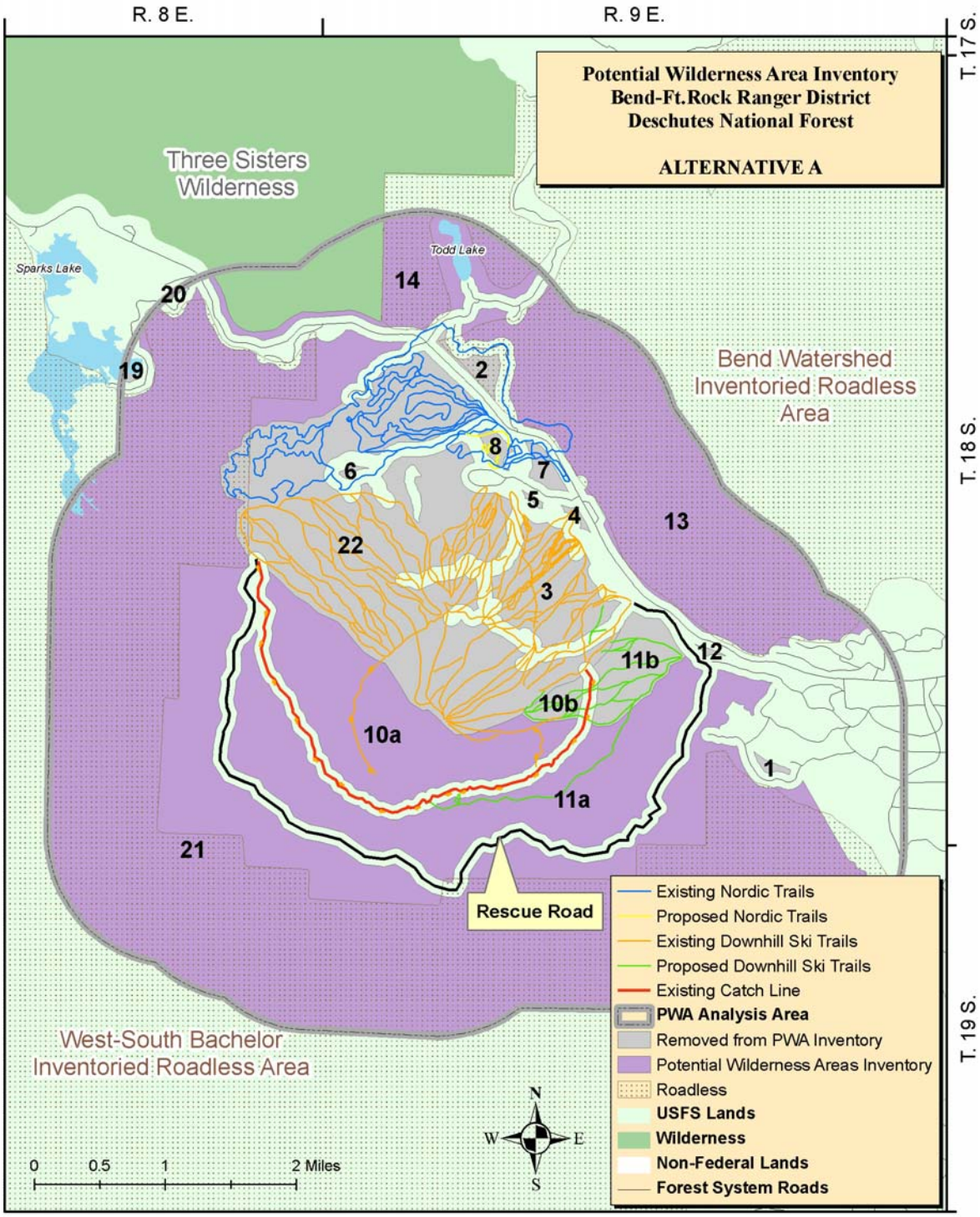

Figure 3-5. Effects on PWA polygons under Alternative A – No New Catchline.

With no new catchline, Alternative A would provide no return for skiers to the Eastside lift downslope from the existing catchline. Consequently, Alternative A would affect the acreage of PWA Polygons 10 and 11 less than the Proposed Action. However, the operation of the Eastside pod in the winter and the effect of the summer operation on these polygons would be as described for the Proposed Action.

Wilderness, Inventoried Roadless Area, and Other Unroaded and Undeveloped Land

Wilderness

Under Alternative A, the summer and winter operation of Mt. Bachelor would be very similar to that under the Proposed Action, with a change in development and skier activity in the Eastside pod. As a result, the effect on Wilderness would be as described for the Proposed Action.

Inventoried Roadless Area

Under Alternative A, the effect on IRAs would be as described for the Proposed Action, except eastern portion of the West-South Bachelor IRA (Polygon 21) would not be subject to the noise of constructing the new catchline.

Other Unroaded and Undeveloped Land

The effect on Polygons 19 and 20 under Alternative A would be as described for the Proposed Action.

3.5.1.4 Cumulative Effects

Of the cumulative actions described in Table 3-5, several lie within the PWA analysis area. However, most are in areas withdrawn from the PWA inventory due to proximity to roads or ski area developments. Cumulative actions in this category include the Sparky vegetation management project, existing summer recreation sites, existing sno-parks, county road maintenance, alternative transportation planning, and the Nordic Center hazard tree removal. These actions would not interact with the Proposed Action or Alternative A to generate cumulative effects.

Other cumulative actions are sited in parts of the PWA analysis area not withdrawn from the inventory. These include:

- Winter and summer trails that generally surround the analysis area in all quadrants except the southwest. These are consistent with unroaded resources and features listed above (3.5.1.2), specifically primitive and semi-primitive recreation, and would not generate the potential for adverse cumulative effects.

- Existing summer recreation sites that lie on trails south and southeast of the ski area. These would not generate the potential for adverse cumulative effects for the same reasons outlined above.

- Travel Management Plan, implemented Forest-wide. By prohibiting summer, motorized travel off of designated routes, this action would reduce adverse impacts on several of the unroaded resources and features in the analysis area. However, since the effects of either the Proposed Action or Alternative A would be manifested primarily in the winter, the potential cumulative effect would be negligible.

The loss of PWA acreage associated with the Proposed Action (447.5 acres) or Alternative A (279.8 acres) in the analysis area would be located inside the Mt. Bachelor SUP area and adjacent to existing ski area development. PWA Polygons 10 and 11, which would be affected by ski area development, are not contiguous to larger PWA polygons, IRAs, Unroaded Areas or Wilderness. PWA Polygons 13, 14, and 21 are adjacent to over 127,800 acres of IRA, Unroaded Area, and Wilderness outside of the analysis

area. Within the analysis area, under the Proposed Action, the loss of 447.5 acres of PWA equates to approximately 3.3 percent of the PWA in the analysis area and 0.3 percent of the area incorporating adjacent PWA, IRA, and Wildermess. Under Alternative A, the loss of 279.8 acres of PWA translates to approximately 2.1 percent of PWA in the analysis area and 0.2 percent of the area incorporating adjacent PWA, IRA, or Wilderness. Considering that the majority of PWA in the analysis area is bordered by or contiguous with tens of thousands of acres of IRA, where no loss of PWA could occur, the cumulative loss of PWA associated with either the Proposed Action of Alternative A would be substantially less than 1 percent of the PWA in the area surrounding Mt. Bachelor.

Overall, notable cumulative effects on PWA or other unroaded and undeveloped land are not anticipated.

3.5.1.5 Forest Plan Consistency

Of the land designations considered in this analysis, the NWFP and Forest LRMP provide standards and guidelines specific only to Wilderness management. Those standards and guidelines do not address noise from sources outside Wilderness boundaries. As no other direct, indirect, or cumulative impacts on Wilderness have been identified, none of these Wilderness standards and guidelines are relevant. The Proposed Action and Alternative A have been shown to meet the goals and objectives for the Intensive Recreation Management Area (see section 1.4).

3.5.2 SAFETY

3.5.2.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

Issue 1: The lift access provided by the Eastside Express lift may result in off-piste skiers going too far down the slope and becoming stranded, unable to ski back to the lift.

Indicators: Assessment of the terrain, catchline and Rescue Road alignments, and operational procedures affecting off-piste skiing to determine the likelihood of skier stranding.

Analysis Area: Direct, indirect, and cumulative impacts are addressed in the context of the area between the existing eastside catchline and the Rescue Road around the base of the slope.

Issue 2: Development of hiking and biking trails may create the potential for collisions between hikers and bikers.

Indicators: Assessment of the design, rules for use, and anticipated use patterns of the two trail systems to determine the likelihood of collisions.

Analysis Area: Direct impacts are addressed in the context of the trail systems. No indirect or cumulative effects are anticipated.

3.5.2.2 Affected Environment

3.5.2.2.1 Off-Piste Skier Safety

The existing downhill skiing terrain at Mt. Bachelor provides skiable access from each ski pod to the corresponding lift bottom terminal. Those skiers who ski off-piste are afforded numerous ways back to the chairlift, as well. For example, skiers in the Northwest Express and Outback Express pods can ski the tree islands between the trails and, in all cases, emerge on a ski trail that will guide them to the bottom terminal of the chairlift. Skiers in this area who desire to ski the western slopes of Mt. Bachelor are provided a catchline around the base of the slope, the purpose of which is to guide these off-piste skiers

back into the Northwest Express pod. The catchline is a cat-track width clearing in the trees that is signed as the last available sliding path back to the chairlift.

Summit Express skiers face a slightly different situation, in that the entire chairlift is located above the treeline and is therefore visible and accessible from the within the Summit Express pod. Skiers in this area of the mountain wishing to ski the lower, eastern slopes of Mt. Bachelor are provided a catchline at the treeline, whose purpose is to guide these off-piste skiers back into the Rainbow pod. For those skiers who wish to tree ski the attractive forest terrain below the catchline, no skiable route back to the lifts exists. These skiers may continue downhill through the trees below the catchline, where they can access the existing Rescue Road. This road, while not a skiable route to the lifts, provides a clearing on which these skiers can skate or walk back to the lifts. The road is groomed and, as its name implies, is used to rescue stranded skiers with a snowcat if they are missing after the ski area closes.

Currently, the eastern slopes of Mt. Bachelor provide these two routes to prevent skiers from becoming stranded, although the lower Rescue Road does not provide an easy, downhill glide.

3.5.2.2.2 Conflicting Summer Uses

The MDP notes that Mt. Bachelor currently provides a limited summer operation that includes hiking, interpretive talks, disc golf, sightseeing, mountaintop dining, summer dog sledding, and social events. Only one designated mountain bike trail is offered, and no formal mountain biking program takes place during the summer. The mountain bike trail is a cross-country trail located northwest of West Village, passing through the Nordic Center terrain. The ski area service roads, particularly the summer access road connecting West Village and Sunrise base area and the Rescue Road from Sunrise to its intersection with Snowmobile Trail No. 40, are currently open to mountain bike use but are infrequently used. The single formal hiking trail, the Summit Trail, is too narrow and steep for mountain bike use and is designated "hiking only." Because of the limited opportunities, conflicts between user groups such as hikers and mountain bikers has not been identified as an issue with the existing summer program at Mt. Bachelor.

3.5.2.3 Direct and Indirect Effects

3.5.2.3.1 No-Action Alternative

Under the No-Action Alternative, off-piste skier safety and conflicting summer uses would remain as described for the existing condition (sections 3.5.2.2.1 and 3.5.2.2.2).

3.5.2.3.2 Proposed Action

Off-Piste Skier Safety

Under the Proposed Action, Mt. Bachelor would install the Eastside Express pod on the eastern slopes of Mt. Bachelor, in the area currently served by the catchline described for the Summit Express above (section 3.5.2.2.1). As a result of the new lift and trails, this area of the mountain would realize substantially increased use due to the presence of formal ski terrain on the protected, eastern slopes. As described above, the existing catchline is located along the treeline, which is approximately one-third of the way down the proposed Eastside pod from the top of the lift. This catchline would not provide for Eastside pod skiers wishing to ski off-piste in the trees south of the developed pod.

The Proposed Action includes a new catchline that would be lower in elevation to provide a gliding path through the forest from the eastern slopes (south of the Eastside pod) back to the new ski pod (Figure 2-1). This catchline would be marked as the last skiable way to the Eastside Express lift. Skiers who would ski beyond the proposed catchline would eventually arrive at the Rescue Road described above (section 3.5.2.2.1).

Under the Proposed Action, skiers would be able to ski farther downslope than under existing conditions while still being afforded a skiable catchline back to the ski area. This would open nearly 400 acres of new off-piste ski terrain. Like the existing condition, those skiers going beyond the proposed catchline would reach the Rescue Road, which provides no skiable pathway back to the Eastside pod.

The Proposed Action would include three routes to prevent skiers from becoming stranded: the existing catchline, the proposed lower catchline, and the lower Rescue Road. Like the existing condition, the Rescue Road would not provide a skiable route back to the ski area.

Conflicting Summer Uses

The Proposed Action would include the development of a lift-served, downhill mountain bike park and hiking trails, generally in the Pine Marten pod (see Figure 2-1). The bike park would operate in much the same manner as downhill skiing during the winter. Bike park staff would load mountain bikes on the chairlift, and mountain bikers would ride the lift to the top. At the top, bikers would mount their bikes, choose a downhill trail, and descend to the bottom terminal.

In this regard, downhill mountain biking is different from cross-country mountain biking, described under the existing condition (section 3.5.2.2.2). Where cross-country mountain biking occurs on trails and roads that are similar to and often overlap with hiking trails, downhill mountain bike trails in the bike park would be dedicated to bike park users only – hikers or other users would not be allowed on the bike park trails, and the bike park staff would enforce this closure. Similarly, bike park users would be in the park to round-trip ride the lift and bike trails and would not be allowed on hiking trails. Therefore, in the bike park itself, there would be no conflict between bike park users and other use groups under the Proposed Action.

Correspondingly, the proposed hiking trails originating or ending at Pine Marten Lodge would be designated as "hiking only." Bike park staff would monitor this closure to ensure that conflicts did not occur on the hiking trails.

The presence of a bike park at Mt. Bachelor would spur new mountain bike-related visitation in addition to the bike park users. It is expected that cross-country mountain biking, outside of the bike park and designated hiking-only trail system, would also increase as mountain biking grew in popularity at Mt. Bachelor. With increased mountain bike use of the summer access road connecting West Village and Sunrise base area and the Rescue Road from Sunrise to its intersection with Snowmobile Trail No. 40, the potential for conflicts with other user groups would increase. If these conflicts became an issue, Mt. Bachelor would implement measures to better separate cross-country mountain bikers from other user groups, including designation of hiking and bike lanes on access roads and designation of hiker-only and mountain biker-only roads.

3.5.2.3.3 Alternative A – No New Catchline

Off-Piste Skier Safety

Under Alternative A, the proposed Eastside pod would be constructed as under the Proposed Action except that no new catchline would be constructed. Similar to the Proposed Action, Alternative A would lead to increased off-piste skiing on the eastern slopes of Mt. Bachelor due to the presence of the new lift and trails. With the existing catchline being located at the treeline, those skiers wishing to tree ski on the lower slopes south of the Eastside pod would have no skiable route back to the ski area and would ultimately reach the lower Rescue Road as a way back to the ski area, as described for the existing condition. This condition would be exacerbated compared to the existing condition due to the increased number of skiers in the area resulting from the new Eastside pod. Consequently, Alternative A would represent a greater impact on off-piste skier safety than the No-Action Alternative or the Proposed Action.

Conflicting Summer Uses

The effect on conflicts between mountain bikers and other Mt. Bachelor users under Alternative A would be as described for the Proposed Action.

3.5.2.4 Cumulative Effects

None of the projects listed in Table 3-5 would cumulatively affect skier safety on the east slopes of Mt. Bachelor or summer-use conflicts in conjunction with the Mt. Bachelor improvements described for the Proposed Action or Alternative A.

3.5.2.5 Forest Plan Compliance

The Forest LRMP includes the following pertinent standard and guideline:

- M11-12. Mt. Bachelor will continue to grow as an international destination for both alpine and Nordic skiing. Emphasis will be placed on building up the summer program to make Mt. Bachelor a year round resort. No additional regional or destination alpine areas will be built on the Forest until Mt. Bachelor has been developed to near the capacity of the Master Plan. Nordic areas and local alpine areas, however, may be added elsewhere on the Forest as the need develops.

  Discussion: Inclusion of the lift-served, downhill mountain bike park in the Proposed Action and Alternative A meets the LRMP direction to build up the summer program at Mt. Bachelor, as do the other summer recreation projects proposed.

3.5.3 Heritage Resources

3.5.3.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

Issue 1: Construction of the proposed projects may damage prehistoric or historic cultural resources.

Indicators: Survey and inventory of any cultural resources in the project area, including the built environment, that may be eligible for listing under the National Register of Historic Places (NRHP) and assessment of potential impacts on such resources.

Analysis Area: Analysis of direct impacts focuses on the area of potential effect (APE) associated with the proposal projects. No indirect or cumulative impacts are anticipated.

Issue 2: Construction, maintenance, operation, and use of the proposed projects may adversely affect Native American traditional cultural places (TCPs).

Indicators: Interpretation of the results of background research, cultural resource surveys, and input from Tribal representatives.

Analysis Area: Analysis of direct impacts focuses on the APE. No indirect or cumulative impacts are anticipated.

Detailed analysis of potential impacts on heritage resources is available in the specialist report, *Mt. Bachelor Cultural Resources Inventory Survey and Historic Built Environment Assessment* (Smith et al. 2011), which is incorporated by reference and included in the project record. Background research for this project was completed at the Oregon State Historic Preservation Office (SHPO) in Salem, Oregon, and at

the DNF, Bend-Fort Rock Ranger District, Bend, Oregon. That research determined that numerous cultural resource surveys had been previously conducted within the Special Use Permit (SUP) area.

An intensive, non-collection cultural resource survey and site assessment of those portions of the APE that had not been previously investigated was subsequently performed (Smith et al. 2011). The study was performed following the *Guidelines for Historic Resource Surveys in Oregon* (Oregon State Historic Preservation Office 2011a), *Guidelines for Conducting Field Archaeology in Oregon* (Oregon State Historic Preservation Office 2007), and updated guidance provided in *State of Oregon Archaeological Reporting Standards* (Oregon State Historic Preservation Office 2011b). The investigative approach and scope is consistent with cultural resources standards and guidelines outlined in the Forest LRMP.

Background research and survey work was completed to determine if historic or archaeological sites were present within the project vicinity and how they may be affected by the project. All cultural resources of historical age – 40 years or older for this project given the 10-year implementation period of the Proposed Action – encountered during the survey were recorded and assessed for NRHP eligibility as per the cited standards and guidelines. As a result of the background research and survey, one isolated prehistoric artifact and two historical buildings were found to be present within the APE; none are eligible for the NRHP.

As part of the public scoping process for this project, consultation letters were mailed to 19 Tribal representatives. Tribes receiving notifications were identified by the DNF as having traditional associations with or interest in the project area, including the Klamath Tribes, Burns Paiute Tribe, Confederated Tribes of the Warm Springs, and Confederated Tribes of the Umatilla Reservation. No TCPs or sacred sites were identified by the Tribes as occurring within the APE or SUP.

3.5.3.2 Affected Environment

The project area is in the northeastern corner of what was Paiute territory at historic contact; the Tenino were just to the north and the Molala to the west. Sufficient resources were apparently not available to support permanent residence, and, in all likelihood, various groups used the project vicinity. A foraging lifeway predominated along the Deschutes River through the Early and Middle Archaic periods, until around 2,000 B.P. After that time, archaeological sites are more abundant along the river, suggesting that Late Period use of the area was focused along the major streams. Seasonal movements involved use of upland settings for gathering plants and hunting animals, with small and dispersed habitation sites located in sheltered lowland settings. Relatively high elevations that are snow covered much of the year combined with limited resources suggest that the project area received limited seasonal use by Native Americans.

Historic activities in the project vicinity began in 1825 when a Hudson Bay Company expedition led by Peter Skene Ogden traveled along the Deschutes River to the Crooked River. A second Ogden team penetrated further south in 1826 – 1827, traversing the Paulina Mountains south of Bend. Settlement began in much of the Pacific Northwest during the 1840s, but central Oregon south of the Columbia River was considered a place to get through on the way to the Willamette Valley. Settlement in Deschutes County, which began in the 1860s, focused on ranching. Passage of the Homestead Act in 1862 and construction of railroads, however, accelerated the rate of settlement and development of agriculture. By the 1890s the range-oriented economy was secondary to the agricultural economy.

In 1893, the Cascade Range Forest Reserve was created from lands withdrawn from the public domain, including Bachelor Butte. The Reserve was under General Land Office (GLO) administration, which divided the Reserve into several districts. The Bachelor Butte area was within the Cascade National Forest in 1908 but in 1911 the DNF was created in the area reaching from the Deschutes drainage to the Cascades' summit. In 1958, the project area was leased from the DNF under a SUP by Mt. Bachelor, Inc. to develop a recreational ski facility. Mt. Bachelor has expanded through the years and continues to operate today. In 1983, Bachelor Butte was officially renamed Mount Bachelor.

3.5.3.2.1 Prehistoric or Historic Cultural Resources

Numerous cultural resource surveys have previously been conducted at Mt. Bachelor. Survey results indicate that the density of known cultural resources within the project area is low. Correspondingly, the probability of previously unidentified sites is low. Previously noted cultural resources at Mt. Bachelor are primarily within the Sunrise area or close to the Eastside pod and none were formally designated as archaeological or historical sites by the SHPO; all were recommended by the recording investigators as ineligible for the NRHP.

Several features and isolated artifacts were recorded during the previous surveys within the Sunrise area. Of note is a historic log enclosure identified by Baxter (1980) during a survey for the Sunrise parking area and several ski runs. The log enclosure was thought to be associated with the construction of the forest service fire lookout tower located on the summit between 1919 and 1939. Although the lookout tower has not been officially recorded as a site, a previous survey report by Churchill (1994) notes that the tower itself is no longer present although concrete anchor piers and miscellaneous hardware remain at the location. The former lookout tower is outside of the current APE. A wood box/trough and a trail thought to be associated with the fire lookout tower were also recorded during Baxter's (1980) survey and, along with the log enclosure, were recommended in that report as ineligible for the NRHP. None of these features were formally designated as an archaeological or historical site by the SHPO. The log enclosure has presumably since been destroyed as its location was graded and paved over during construction of the Sunrise parking lot. Other segments of a trail were noted by Coastal Magnetic Search and Survey (Churchill and Jenkins1992) within the Sunrise area; they were also recommended by the investigator as ineligible for the NRHP.

As discussed in the specialist's report (Smith et al. 2011), the historic alignment of the trail to the fire lookout tower could not be ascertained through archival research. Although a trail on the east side of Mt. Bachelor is indicated on 1924 and 1931 versions of DNF recreation and resource maps archived at the Oregon Historical Society (OHS) Library, the maps are at too small a scale to discern its actual alignment. The 1963 Bachelor Butte, Oregon 7.5' topographic quadrangle does not show the trail; it is the earliest version of that map on file at the Oregon State University Map Archives, the University of Oregon Map Archives, and in the historic collection of topographic quadrangles on the USGS website. Therefore, it is uncertain if the trail segments noted in the field by the previous investigators were part of the historic trail associated with the fire lookout tower. As the trail noted by the previous researchers is used as a hiking trail today, its age and original association may be modern.

A historic can scatter/dump (Field Number S-1), installation wire, and wooden flume also thought to be associated with the former fire lookout tower were identified in the Sunrise area by Century West Engineering (1981). None of these features were formally designated as an archaeological site by the SHPO and they were recommended by the consultant as ineligible for the NRHP. They are located outside the current APE. A structural foundation thought to be associated with the historic Dutchman Flat cabin (Field Number FS61100081) or with construction of the fire lookout was recorded by Scott (1988) on the west side of Hwy. 46, near the entrance to the ski area and outside of the current APE. It was not formally recorded as an archaeological site by the SHPO and it was recommended by Scott (1988) to be ineligible for the NRHP. An isolated prehistoric biface found at Dutchman Flat was also recorded during the same study, but no record of the precise discovery location was with the report at the site file repositories; the isolated artifact was not encountered during field investigations for the current project. An isolated piece of obsidian debitage was recorded by the DNF, Bend Ranger District (McFarland and Lindh 1985) along Dutchman Creek, just outside the Eastside pod of the Mt. Bachelor and outside of the current APE. Neither isolated find met the criteria for an archaeological site or eligibility criteria for the NRHP.

During the survey conducted for the current project, one isolated prehistoric artifact and two historical buildings were documented (Smith et al. 2011). The isolated artifact is a single piece of prehistoric obsidian debitage discovered near the northern terminus of Survey Area #4 (Lower Access Road near the Sunrise Express area). It does not meet the criteria for an archaeological site or eligibility criteria for the NRHP.

The two historical buildings present within the current APE and documented as part of the current study include the West Village Lodge (1966) and the generator building (pre-1971), both of which are located in the West Village. Neither building is eligible for the NRHP. The generator building lacks historic significance and also lacks historic integrity due to previous additions and remodeling. The West Village Lodge (previously called the Main Lodge) lacks historical significance under NRHP-eligibility criteria A, B, and D. Although the West Village Lodge might have been historically significant under Criterion C for its original Mid-Century Modern ski lodge design, it no longer retains historic integrity due to extensive alterations and expansions since 1971 and is ineligible for the NRHP. Those alterations have stripped the building of its defining architectural elements and significantly altered its massing, scale, and design. In addition, Mt. Bachelor does not meet NRHP eligibility requirements for a historic district. The only other historical building still extant at Mt. Bachelor, the Junior Race Lodge (1970), is located in the Sunrise area. It was not individually evaluated as part of this project as it lies outside of the APE.

Although additional historical buildings and a variety of ski lifts and associated structures were once present at Mt. Bachelor, including the Egan Lodge (1958), none survive today except the West Village Lodge and the generator building in West Village and the Junior Race Lodge, located west of the Sunrise area. The ski resort property does not retain sufficient historic integrity or built environment resources to communicate its historic character or significance as a historic district. Consequently, Mt. Bachelor does not meet NRHP eligibility requirements for a historic district.

3.5.3.2.2 Traditional Cultural Properties

No TCPs, also called Traditional Cultural Heritage Resources (TCHRs), were identified during the tribal consultation process or background research conducted for this project. The DNF and the Bend-Fort Rock District received no comments or concerns from Native American Tribes regarding the Mt. Bachelor project. In addition, no comments or concerns were communicated by the Tribes regarding TCPs.

3.5.3.3 Direct and Indirect Effects

3.5.3.3.1 No-Action Alternative

Prehistoric or Historic Cultural Resources

There will be no effect on NRHP-eligible or -listed prehistoric or historic cultural resources under the No-Action Alternative. The cultural resource investigation conducted for this project identified no prehistoric or historic cultural resources within the APE that are listed or eligible for the NRHP (Smith et al. 2011). Conditions under the No-Action Alternative for prehistoric or historic cultural resources will not change from those described in section 3.5.3.2, Affected Environment.

Regardless of whether the Proposed Action is taken, a Categorical Exclusion (CE) was recently issued for a planned project within the SUP area and the project is moving forward. That project involves new construction of an administration building and remodeling of the existing guest services building at West Village.

The existing Guest Services building and planned administration building are located in the West Village parking lot so construction activities are limited to this hardened location. No previously undisturbed areas will be impacted during construction. Work will include construction of the new office building and remodeling of the guest services building which will include converting the interior to a new use and

cladding the exterior in wood and stone materials. The exterior style of both buildings will be a modified Cascadian look that will serve as the theme for all future building construction or reconstruction.

In addition to other modern buildings in the West Village complex, there are two buildings that are historic in age, as discussed above: the West Village Lodge, constructed in 1966, and the generator building, which has an unknown construction date, but pre-dates 1971. As discussed above (section 3.5.3.2.1), neither building is eligible for the NRHP. In addition, Mt. Bachelor does not meet NRHP eligibility requirements for a historic district. Consequently, construction of the new administration building and remodeling of the guest services building exterior will not cause a visual or physical impact on NRHP-eligible historic built environment resources. As the construction will be in an existing paved parking lot, there will also be no effect on archaeological resources. There will not be any impacts on cultural resources associated with this project because no heritage resources that are listed or potentially eligible for NRHP listing will be affected.

Traditional Cultural Properties

There will be no effect on NRHP-eligible or -listed TCPs or sacred sites under the No-Action Alterative. As noted in section 3.5.3.2, no TCPs were identified in or near Mt. Bachelor. Conditions under the No-Action Alternative for TCPs will not change from those described in section 3.5.3.2.

3.5.3.3.2 Proposed Action

Prehistoric or Historic Cultural Resources

There would be no direct or indirect effect on NRHP-eligible or -listed prehistoric or historic cultural resources under the Proposed Action. The project area has a low density of previously recorded cultural resources and a low probability for the presence of undiscovered cultural resources. Cultural resources within the APE that were recorded during the survey for this project include an isolated piece of prehistoric obsidian lithic debitage and two historical buildings associated with the ski area, the generator building (pre-1971) and the West Village Lodge (1966). All prehistoric and historic cultural resources within the APE have been determined ineligible for the NRHP. Given the paucity of known cultural resources and the low probability for unknown cultural resources to be present within the SUP, if increased visitation to the SUP resulted from the implementation of the MDP, it is anticipated that there would be no indirect effect on prehistoric or historic cultural resources.

Mitigation measures listed in section 2.2.6 would protect any previously unidentified prehistoric or historic cultural resources identified or encountered during the implementation of the MDP.

Traditional Cultural Properties

There would be no effect on NRHP-eligible or -listed TCPs or sacred sites under the Proposed Action. As noted in section 3.5.3.2, no TCPs or sacred sites were identified in or near Mt. Bachelor.

Mitigation measures listed in section 2.2.6 would protect any previously unidentified TCPs or sacred sites identified or encountered during the implementation of the MDP.

3.5.3.3.3 Alternative A – No New Catchline

Prehistoric or Historic Cultural Resources

There would be no effect on NRHP-eligible or -listed prehistoric or historic cultural resources under Alternative A. As no prehistoric or historic cultural resources eligible for or listed on the NRHP were identified within the Proposed Action APE, exclusion of the proposed new catchline and associated selective tree removal would not provide a demonstrable lesser effect on cultural resources over the Proposed Action. Additionally, as noted in section 3.5.3.2, the probability for the presence of previously unidentified sites throughout the SUP is low, particularly so in the proposed new catchline area where no cultural resources were identified during the survey for this project (Smith et al. 2011) or in previous studies. Given the rugged and broken terrain with steep lava flows and scree slopes within the new

catchline and associated selective tree removal, the likelihood for undiscovered cultural resources is particularly low.

Mitigation measures listed in section 2.2.6 would protect any previously unidentified prehistoric or historic cultural resources identified or encountered during the implementation of the MDP.

Traditional Cultural Properties

There would be no effect on NRHP-eligible or -listed TCPs or sacred sites under Alternative A. As noted in section 3.5.3.2, no TCPs or sacred sites were identified in or near the Mt. Bachelor or, specifically, within the proposed new catchline. Exclusion of the proposed new catchline and associated selective tree removal, therefore, would not provide a demonstrable lesser effect on TCPs over the Proposed Action.

Mitigation measures listed in section 2.2.6 would protect any previously unidentified prehistoric or historic cultural resources identified or encountered during the implementation of the MDP.

3.5.3.4 Cumulative Effects

Of the 11 past, ongoing, or planned projects or actions described in Table 3-5, none hold the potential to interact with the Proposed Action or Alternative A and generate cumulative impacts on heritage resources. Therefore, there would be no incremental cumulative impacts on cultural resources caused by the identified projects/actions.

3.5.3.5 Forest Plan Compliance

The proposed MDP is consistent with the applicable Forest LRMP Forest-wide standards and guidelines. Those that do not apply (i.e., CR-3) are omitted. The NWFP contains no pertinent standards and guidelines, and no applicable Management Area 11 standards and guidelines are included in the Forest LRMP. The applicable key standards and guidelines are as follows:

- CR-1. In compliance with applicable federal historic preservation legislation (National Historic Preservation Act, Executive Order 11593), a professionally supervised cultural resource inventory program will be conducted on both a Forest-wide and project specific level. The surveys will be conducted according to an inventory plan and research design agreed to by the Forest Service and the [SHPO].

  Discussion: As discussed in section 3.5.3.2 and the supporting specialist report (Smith et al. 2011), the cited analysis has been completed via a professionally supervised cultural resource inventory following applicable state, federal, and DNF guidelines. The methods and approach used for the background research and survey were designed through close consultation between the specialist and the DNF. Review by the Forest Archaeologist and SHPO ensures that documentation is consistent with the cited Forest LRMP and Oregon SHPO requirements.

- CR-2. Cultural resource properties located during inventory will be evaluated by a professional archaeologist/historian to determine their eligibility for listing in the NRHP, according to the criteria of eligibility established in the NHPA.

  Discussion: As discussed in section 3.5.3.2 and the supporting specialist report, the cited analysis has been completed and documented in this EIS. Review by the Forest Archaeologist ensures that documentation is consistent with the cited Forest LRMP. Evaluation of cultural resources occurring within the APE for NRHP eligibility has occurred in a manner consistent with the cited direction. No sites eligible for the NRHP would be affected by the Proposed Action or action alternative.

- CR-4. Results of project level cultural resource inventories, or the intent to carry out such inventories, will be documented through environmental analysis of the project.
    - Cultural resource properties in conflict with ground disturbing projects will be professionally evaluated to determine site significance and to aid in determining the full range of management alternatives.
    - Depending on the nature of the project, the activity may be redesigned to avoid damage or disturbance to significant sites, or mitigation procedures will be developed. In some instances where avoidance is not possible, the value of the property may be conserved through a professionally acceptable data recovery program.

  Discussion: See preceding response.

- CR-5. Management of cultural resources will be coordinated with other agencies including the SHPO and the Advisory Council on Historic Preservation, as required by federal and state historic preservation laws and regulations. Management of the Native American cultural resources will also be appropriately coordinated with the Warm Springs and Klamath tribal groups. The Deschutes Historic Landmarks Commission will also be consulted as appropriate.

  Discussion: As discussed in section 3.5.1.2 and the supporting specialist report, agency and Tribal coordination and consultation has occurred in a manner consistent with the cited direction. No TCPs, sacred sites, or sites eligible for inclusion on the NRHP would be affected by the Proposed Action or action alternative.

- CR-6. Management of the Native American cultural resources will be coordinated with the appropriate Native American Tribe. This coordination will include (but not necessarily be limited to) notification of the appropriate Tribal Group when projects are proposed in areas of known concern, and opportunity for Tribal involvement in research of sites with known Tribal affiliations.

  Discussion: The Forest Service has provided potentially affected Tribes with a project description and opportunity to comment. Further opportunities for involvement will be available as needed, including review of this EIS and those identified in section 3.5.3.3.2 to ensure compliance. No TCPs or sacred sites would be affected by the Proposed Action or action alternative.

- CR-7. Cultural resources may be developed for educational, scientific, or recreational purposes to the extent the integrity of the resource is maintained.
    - Cultural resource management will ensure that properties and their records are protected to prevent unauthorized uses and to prevent degradation.
    - The maintenance level for eligible historic structures and prehistoric sites will be based on an analysis of utility, scientific and historical value, public interest, area allocation, and available funding.
    - Public use of cultural properties will be monitored to prevent degradation or as specified in a management plan for the property.
    - Artifacts recovered from sites on National Forest lands must be curated in a repository with adequate long-term curatorial capabilities.

Discussion: While cultural resources have been discussed in analysis of the Proposed Action, specific site locations remain confidential. No NRHP-eligible historic structures or prehistoric sites would be affected by the Proposed Action or action alternative. No artifacts were collected during the cultural resources inventory conducted for this project.

- CR-8. Human Burials: The appropriate treatment of historic and prehistoric human burials shall follow federal policies and Oregon state law. Upon their discovery, burials will be treated as follows:
    - They will be immediately evaluated by a Forest Service archaeologist and a qualified forensic anthropologist to determine if the skeletal material is human and to what time period and ethnic group it may be ascribed.
    - Appropriate local officials (county coroner) and American Indian tribes will be notified of the discovery if the skeletal material is human. Based on the circumstances of the discovery and the origin and ethnic affiliation of human remains, the burial will be treated as follows:
        - The burial will be reinterred in place. The project (e.g., a timber sale cutting unit) will be redesigned to avoid causing further impact on the site. The burial site will be monitored and protected in place for all future projects and to prevent vandalism and natural degradation.
        - Where reinternment in-place is neither feasible nor prudent, and where affiliation with a recognized American Indian tribal group can be reasonably established, the pertinent tribe or confederation of tribes will be contacted. The nearest tribe or confederation will be contacted in situations where a direct link cannot be made to an existing tribal entity. In either case, based on consultation with the appropriate tribal officials, the burial may be reinterred on an adjacent Indian reservation.

  Discussion: As discussed in section 3.5.3.3.2 and the supporting specialist report, specific protocols consistent with the cited direction will be followed should human remains be encountered during any phase of MDP implementation to ensure compliance.

- CR-9. The Forest will meet all requirements of the American Indian Religious Freedom Act (AIRFA) prior to the implementation of projects. Based on the AIRFA consultation process with American Indian groups, federal protection of contemporary American Indian sacred sites may include but is not limited to, access to sacred and traditional sites, use and possession of sacred objects, and the enactment of ceremonies and traditional rites. Related activities may include gathering of plants for food, medicinal, or craft uses, and the construction of sweat lodges and structures for curing and vision questing.

  Discussion: Through scoping, the Forest Service has provided potentially affected Tribes with a project description and opportunity to comment. Further opportunities for involvement will be available as needed, including those identified in section 3.5.3.3.2 to ensure compliance. No concerns or issues regarding the Proposed Action were communicated by the consulted Tribes. No TCPs or sacred sites would be affected by the Proposed Action or action alternative.

- CR-10. AIRFA addresses the religious rights or freedoms of all American Indians without regard for federal tribal recognition, but does not convey exclusive use of areas or free use of Forest products. Therefore, in considering access to traditional areas or sacred sites, for example, the

Forest must also take into account other existing or potential uses. Publicly owned property (cultural sites, artifacts) remain the property of the United States Government. Activities which may affect such properties, sites, or artifacts are subject to existing laws and regulations.

Discussion: See preceding response.

- CR-11. The nonrenewable, generally fragile, nature of cultural resources will be recognized and will be accordingly managed to the greatest scientific and public good.

  Discussion: As discussed in section 3.5.3.2 and the supporting specialist report, an inventory and assessment of cultural resources that might be affected by the Proposed Action has been conducted in a manner consistent with the cited direction. No resources eligible for the NRHP would be affected by the Proposed Action or action alternative.

3.5.4 RECREATION

3.5.4.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

As anticipated effects of the Proposed Action on alpine skiing, mountain biking, hiking within the SUP area, and snow play within the SUP area are well documented in the accepted MDP, this analysis focuses on potential effects on other forms of recreation.

Issue 1: Relocation of the tubing hill and snow play area to the proposed site may adversely affect the experience of skiers using the Nordic Center.

Indicators: Assessment of the effects of proposed Nordic trail alterations and additional activity, noise, demand for services (e.g., restrooms and warming areas), and potential foot traffic adjacent to the Nordic Center.

Analysis Area: Analysis of direct impacts focuses on the affected portion of the Nordic Center. No indirect or cumulative effects are anticipated.

Issue 2: Removal of Snowmobile Trail No. 40 from the National Forest Trail System may adversely affect the recreational opportunities available to snowmobilers on the DNF.

Indicators: Assessment of recreational opportunity lost in terms trail miles and unique terrain or other amenities accessed by the trail.

Analysis Area: Analysis of direct impacts focuses on the closed trail. No indirect effects are anticipated. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

3.5.4.2 Affected Environment

3.5.4.2.1 Nordic Center

The majority of the Nordic Center terrain at Mt. Bachelor is located west and northwest of the existing Nordic Lodge and consists of intermediate and expert terrain. The lower-level terrain is located on flatter ground to the east and northeast of the lodge. Blue Jay's Way provides the primary skier access into and out of the intermediate and expert Nordic trail system, creating a loop around the Old Maid, a knoll that is prominent in this portion of the ski area.

By its location on the north side of the West Village parking lot, the Nordic Center is located away from the activity of the alpine ski facilities and the existing tubing hill, which is located along the lower portion of the Red Chair. Nordic skiers on Blue Jay's Way are able to see and hear activity in the parking lot, as well as the existing tubing hill. However, this activity is relatively distant from the Nordic Center.

The MDP indicates that the existing tubing area comfortably accommodates 275 tubers at one time, receiving over 700 tuber visits per day over several 1-hour sessions. The existing tubing operation is located between the Red Chair and the rental shop on terrain that is less than ideal. The slope gradient on the existing tubing hill does not provide an adequate run-out distance for tubers to slow down, requiring management to apply straw to the snow surface at the end of the tubing lanes to slow tubers as they finish their run. While some tubing operations provide music at their tubing hills, Mt. Bachelor does not play music for its guests.

3.5.4.2.2 Snowmobile Trail 40

Snowmobile Trail No. 40 is 2.8 miles long, beginning at its intersection with Snowmobile Trail No. 4 and ending at Sunrise Lodge. Trail No. 4 begins at Wanoga Sno-Park, which accesses about 150 miles of groomed snowmobile trails. Trail No. 40 branches off from Trail No. 4 about 4.9 miles west of Wanoga Sno-Park.

Trail No. 40's primary purpose is providing snowmobile access to facilities at Sunrise Lodge. However, as uses of all types increase, several safety issues have arisen. First, use around Sunrise Lodge has increased over time. With the proposed development of a new high-speed lift and location of ski school and kids' ski areas near the lodge, use will increase further. Continuing to allow snowmobile access in this area would add to the congestion and create additional safety concerns. The snowmobile trail in this area was also used by a dogsled permittee based at Mt. Bachelor. A collision between a snowboarder and a dogsled in 2012 prompted Mt. Bachelor to modify the dogsled route to avoid this congested area. Second, the snowmobile trail intersects Mt. Bachelor's Rescue Road, and unauthorized snowmobile use of the Rescue Road has obscured ski tracks that help the ski patrol locate missing skiers. Third, while the snowmobile trail dead-ends at Sunrise Lodge, some riders continue on to cross Hwy. 46 to access Dutchman Flat and the nearby high country. Crossing the highway creates a safety issue. For these and other reasons, use of the snowmobile trail is low.

3.5.4.3 Direct and Indirect Effects

3.5.4.3.1 No-Action Alternative

Nordic Center

Under the No-Action Alternative, the current Nordic Center and tubing operations would continue as described for the existing condition. The tubing hill would remain on the opposite side of the West Village parking lot from the Nordic Center. Consequently, the tubing hill would have no additional impact on the experience of Nordic skiers.

Snowmobile Trail 40

Under the No-Action Alternative, the trail would remain part of the trail system, and the noted safety issues (section 3.4.5.2.2) would continue. Increased use by snowmobilersand skiers around the Sunrise base area would exacerbate these issues.3.5.4.3.2 Proposed Action.

3.5.4.3.2 Proposed Action

Nordic Center

The Proposed Action would re-locate the tubing operation away from the alpine terrain and onto the southwest face of the Old Maid. As described in the MDP, the terrain in this location would be more suitable for the tubing operation than the existing terrain in that the slope gradient is moderately steep with a long, flat run-out for tubers to slow to a stop without the use of straw for braking. The proposed

tubing lanes would provide for up to 400 tubers at one time, an increase of 125 over the existing condition. This location would also allow tubers to park in an area of the parking lot that is the least popular with alpine skiers due to its distance from the alpine terrain.

West of the tubing lanes and adjacent to the parking lot would be a snowplay area that would provide terrain for small children to try skiing or snowboarding, and other forms of snow play (Figure 2-3). Also, this area would include yurts or other portable structures for ticket sales, warming, and restrooms.

The re-location of the tubing hill would sever Blue Jay's Way, which provides an expert route from the Nordic Lodge around the Old Maid to the trail network. The Proposed Action would relocate Blue Jay's Way to bypass the tubing hill (Figure 2-3).

Under the Proposed Action, the re-location of the tubing hill and operation of the snowplay area would introduce a new user group into the area near the Nordic Lodge and the trail network. This would increase the level of activity, and therefore noise, that could be perceived by Nordic skiers as they ski between the lodge and the intermediate and expert Nordic trails. As under the existing condition, management would not play music at the tubing area; however, the normal operating sounds of the tubing hill, including tubers yelling with enthusiasm, would be perceptible to Nordic skiers on the re-aligned Blue Jay's Way.

It is not expected that the tubing and snowplay guests would place an added demand on the Nordic Lodge for warming and restrooms because the tubing/snowplay yurt would provide these facilities. Tubers and snowplay guests would use the yurt as opposed to walking over 1,000 feet along the parking lot to the Nordic Lodge.

Overall, the introduction of the tubing and snowplay into the area would add to the noise level in the vicinity of the Nordic Lodge and on the re-aligned portion of Blue Jay's way. This added noise would be similar to that experienced on Blue Jay's Way under the existing condition but louder due to proximity. The activity would be much closer to Blue Jay's Way than under the existing condition.

Snowmobile Trail No. 40

Removal of the trail from the National Forest Trail System under the Proposed Action would alleviate the safety issues discussed above (section 3.5.4.2.2) and avoid worsening conflicts as skier use of Sunrise base area increases, resulting in increased congestion. However, snowmobilers would lose 2.8 miles of groomed trail and access to the amenities provided by the Sunrise Lodge. Since the trail deadends at Sunrise, no access to other trails or snowmobile infrastructure would result from the closure. In terms of amenities, Elk Lake Lodge remains open for most of the winter, providing amenities similar to those at Sunrise Lodge that would remain accessible to snowmobilers in the area.

3.5.4.3.3 Alternative A – No New Eastern Catchline

Under Alternative A, the effect on Nordic skiers would be as described under the Proposed Action, as elimination of the lower catchline and associated selected tree removal would not affect the tubing/snowplay areas or the Nordic operation. Likewise, the effects on safety and recreational opportunities associated with removal of Snowmobile Trail No. 40 from the National Forest Trail System would be similar to those outlined above for the Proposed Action.

3.5.4.4 Cumulative Effects

None of the projects listed in Table 3-5 would cumulatively affect the experience of Nordic skiers at Mt. Bachelor or area snowmobilers in conjunction with the Mt. Bachelor improvements described for the Proposed Action or Alternative A.

3.5.4.5 Forest Plan Compliance

No standards and guidelines from the NWFP or the Forest LRMP are relevant to this recreational issue or the tubing hill.

3.5.5 SCENIC RESOURCES

3.5.5.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

Issue 1: The proposed on-mountain projects, particularly the Eastside pod and the mountain bike park, may adversely impact scenic resources in the middleground and background as viewed from sensitive viewpoints along Hwys. 45 and 46 (The Cascade Lakes National Scenic Byway).

Indicators: Assessment of the projects' visual impact in accordance with the Visual Management System (VMS) specified in the Forest LRMP paired with the approach outlined in the more recent Scenery Management System (SMS). The use of up to two visual simulations for middle and background assessment.

Analysis Area: Analysis of direct, indirect, and cumulative impacts focuses on sensitive viewpoints within the project-area viewshed, including:

1. Wanoga Sno-Park
2. Swampy Lakes Sno-Park
3. Sandshed Curve Viewpoint
4. Kapka Sno-Park
5. Hwy. 45/Hwy. 46 Junction
6. Hwy. 46 approaching Sunrise Village
7. Dutchman Flat Sno-Park
8. Edison Sno-Park
9. Hwy. 45 approximately 2 miles south of Hwy. 45 Junction

Issue 2: The proposed base area improvements and biomass cogeneration facility may adversely affect scenic resources in the foreground as viewed from sensitive viewpoints at Sunrise Village and West Village.

Indicators: Assessment of the buildings' architectural character in accordance with the ski area's new architectural theme and the provisions of *The Built Environment Image Guide for the National Forests and Grasslands* (BEIG; Forest Service 2001). The use of architectural simulations depicting the architectural character of the buildings.

Analysis Area: Affected viewpoints in Sunrise Village (Viewpoint 10) and West Village (Viewpoint 11).

3.5.5.2 Affected Environment

3.5.5.2.1 Background

Visual Management System

The goal of landscape management on all National Forest System lands is to maintain the highest possible scenic quality, commensurate with other appropriate public uses, costs, and benefits. Since the mid-1970s, the Forest Service has operated under the guidance of the VMS (AH-462, National Forest Landscape Management, Volume 2, Chapter 1, issued April 1974) for inventorying, evaluating, and managing scenic

resources on National Forest System lands. The VMS provides a system for measuring the inherent scenic quality of any forest landscape and the degree of alteration for use in inventory and management.

VMS Visual Quality Objectives (VQOs) are based on the physical characteristics of the landscape and the sensitivity of the setting as viewed by humans. VQOs define how the landscape will be managed, the level of acceptable changes to the landscape character permitted in the area, and under what circumstances management activities or recreational development may be allowed.

Different VQOs may apply to different distance zones. Applicable VQOs are based on land allocations established by the Forest LRMP. Mt. Bachelor is prescribed a VQO of Partial Retention for the middleground and background in the Forest LRMP, which also provides one standard and guideline for MA-11, Intensive Recreation, relating to VQOs:

> M11-35 – Within existing or future developed areas, management activities and facilities will meet Modification or a higher objective.

Scenery Management System

In 1995 an updated landscape management system, the Scenery Management System (SMS), was introduced by the Forest Service. The SMS was developed to eventually replace the VMS; its principles and premises are based not only on research findings but on over 20 years of experience with implementing the VMS. In October 1996, *Landscape Aesthetics: A Handbook for Scenery Management* (Forest Service 1995) was released to begin the transition to the SMS.

Conceptually, the SMS differs from the VMS in that it recognizes the role of human landscape constituents in the inventory and planning process. The SMS borrows from and is integrated with the basic concepts of ecosystem management. The SMS pertains primarily to the social/cultural dimension of ecosystem management, but also has links to the biological and physical. Scenic Integrity Level (SIL) is used to describe the existing level of integrity of a scene.

Full adoption of the SMS is to occur as each National Forest revises its LRMP. Direction for scenery management is contained within LRMP goals, objectives, standards, and guidelines. For Forests not currently undergoing the forest plan revision process, or for those requiring extensive time for revision, application of the SMS may occur at the sub-forest or project level. At the time of this EIS, the Forest LRMP has not been updated. For this analysis, both the VMS and SMS are used to describe the existing landscape and evaluate the effects of the Proposed Action and alternatives. To help bridge between the two systems, the Forest LRMP provides the following explanation of terms:

- High Scenic Integrity Level (SMS), Natural Appearing Landscape, equates to Retention (VMS).
- Moderate Scenic Integrity Level (SMS), Slightly Altered Landscape, equates to Partial Retention (VMS).
- Low Scenic Integrity Level (SMS), Altered Landscape, equates to Modification (VMS).

Thus, the VQO of Partial Retention assigned by the Forest LRMP to middleground and background views of Mt. Bachelor translates to a Moderate SIL under the SMS. The distance zones used in the analysis, from the perspective of the observer, are defined as follows:

- Immediate Foreground 0 - 300 feet
- Foreground 0 – 0.5 mile
- Middleground 0.5 mile - 4 miles
- Background 4 miles - horizon

Built Environment Image Guide

The BEIG was prepared by the Forest Service for use by those involved in planning, designing, constructing, repairing, maintaining, and authorizing facilities on National Forest System lands, including architects and landscape architects. It states:

> The better each of us understands the environmental, cultural, and economic context of each facility's design, the better we will serve our customers and reflect a quality agency image. (p.4.)

An important aspect of the BEIG with regard to Mt. Bachelor is that it considers not only the natural environment but also the cultural and economic contexts:

> The proper fit of Forest Service facilities into their natural, cultural, and economic contexts requires careful consideration of many aspects of design, including scale, proportion, and selection of building materials. (p.5.)
>
> The built environment should reflect the context of its surroundings, including its physical setting, social context, and long-term economic effects… (p.6.)

The BEIG includes architectural character guidelines for the regions of the U.S., including the North Pacific Province. This architectural character has been referred to as "Cascadian." BEIG architectural guidelines pertinent to Mt. Bachelor MDP and the "modified Cascadian" architectural desired for the resort include the following:

- Diminish apparent mass of larger buildings by creating wings or compounds of connected structures.
- Use building materials in scale (for example, oversized stone and timbers) in massive forests.
- Use heavy timber vertical posts or trusses as a wood element reminiscent of CCC structures.
- Use battered stone when possible.
- Use a concrete base if it is skillfully textured and colored.
- Make windows large to take in views, warmth, and precious sunlight.
- Protect entrances from driving rain and snow by including porches and vestibules when possible.
- Use a steeper roof pitch with shorter overhangs in areas with heavy snows.
- Avoid multiple roof forms that may shed snow onto other roofs.
- Use shed- or gable-type dormers.
- Use eaves that have heavy bargeboards.
- Expose rafters, but protect tails from the elements by not extending them beyond the roofing.
- Celebrate the use of wood as a symbol and the most significant resource of the province.
- Make urban structures more colorful with pastels and strong accent colors for trim.
- Avoid dark colors indoors. Make interiors light and reflective to create a light, airy environment.
- Use dark colors for metal roofs – green, black, or brown.

3.5.5.2.2 Existing Condition

This analysis focuses on a total of 11 viewpoints to assess the visual effects of the Proposed Action and alternatives. Viewpoints 1 – 9 provide a baseline for assessment of VQO/SIL to address Issue 1, impacts on scenic quality and scenic integrity in the middleground and background. Viewpoints 10 and 11 are used to evaluate Issue 2, impacts on the built environment and adherence to the BEIG. Figure 3-6 shows the location of these viewpoints.

Note that figures illustrating existing views that would not be affected by the Proposed Action or alternatives are included in this section. To facilitate comparison, figures from viewpoints that would be affected are paired with figures simulating the altered views in section 3.5.5.3 below.

Scenic Quality and Scenic Integrity

The views toward Mt. Bachelor from the nine viewpoints selected for analysis of this issue are presented below. Several of these viewpoints offer screened views of Mt. Bachelor or no view of the mountain at all. Photographs were taken by the Forest Service during the early summer of 2011 at a time when the snowpack on the mountain was still evident. This accentuates the difference between the green forest cover and the white, snow-covered ski trails. Typical summertime scenes would include vegetative cover on the ski trails.

Viewpoint 1: Wanoga Sno-Park

The Wanoga Sno-Park viewpoint is located approximately 6 miles east of Mt. Bachelor, along the south side of Hwy. 46 (Figure 3-7). Visual screening is provided by the foreground vegetation, such that only the snow-covered, treeless portion of the mountain is visible in the background. As a result, the area of the proposed Eastside pod is not visible. From this viewpoint, it is not evident that ski lifts, trails and other facilities are present on the mountain; the scenery appears unaltered.

Figure 3-7. Viewpoint 1, Wanoga Sno-Park, existing condition.

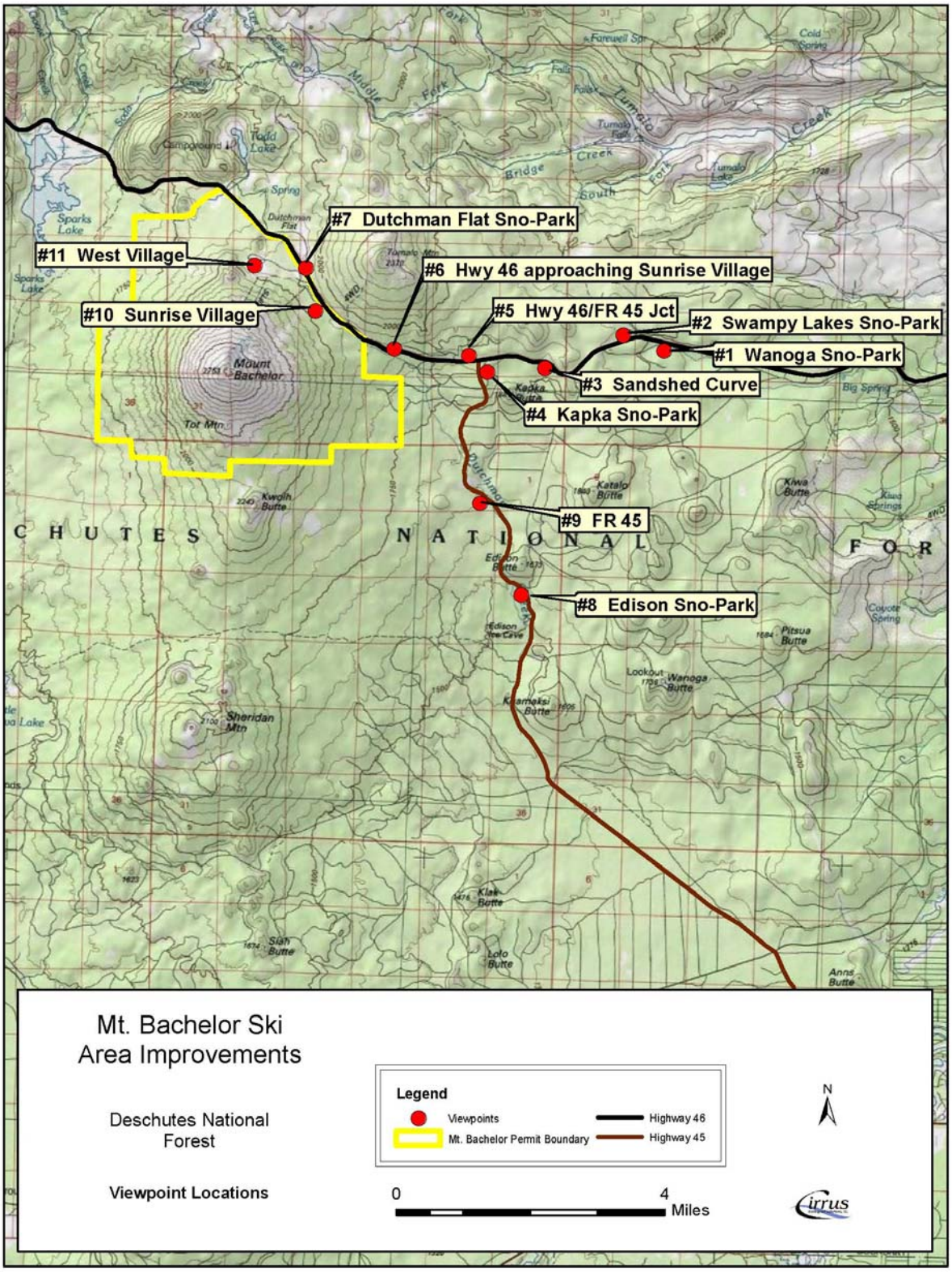

Figure 3-6. Mt. Bachelor viewpoint locations.

Viewpoint 2: Swampy Lakes Sno-Park

The Swampy Lakes Sno-Park viewpoint is located approximately 5 miles east of Mt. Bachelor on the north side of Hwy. 46 (Figure 3-8). Forest vegetation in the foreground effectively screens all of Mt. Bachelor from this viewpoint.

Figure 3-8. Viewpoint 2, Swampy Lakes, existing condition.

Viewpoint 3: Sandshed Curve

The Sandshed Curve viewpoint is located approximately 4 miles east of Mt. Bachelor (Figure 3-9). This viewpoint is the first opportunity along Hwy. 46 to view Mt. Bachelor from the summit to the base of its slopes in the background. The snow-covered summit of the volcano dominates the background view, and numerous natural openings along the treeline dominate the view of the slopes as the snowfield transitions to forest.

Marginally perceptible along the treeline, right of center in the scene, are two ski slopes emanating from the top of the Skyliner Express pod. These openings differ from the natural openings in that they do not follow the fall line and they appear to cut across the terrain and treeline vegetation. In the center of the scene, the eastern-most trail in the Rainbow pod is visible as it cuts into the treeline and continues down the slope and through the forest. However, because the upper portion this trail follows an existing, natural swale in the terrain, the visual effect of the clearing at the treeline is similar to that of other swales. As this trail clearing continues into the forest, the view of the trail becomes more oblique and screened by trees along the skier's right of the trail, making it barely perceptible in the view.

From this distance, the lift towers of the Summit Express are barely perceptible as vertical lines protruding from the snowfield. The top terminal of the lift from this angle follows the form and line of the rocky outcrops at the summit. The scene appears mostly unaltered.

Figure 3-9. Viewpoint 3, Sandshed Curve, existing condition.

Viewpoint 4: Kapka Sno-Park

The Kapka Sno-Park viewpoint is located approximately 3 miles east of Mt. Bachelor in the southeast quadrant of the intersection of Hwys. 45 and 46 (Figure 3-10). The view from the sno-park to Mt. Bachelor looks across Hwy. 45. The foreground and middleground topography across Hwy. 45 begins to rise to the slopes of Mt. Bachelor almost immediately, which provides both topographic and vegetative screening. As a result, only the portion of the mountain that is above the treeline is visible in the background, although filtered by forest vegetation. Development on the mountain is imperceptible from this viewpoint.

Figure 3-10. Viewpoint 4, Kapka Sno-Park, existing condition.

Viewpoint 5: Hwy. 45/Hwy. 46 Junction

Viewpoint 5 is located approximately 2.5 miles east of Mt. Bachelor (Figure 3-14; page 190). Similar to Viewpoint 3, the snow-covered summit dominates the middleground view. From this location, the ski trails that are visible in Viewpoint 3 are screened by foreground vegetation along Hwy. 46. However as the observer proceeds west along the visible straightaway in the highway, these same ski trail openings become visible and more perceptible due to the reduced distance to the mountain (about 1.5 miles) compared to Viewpoint 3.

The upper portion of the eastern-most ski trail in the Rainbow pod is also visible in this scene, as described for Viewpoint 3. However, due to the decreased distance to the mountain in this view, the lower ski trail is less perceptible than from Viewpoint 3 as a result of increased screening by the trees on skier's right of the trail. Also, due to the decreased distance to the mountain compared to Viewpoint 3, the lift towers on the Summit Express lift are visible in the view without effort, but they do not dominate the view and do not detract from the observer's perception that they are viewing a mostly unaltered mountain scene. The top terminal of the lift is evident along the summit, breaking the natural line along the summit. It does not dominate the view of the summit, suggesting only a slight alteration from the natural form.

Viewpoint 5 provides an unobstructed view of the eastern slopes of Mt. Bachelor, including the entire area of the Eastside lift and trails in the Proposed Action (discussed in section 3.5.5.3.2). As a result, this

view provides the base scene for a visual simulation of the lift and trail clearing for the Eastside pod (see Figure 3-15; page 191).

Viewpoint 6: Highway 46 approaching Sunrise Village

Viewpoint 6 is "the arrival scene." In this view, approximately 1 mile from Mt. Bachelor (Figure 3-16; page 192), the observer has the perception of arriving at the ski area. As with the more distant scenes, the snow-covered mountain, the treeline, and the verdant forest dominate the middleground view. However, from this distance, the ski trails are more visible, and the viewer can ascertain skiers as they descend the slopes, particularly above the treeline. The lift towers of the Summit Express are readily visible, the movement of the chairs is noticeable, and the top terminal of the lift stands out clearly, breaking the natural line of the summit.

The existing maintenance facility and the proposed biomass facility site are located in the lower right of the view. However, the forest vegetation and topography in the foreground provide natural screening so that the maintenance facility, a two-story structure, is not evident. While this scene is altered by ski area development, it is dominated by the natural form of the mountain and the lines associated with the transition from snowfield to forest cover. The ski area facilities are clearly evident but subordinate to the natural features of the scene.

Viewpoint 6 provides a close-up view of the Eastside pod in the Proposed Action (discussed in section 3.5.5.3.2). This scene provides the base for the Visual Simulation of Viewpoint 6 (Figure 3-17; page 192).

Viewpoint 7: Dutchman Flat Sno-Park

Viewpoint 7 is located in Dutchman Flat Sno-Park, across Hwy. 46 from the bottom terminal of the Skyliner Express (Figure 3-11). The upper portions of ski trails are evident as they enter the forest in the middleground, but forest vegetation in the foreground screens the lower trails from view. Similar to Viewpoint 6, the Summit Express is clearly visible, and movement of the chairs on the lift is evident. The top terminal from this view appears less dominant than in Viewpoint 6 as a result of the oblique angle from which the terminal is seen in this view. It appears similar in form to the rocky outcrops to the right in the scene. The movement of skiers in the Summit Express and Skyliner Express pods is clearly visible.

The existing maintenance facility, a two-story structure, is located in the lower left of the scene. The foreground topography and screening prevent the maintenance facility form being perceptible from this viewpoint.

While the landscape alterations associated with ski lifts and trails are clearly evident in the scene, the view of the natural form associated with the summit and snowfields dominates the middleground view and forest vegetation dominates in the foreground.

Viewpoint 8: Edison Sno-Park

Viewpoint 8 is located approximately 3.5 miles southeast of Mt. Bachelor on Hwy. 45 (Figure 3-12). From this viewpoint, the summit of Mt. Bachelor is barely perceptible in the background through the forest vegetation (see slightly left of center in the scene). The screening provided by the foreground vegetation obscures this view of developed ski area facilities.

Figure 3-11. Viewpoint 7, Dutchman Flat Sno-Park, existing condition.

Figure 3-12. Viewpoint 8, Edison Sno-Park, existing condition.

Viewpoint 9: Hwy. 45 approximately 2 miles south of Hwy. 46 Junction

Viewpoint 9 is located 1 mile north of Viewpoint 8 along Road 45, approximately 3 miles southeast of Mt. Bachelor (Figure 3-13). The background view of Mt. Bachelor is unobstructed and completely unaltered, with all developed facilities located entirely out of view around the mountain to the north.

Figure 3-13. Viewpoint 9, Hwy. 45 approximately 2 miles south of Hwy. 46 junction, existing condition.

Architectural Character

Viewpoints 10 and 11 are used to assess the effect of the Proposed Action and alternatives on the architectural character of the built environment. These views intentionally focus on the man-made buildings at Mt. Bachelor. The objective of the built environment analysis is not to assess VQOs or SIL; these scenes meet a VQO of Modification and a SIL of Low. Rather, these views address the buildings' adherence to the BEIG. As a result, Viewpoints #10 and #11 are based on simulated views of the buildings and their architecture.

Viewpoint 10: Sunrise Village

Viewpoint 10 faces to the southeast across Sunrise Village (Figure 3-18; page 194). The existing Sunrise Lodge is the only building in the scene. The existing lodge does not follow the architectural character of the North Pacific Province in that both the roof and walls are large, flat surfaces. The blue metal roof on the loading area is suggestive of an urban environment. There is no evident use of rock or wood and no

steep roof pitch is incorporated into the building – these are key elements of the desired architectural character. The facilities in the Sunrise Village currently do not adhere to the BEIG.

The existing maintenance facility and the location of the proposed biomas generation plant are approximately 2,500 feet northwest of this site, and not visible from the Sunrise Village. (Figure 3-19; page 194)

Viewpoint 11: West Village

Viewpoint 11 faces to the south across the West Village (Figure 3-20; page 195). Five buildings are prominent in this view. The generator and ski patrol buildings, located left of the scene, are currently unsightly, as mentioned in the MDP. The other three buildings, West Village Lodge, Bachelor Ski and Sport, and guest services each have their own architectural character. None of these buildings currently include wood or stone in their façades. All have many large, flat surfaces on both the walls and the roof, although the guest services building does make use of a peaked structure, which breaks up the apparent surface area of the roof.

The blue metal roof of Bachelor Ski and Sport is suggestive of a more urban environment – it is not what one would expect to see on a mountain in the Pacific Northwest. The West Village Lodge has been renovated several times over its life, and there have been attempts to include some use of dormers and trim to break up the surface area and reduce the apparent mass of the building. Nonetheless, the lack of wood, stone, or steep roof pitches makes for a building that is inconsistent with the architectural character of the North Pacific Province, as described in the BEIG.

The temporary administration building in the West Village base area is a sprung structure that provides space for ski area employees. This structure is not intended to be a permanent part of the base area, and it was not designed or constructed to be consistent with the BEIG.

In summary, the facilities in the West Village currently do not currently adhere to the BEIG.

The existing maintenance facility and the location of the proposed biomas generation plant are approximately 3,500 feet southeast of this site, and not visible from the West Village.

3.5.5.3 Direct and Indirect Effects

3.5.5.3.1 No-Action Alternative

Scenic quality and Scenic integrity

Under the No-Action Alternative, no modifications of the existing lift and trail system would take place. The scenic quality and scenic integrity from Viewpoints 1 – 9 would remain as described above for the existing condition.

Architectural Character

Under the No-Action Alternative, Mt. Bachelor would implement two previously approved projects that would affect the ski area's adherence to the BEIG (Figure 3-21; page 195). The existing temporary administration building would be replaced with a new administration building, and the guest services building would be modified to include a new façade.

These improvements would incorporate architectural characteristics of the North Pacific Province including:

- Use of board and batten and lap siding (natural wood) to break up the wall surfaces.
- Exposed beams and rafters, including the beam and rafter ends.

- Use of overhangs to protect entrances from falling snow.
- Large windows to take in the views of the mountain.
- Board-formed concrete foundation.
- Stone veneer wall sections.
- Varied roof and wall lines to reduce the building's apparent mass.

With the new, Cascadian façade on the guest services building and the new administrative building, the West Village would better adhere to the BEIG. However, the construction of two new buildings in the North Pacific architectural character would also highlight the divergence of the remaining buildings from the BEIG.

3.5.5.3.2 Proposed Action

Scenic quality and Scenic Integrity

Viewpoint 1: Wanoga Sno-Park

Under the Proposed Action, the proposed Eastside pod would be developed, including new clearings for a chairlift and ski trails. As viewed from Wanoga Sno-Park, the additional development would be screened by the foreground vegetation. Due to the screening effect, this view would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Viewpoint 2: Swampy Lakes Sno-Park

Under the Proposed Action, foreground vegetation would continue to screen background views of Mt. Bachelor. Therefore this view would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Viewpoint 3: Sandshed Curve Viewpoint

The Proposed Action would introduce new clearings to this scene for the development of the Eastside pod. Given that the trails in the Eastside pod follow the fall-line, these trails would appear almost natural from this distance due to the oblique view, as described above for the Rainbow pod under the existing condition. From this distance, the lift towers of the Summit Express and the new Eastside Express would be barely perceptible as vertical lines protruding from the snow. Ski area development would continue to be subordinate to the natural form and lines of Mt. Bachelor. The scene would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Viewpoint 4: Kapka Sno-Park

Under the Proposed Action, the topography and vegetation in the foreground and across Hwy. 45 would continue to provide topographic and vegetative screening. Only the portion of the mountain that is above the treeline would be visible. The Eastside pod would not be perceptible due to the screening, and existing development would remain imperceptible from this viewpoint. This view would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Viewpoint 5: Hwy. 45/Hwy. 46 Junction

Viewpoint 5 would provide the most direct view of the Eastside pod under the Proposed Action. The clearing of ski trails and the lift line would introduce new lines and contrast into the forest below the treeline. Compared to the existing condition, it would be obvious to the observer that ski trails are visible and the forest has been altered (Figure 3-15). The proposed catchline would be barely perceptible from this view due to the narrowness of the trail and screening provided by the forest vegetation along it (see

left-center of the scene). The lift towers and top terminal of the Eastside Express would be perceptible, but similar to the Summit Express, they would not dominate the view. Even with the new development in the scene, the natural form and lines of the mountain and forest dominate the scene. This view of Mt. Bachelor would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Figure 3-14. Viewpoint 5, Hwy. 45/Hwy. 46 Junction, existing condition.

Figure 3-15. Simulation of Viewpoint 5, Hwy. 45/Hwy. 46 junction, Proposed Action.

Viewpoint 6: Highway 46 approaching Sunrise Village

Viewpoint 6 would provide a view up the lift line of the Eastside Express under the Proposed Action. The lift line would be evident, with the lift towers and top terminal visible. From this viewpoint, the observer would easily notice the movement of the chairlift and skiers as they descended the slopes. Forest vegetation in the foreground partially screens the ski trails in the new ski pod, but the ski trails are evident. Also the gladed ski terrain is discernible as a "thinner forest" to the left of center in the scene (Figure 3-17).

The biomass facility would be located in the lower right of the view. This facility is proposed to be a two-story structure with a smokestack that is assumed to be 50 feet in height. The facility would include scrubbers that would reduce emissions to levels that would not generate any notable haze (see section 3.4.1, Air Quality). Similar to the existing maintenance facility, the biomass facility would be screened by the forest vegetation and topography in the foreground.

While this scene would appear more altered than the existing condition, it would continue to be dominated by the natural form of the mountain and the lines associated with the transition from snowfield to forest cover. The ski area facilities would be more evident than under the existing condition, but still subordinate to the natural features of the scene. this view would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Figure 3-16. Viewpoint 6, Hwy. 46 approaching Sunrise Village, existing condition.

Figure 3-17. Simulation of Viewpoint 6, Highway 46 approaching Sunrise Village, Proposed Action.

Viewpoint 7: Dutchman Flat -Park

Under the Proposed Action, the Eastside pod would not be visible to the observer at Viewpoint 7. The lift and trail development would be around the mountain to the east, out of view. The proposed biomass facility, with its two-story structure and 50-foot smokestack, would be located in the lower left of the scene. Similar to Viewpoint 6, foreground forest screening and topography would hide the facility from view. As described for Viewpoint 6, scrubbers would reduce emissions to the point that no discernible haze or smoke would be evident in this view. Viewpoint 7 would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL under the Proposed Action.

Viewpoint 8: Edison Sno-Park

Under the Proposed Action, no new development would be noticeable from this viewpoint due to the screening provided by the foreground forest vegetation. The view of Mt. Bachelor would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Viewpoint 9: Road 45 approximately 2 miles south of Hwy. 45 Junction

Under the Proposed Action, the Eastside pod would be developed along the slopes on the right side of this scene. The new ski trails would not be discernible due to the oblique angle from this view point as well as the screening provided by the foreground vegetation. The view of Mt. Bachelor would remain unobstructed and completely unaltered, with the existing and proposed facilities located entirely out of view around the mountain to the north. This view of Mt. Bachelor would continue to meet or exceed the assigned VQO of Partial Retention and Moderate SIL.

Architectural Character

A stated goal in the MDP is to "Improve lodge and facility aesthetics by aligning more closely with [the BEIG], in the Cascadian architectural style." (MDP p.I-2). Plans and specifications for these new buildings and renovations have not been prepared to date. Under the Proposed Action, existing buildings would be re-modeled and new buildings would be constructed in a manner that is consistent with the goal of better aligning with the BEIG.

Viewpoint 10: Sunrise Village

The Proposed Action would include a re-model of the existing lodge to incorporate wood and stone into the façade. A new day lodge would be constructed to a design that would be similar in architectural character to the new administrative building in the West Village, described for the No-Action Alternative. These two projects would improve the adherence to the BEIG in the Sunrise Village.

The proposed biomass generation facility, with its two-story structure and 50-foot smokestack, would be located approximately 2,500 feet northwest of Sunrise Village (right of this scene). Similar to Viewpoint 6, foreground forest screening and topography would hide the facility from view at this location. As described for Viewpoint 6, scrubbers would reduce emissions to the point that no discernible haze or smoke would be evident from Sunrise base area.

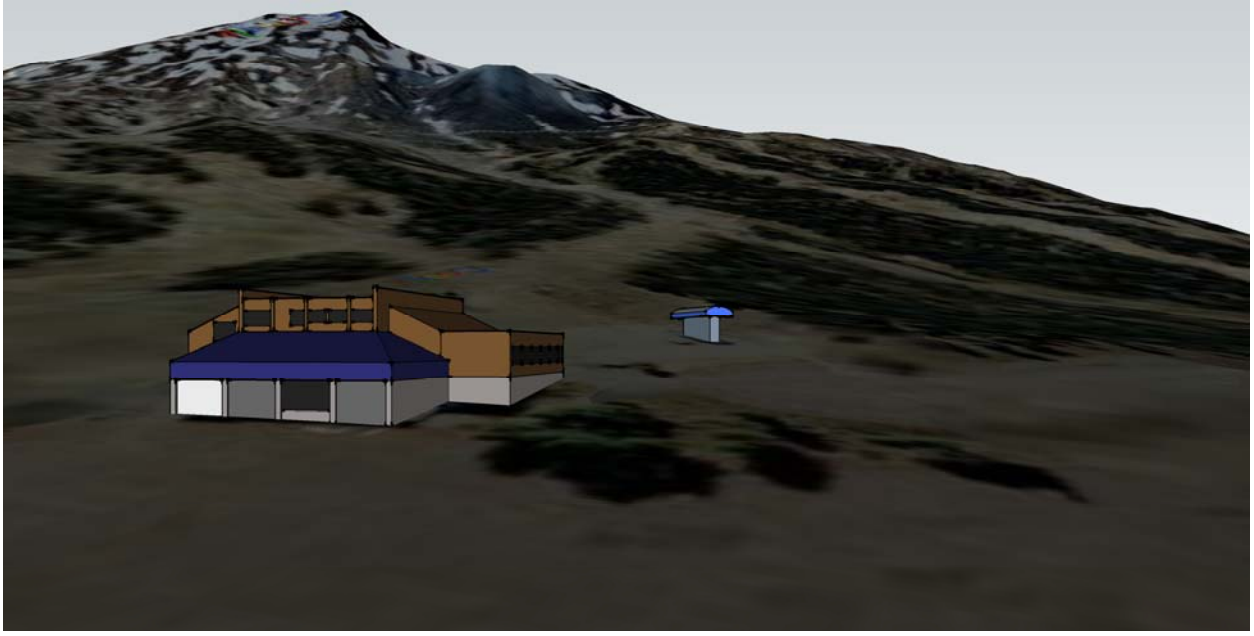

Figure 3-18. Simulation of Viewpoint 10, Sunrise Village, existing condition.

Figure 3-19. Simulation of Viewpoint 10, Sunrise Village, Proposed Action.

Viewpoint 11: West Village

Under the Proposed Action, West Village would witness numerous improvements to the architectural character of the buildings. Bachelor Ski and Sport would receive a new façade that included wood siding, wood beams, and stone veneer. Similarly, the West Village Lodge would be renovated, including additions on each end. The building would be sided with wood, and wood beams would be added to the façade along with stone veneer. The additions would be designed in a way that allows for the facades and roof lines to break up the scale of the building. The guest services building would receive a new façade, similar in character to the West Village Lodge. The existing, unsightly ski patrol and generator buildings would be removed. The generator building would be replaced by a new structure in the maintenance area.

Overall the improvements in the Proposed Action would provide a consistent architectural theme, which is currently missing in West Village (Figure 3-22). West Village would better adhere to the BEIG compared to the existing condition or the No-Action Alternative.

Figure 3-20. Simulation of Viewpoint 11, West Village, existing condition.

Figure 3-21. Simulation of Viewpoint 11, West Village, No-Action Alternative.

Figure 3-22. Simulation of Viewpoint 11, West Village, Proposed Action.

The proposed biomass generation facility, with its two-story structure and 50-foot smokestack, would be located approximately 3,500 feet southwest of West Village (left of this scene). Similar to Viewpoint 6, foreground/middleground forest screening and topography would hide the facility from view. As described for Viewpoint 6 and Sunrise Village, scrubbers would reduce emissions to the point that no discernible haze or smoke would be evident from West Village base area.

3.5.5.3.3 Alternative A – No New Eastern Catchline

Under Alternative A, the visual effects would be as described for the Proposed Action, with the exception of Viewpoint 5 (see Simulation of Viewpoint 5; Figure 3-15). Alternative A would not provide a catchline in the Eastside pod. Consequently, no catchline would be visible in the view from Viewpoint 5.

3.5.5.4 Cumulative Effects

None of the projects identified in Table 3-5 would impact visual resources on Mt. Bachelor at the same time as the Mt. Bachelor improvements described for the Proposed Action or Alternative A. Therefore, no cumulative effects on visual resources would result from the Mt. Bachelor improvements described for the Proposed Action or Alternative A.

3.5.5.5 Forest Plan Compliance

The Proposed Action and alternatives would all maintain a VQO of Partial Retention (SIL of Moderate) in the middleground and background, consistent with the prescribed VQO. The Forest LRMP provides one standard and guideline for MA-11:

- M11-21. Mixed conifer stands will be managed to perpetuate or enhance the characteristic (or natural) landscape. The characteristic landscape normally contains stands that are visually dense, though not necessarily continuous. Diversity in tree and shrub species and in diameter classes produces the desired visual character when viewed from recreation areas.

Discussion: Modification of the mountain hemlock stands will occur with the approval of the proposed Eastside lift, ski runs, and glade area but is consistent with other developed areas in the SUP area.

- M11-35. Within existing or future developed areas, management activities and facilities will meet Modification or a higher objective.

  Discussion: Viewed in the foreground, the base area facilities in the ski area would meet a VQO of Modification and corresponding SIL of Low, consistent with M11-35.

3.5.6 TRANSPORTATION

3.5.6.1 Scope of Analysis

Scoping and internal, interdisciplinary review identified the following environmental effects addressed in this analysis:

Issue: Proposed improvements may generate traffic increases and parking demand that are beyond the capacity of Hwy. 46 and available parking at the ski area.

Indicators: Compliance with Forest LRMP stipulations that Hwy. 46, also referred to as Century Drive and the Cascade Lakes Scenic Byway, be upgraded as necessary to ensure that 90 percent of ski area visitors can reach the ski area from Bend in 1 hour or less and that parking capacity be "tied to" highway capacity.

Analysis Area: Analysis of direct and indirect impacts focuses on Hwy. 46 and ski area parking lots. The analysis area for cumulative effects is defined as the four 6th-field subwatersheds originating on Mt. Bachelor.

3.5.6.2 Affected Environment

3.5.6.2.1 Introduction

Mt. Bachelor is located approximately 22 miles west of Bend, OR, on Hwy. 46. The highway provides access to Oregon's high Cascade Lakes area during the non-winter seasons, and it was officially designated as a National Forest Scenic Byway in 1989.

During the winter, Hwy. 46 is closed at Mt. Bachelor, and the highway is used by the winter recreating public, serving primarily as a "driveway" to Mt. Bachelor and other winter recreation parking facilities (sno-parks). Consequently, Forest LRMP direction for Mt. Bachelor's planning and improvements is closely tied to the capacity of the Hwy. 46 and the drive time from Bend to Mt. Bachelor (see section 3.5.6.5).

During peak visitation periods, such as holiday weekends, the behavior of Mt. Bachelor's guests shifts from a local, day-use pattern to a destination resort pattern. During these times, approximately 40 percent of the visits are derived from families staying at Sunriver (Rathbun, 2012). In addition, the average vehicle occupancy (AVO) increases during these peak times from 2.5 to 3.5 people per car as more vacationing families stay in Sunriver and Bend during these holiday weekends when peak visitation occurs.

3.5.6.2.2 Data Collection

The Oregon Department of Transportation (ODOT) indicates that no traffic data is currently collected by ODOT on Hwy. 46 (ODOT 2011a, ODOT 2011b). The most recently collected data was summer use in 2002. ODOT reports that this traffic counting station was never used for winter counts and that the station was ultimately removed in 2002 because of repeated theft of the equipment (ODOT 2011a). Deschutes County currently collects traffic data on the County-managed section of Hwy. 46 (i.e., the portion beyond Mt. Bachelor); however, this data also reflects summer use as that section is closed during winter (Deschutes County Roads Dept. 2011). In the past, Mt. Bachelor has collected traffic data during the morning arrival period to aid in making parking management decisions, but that data was not compiled or saved (Mt. Bachelor 2011). However, Mt. Bachelor does maintain records of parking utilization.

To develop a working model that reflects peak traffic volumes on Hwy. 46 and parking demand during the winter operation of Mt. Bachelor, the starting point was peak-day skier visits. While ski areas, like highways and most public facilities, are not designed for peak days, reporting these peak values provides an indication of worst-case conditions. Table 3-34 shows peak-day visitation at Mt. Bachelor for the previous five ski seasons. The MDP indicates that other guests (e.g., Nordic skiers, tubers) account for an additional 8 percent of visits on the peak days. Table 3-34 calculates the total peak guest number as 8 percent over the skier number for that given day.

Table 3-34. Peak-day visitation at Mt. Bachelor.

Year	Skiers Peak Day	Total Users Peak Day	Variation From Comfortable Capacity
2005/06	12,207	13,184	+31%
2006/07	11,431	12,345	+23%
2007/08	10,098	10,906	+9%
2008/09	9,430	10,184	+1%
2009/10	8,074	8,720	-13%

The MDP states that the existing parking at Mt. Bachelor comfortably accommodates 10,050 guests at one time. As shown in Table 3-34, peak-day guest numbers exceeded that figure during the 2005/06 – 2008/09 seasons. During these times, the parking lots were marshaled to achieve higher-than-normal densities, and any available overflow or roadside parking area was used.

3.5.6.2.3 Methods and Assumptions

Based on these visitor counts and the analysis in the MDP, the number of cars and buses parked at Mt. Bachelor on a capacity day can be calculated. As described above, during peak visitation periods Mt. Bachelor realizes an AVO of 3.5 people per car. In addition, bus shuttle operations accommodate 40 people per bus (Rathbun 2012). The number of vehicles on a capacity parking day can be projected on the basis of guest numbers and these vehicle occupancy figures. These figures in turn translate directly into the number of vehicle trips generated on that day.

The next step is to allocate those vehicle trips by hour to allow comparison to highway capacity figures. The projected volume of traffic would arrive during an AM peak period and depart during a PM peak period, both of which are generally distributed over a period of 4 hours. Table 3-35 shows the estimated

percentage breakdown of vehicles arriving during the AM peak hours and departing during the PM peak hours, based on patterns observed at Mt. Bachelor, as described by Rathbun (2011).

Table 3-35. Peak-hour volume percentages.

Peak-Hour Volumes	Percent of Total by Hour
AM Arrival Peak	
7:00 - 8:00	5%
8:00 - 9:00	25%
9:00 - 10:00	50%
10:00 - 11:00	20%
PM Departure Peak	
2:00 - 3:00	5%
3:00 - 4:00	35%
4:00 - 5:00	40%
5:00 - 6:00	20%

These methods and assumptions are carried into analysis of the impacts of the Proposed Action and alternatives in the following sections.

3.5.6.2.4 Demand on Hwy. 46

As noted above, Mt. Bachelor's existing parking lots comfortably accommodate 10,050 guests at one time. A capacity parking day at Mt. Bachelor would generate a total of 2,819 vehicle trips during the AM and PM peak periods. Table 3-36 shows the calculated peak-period hourly volumes for a capacity parking day under existing conditions, assuming 3.5 people per car and 5 buses with a capacity of 40 people each. The highest peak volume is realized during the 9:00 – 10:00 AM hour, during which 1,412 vehicles travel Hwy. 46 to access Mt. Bachelor.

It is important to note that Hwy. 46 is a two-lane road from Bend to the Hwy. 45 junction (Sunriver Road), which is also a two-lane road. These roads have a capacity of 1,700 cars per lane per hour (ODOT 2012). West of the intersection with the Sunriver Road, Hwy. 45 increases to a four-lane road, with a capacity of 3,400 cars per hour in either direction. ODOT (2012) and Mt. Bachelor (Rathbun 2012) estimate that on peak days, 40 percent of Mt. Bachelor's guests come from Sunriver, while 60 percent come from Bend. Table 3-37 shows the volumes on each segment of Hwys. 46 and 45 based on the hourly volumes described in Table 3-36. Also displayed in Table 3-37 is the Volume to Capacity ratio (V/C), a measure of roadway congestion, calculated by dividing the number of vehicles passing through a section of highway during the peak hour by the capacity of the section. (DKS Associates 2011). According to ODOT (2012), a V/C ratio of 0.65 or less is an acceptable measure of the road's ability to accommodate demand.

Table 3-36. Peak-hour traffic volumes on a current, capacity parking day.

Peak Hour Volumes	Number of Guests	% of Total Cars by Hour	Hourly Volume
AM Arrival Peak			
7:00 - 8:00	503	5%	141
8:00 - 9:00	2,513	25%	704
9:00 - 10:00	5,025	50%	1,412
10:00 - 11:00	2,010	20%	563
Total	**10,050**		**2,819**
PM Departure Peak			
2:00 - 3:00	503	5%	141
3:00 - 4:00	3,518	35%	985
4:00 - 5:00	4,020	40%	1,131
5:00 - 6:00	2,010	20%	563
Total	**10,050**		**2,819**

Table 3-37. Peak-hour traffic volumes by segment on a current, capacity parking day.

Peak Hour	Hourly Volume Below Sunriver	V/C Ratio	Hourly Sunriver Volume	V/C Ratio	Mt. Bachelor Total Volume	V/C Ratio
AM Arrival Peak						
7:00 - 8:00	84	0.05	56	0.03	141	0.04
8:00 - 9:00	422	0.25	281	0.17	704	0.21
9:00 - 10:00	847	0.50	565	0.33	1,412	0.42
10:00 - 11:00	338	0.20	225	0.13	563	0.17
Total	**1,692**		**1,128**		**2,819**	
PM Departure Peak						
2:00 - 3:00	84	0.05	56	0.03	141	0.04
3:00 - 4:00	591	0.35	394	0.23	985	0.29
4:00 - 5:00	678	0.40	452	0.27	1,131	0.33
5:00 - 6:00	338	0.20	225	0.13	563	0.17
Total	**1,692**		**1,128**		**2,819**	

Mt. Bachelor has exceeded the comfortable parking capacity on peak days in past years (see Table 3-34). On these days, the increase in peak traffic volumes would be commensurate with the parking capacity exceedance. For example, the 2005/06 peak day realized 13,184 guests, or 31 percent above the comfortable parking capacity of 10,050. The resulting increase in peak volumes would be expected to be 31 percent above those shown in Table 3-36. The 9:00 – 10:00 AM peak volume on this peak day is calculated as 1,850 cars (131 percent of 1,412) in the four-lane segment of Hwy 45, which translates to a V/C ratio of 0.54

Table 3-38 provides a similar analysis for the average of the top 20 days of visitation (average = 8,059 total guests) during the 2005/06 season, the highest recorded visitation in 5 years. The average of the top 20 days at Mt. Bachelor provides an estimate of the "typical busy day" at the ski area, such as Martin Luther King and President's Day weekends and other high-visitation days that do not necessarily reach or exceed the ski area's capacity. The 9:00 – 10:00 AM peak volume of 1,151 vehicles (V/C ratio of 0.34 at Mt. Bachelor), therefore, represents a volume of traffic that is realized several times during the operating season.

Table 3-38. Peak-hour traffic volumes – average of 20 highest 2005/06 days.

Peak Hour Volumes	% of Total by Hour	Hourly Volume	V/C Ratio
AM Arrival Peak			
7:00 - 8:00	5%	115	0.03
8:00 - 9:00	25%	576	0.17
9:00 - 10:00	50%	1,151	0.34
10:00 - 11:00	20%	461	0.14
Total		**2,303**	
PM Departure Peak			
2:00 - 3:00	5%	115	0.03
3:00 - 4:00	35%	806	0.24
4:00 - 5:00	40%	921	0.27
5:00 - 6:00	20%	461	0.14
Total		**2,303**	

This analysis indicates the minimum demand on Hwy. 46 during the ski season. The average busy day at the ski area results in a peak-hourly volume of 1,151 vehicles per hour (see Table 3-38). A capacity parking day results in 1,412 cars per hour (see Table 3-37), and during the 2005/06 season, Hwy. 46 experienced an estimated peak morning hour with 1,850 cars traveling to Mt. Bachelor. Wintertime use of sno-parks and other facilities along Hwy. 46 results in additional trips that are not accounted for in this analysis. Nonetheless, the demonstrated history of peak-hour traffic volumes associated with Mt. Bachelor shows that Hwy. 46 has accommodated up to 1,850 cars per hour accessing the ski area plus additional trips representing the other user groups along the highway during that day.

The Century Drive roundabout in Bend has been observed by ODOT, Deschutes County, and the City of Bend (Deschutes County Road Department 2011), although no specific traffic counts have been

conducted to observe ski area guest behavior and the associated traffic impacts on the roundabout. Nonetheless, agency personnel report that the roundabout is operating as it was intended to operate with regard to the peak traffic volumes associated with Mt. Bachelor (ODOT 2012, Deschutes County Road Department 2011).

3.5.6.2.5 Drive Time

As described in section 3.5.6.5, the Forest LRMP includes a standard stating that 90 percent of the travelers from Bend should be able to reach Mt. Bachelor within 1 hour. The DNF conducted monitoring during the 2011-2012 ski season to evaluate drive time from Bend to Mt. Bachelor. The DNF monitoring took place from December 14, 2011, through February 18, 2012, on 47 morning trips that included holiday/weekend peak-traffic volumes, typical day-use volumes, clear road conditions, and packed snow and ice. The longest recorded commute from Bend to the ski area was recorded on January 27, 2012, when traffic was heavy and ice was present on the roadway. On this day, the travel time was 45 minutes with an arrival at 9:30 AM, which is the peak arrival hour at Mt. Bachelor (see Table 3-37). Of the sampled days, two other travel times reached 45 minutes under varying traffic densities and road conditions. No travel times reached 1 hour. The minimum travel time was 20 minutes, which occurred twice: once on one clear, light-traffic trip, and once on a patchy ice roadway with moderately heavy traffic. The average of the 47 travel times measured is 29.2 minutes. With the exception of extreme weather or maintenance operations, all indications are that Hwy. 46 meets the Forest LRMP standard under the existing condition.

3.5.6.2.6 Deschutes County Intelligent Transportation System Plan

The Deschutes County Intelligent Transportation System (ITS) Plan was collectively developed by ODOT, the City of Bend, the City of Redmond, Deschutes County, the Bend Metropolitan Planning Organization, and the Federal Highway Administration (FHWA). The outcome of this plan is a 20-year deployment plan of ITS projects, which includes advanced technologies and management techniques, aimed to improve the safety and efficiency of the transportation system (DKS Associates 2011). Stakeholder responses to a questionnaire and public workshops resulted in several comments specific to Mt. Bachelor:

- [Hwy. 46] to Mt. Bachelor needs enforcement for passing areas, traction tire compliance, and vehicle speed.

- Need to encourage ridership on transit service to Mt. Bachelor to reduce problems on [Hwy. 46].

In response to the stakeholder input, the ITS plan includes projects that are intended to address these and other concerns. One proposed project would deploy video, electronic message signs, weather stations, dynamic speed limit signs, and speed photo enforcement on Hwy. 46 between Bend and Mt. Bachelor. Another would deploy electronic message signs to display information for drivers traveling from Sunriver towards Mt. Bachelor. At this time, neither of these projects has been implemented.

3.5.6.3 Direct and Indirect Effects

3.5.6.3.1 No-Action Alternative

Under the No-Action Alternative, Mt. Bachelor would continue to comfortably park 10,050 guests at one time, as described for the existing condition. Peak-hour traffic volumes would continue to be as described for the existing condition, with fluctuations based on annual visitation. The drive time from Bend is projected to remain under 1 hour, with the exception of inclement weather or accidents on the highway that impede traffic. Parking capacity would continue to be adequate for all but peak days per season of the magnitude experienced 2005 – 2009.

3.5.6.3.2 Proposed Action

Under the Proposed Action, Mt. Bachelor would expand parking, increasing the comfortable parking capacity from 10,050 guests to 13,120. This expansion would provide for the MDP's targeted base area capacity (lodges and parking) of 13,120 skiers per day, as well as Nordic skiers, tubers, and other user groups.

The Proposed Action would increase the peak traffic volume on a parking capacity day from 2,819 vehicles to 3,611, for an increase of 792 trips. Under the Proposed Action, Mt. Bachelor would increase bus service from the current 5 buses to 12 buses, consistent with public input received for the ITS Plan (see section 3.5.6.2.6). Table 3-39 shows the peak-period hourly breakdown based on the percentages in Table 3-35. The highest peak-hourly volume would continue to be during the 9:00 – 10:00 AM arrival period, with 1,806 cars traveling Hwy. 46 above the intersection with Hwy. 45 during this hour, resulting in a V/C ratio of 0.53. Below the Hwy. 45 intersection, this same peak hour would generate 1,083 trips for a V/C ratio of 0.64, which is close to the 0.65 limit for effective roadway operation but acceptable, according to ODOT (2012). This peak volume is below the highest projected volume experienced in 2005/06.

Table 3-39. Peak hour traffic volumes under the Proposed Action.

Peak Hour Volumes	Hourly Volume Below Sunriver	V/C Ratio	Hourly Sunriver Volume	V/C Ratio	Hourly Volume Above Sunriver	V/C Ratio
AM Arrival Peak						
7:00 - 8:00	108	0.06	72	0.04	181	0.05
8:00 - 9:00	542	0.32	361	0.21	903	0.27
9:00 - 10:00	1,083	0.64	722	0.42	1,806	0.53
10:00 - 11:00	433	0.25	289	0.17	722	0.21
Total	**2,167**		**1,445**		**3,611**	
PM Departure Peak						
2:00 - 3:00	108	0.06	72	0.04	181	0.05
3:00 - 4:00	758	0.45	506	0.30	1,264	0.37
4:00 - 5:00	867	0.51	578	0.34	1,445	0.42
5:00 - 6:00	433	0.25	289	0.17	722	0.21
Total	**2,167**		**1,445**		**3,611**	

It is expected that Mt. Bachelor would continue to realize occasional peak visitation, as demonstrated under the No-Action Alternative. By providing additional parking, however, the peaks would be comfortably accommodated at Mt. Bachelor's parking lots rather than exceeding their capacity as under the No-Action Alternative.

Under the Proposed Action, the drive time from Bend to Mt. Bachelor is projected to remain under 1 hour, given that the addition of 792 additional cars to the existing peak volumes maintains an effective V/C ratio and the current average drive time is approximately 30 minutes.

The Proposed Action would include moving the Sunrise entrance approximately 850 feet to the west. This new location would facilitate circulation patterns in the proposed parking configuration by eliminating several sharp turns and providing a straight driveway to the parking areas. In addition, the proposed entrance provides an improved line of sight and sight distance in the east and westbound directions compared to the existing entrance. Also, compared to the existing entrance, the proposed location would provide a longer visible area for traffic to move into the left lane for turning into Sunrise and moving right to continue on to West Village. As a result, no additional turn lane is proposed – the turning movement from Hwy. 46 to the Sunrise entrance would operate under similar parameters as the existing entrance, but with improved line of sight and sight distance.

3.5.6.3.3 Alternative A – No New Eastern Catchline

Under Alternative A, parking, peak traffic volumes, drive time and the Sunrise entrance would be as described for the Proposed Action, as elimination of the lower catchline and associated selected tree removal would not noticeably affect capacity, parking, or traffic volumes.

3.5.6.4 Cumulative Effects

Of the 11 cumulative actions described in Table 3-5, only no. 9, the Kapka Butte Sno-Park, has the potentially to generate cumulative effects on the transportation factors addressed in this analysis. The proposed sno-park would be located between Kapka Butte and the junction of Hwy. 46 and Hwy. 45, approximately 2 miles east of Mt. Bachelor. Its parking lot would include approximately 70 spaces for vehicles with trailers and 40 spaces for vehicles with no trailers, for a total of 110 vehicles. Users of the sno-park would generate new vehicle trips along Hwy. 46 and would overlap in space (Hwy. 46) and time (AM and PM peak volumes at Mt. Bachelor) with the direct effects of the Proposed Action and Alternative A. Given the comparatively low parking capacity and distributing the 110 vehicles throughout the AM and PM peak traffic periods, the added traffic volume would add approximately 55 vehicles to the peak hour, assuming that sno-park users follow similar arrival and departure periods and approximately half of the users arrive between 9:00 and 10:00 AM.

Adding 55 vehicles to the highest peak for Mt. Bachelor, the 9:00 – 10:00 AM peak hour, the total volume would increase to 1,138, and the V/C ratio would be 0.67, slightly above the 0.65 planning limit for effective operations, but well-below the capacity of Hwy.46 in this location. Therefore, Kapka Butte Sno-Park would not cumulatively increase peak-hour traffic above the historically-demonstrated capacity of Hwy. 46. Similarly, the sno-park is unlikely to increase the drive time for Mt. Bachelor guests to over 1 hour from Bend.

Project no. 6, Alternative Transportation Planning, would shift management of the shuttle bus service from Mt. Bachelor to Bend Area Transit and would have no notable cumulative effect. Any subsequent efforts to promote mass transit to the ski area would generate a positive cumulative effect by helping to reduce Hwy. 46 traffic and demand for parking at Mt. Bachelor.

The ITS Plan would implement signage and other electronic traffic management tools along Hwy 45 and Hwy. 45 to better inform drivers of traffic conditions (DKS Associates 2011). These projects, when implemented, would help to address inefficient road operations during inclement weather, heavy traffic periods, and during maintenance of the roadways.

3.5.6.5 Forest Plan Compliance

Direction in the Forest LRMP includes the following standard and guideline for Management Area 11, M11-9, relevant to this analysis (emphasis added):

- M11-9. Mt. Bachelor ski Area will continue to expand to its approved capacity of approximately 26,000 people each day. In reaching this capacity, the following principles will be maintained:
    - No public overnight accommodations on the mountain.
    - A balance between lift, lodge, run, and parking capacity will be maintained.
    - ***Parking capacity will be tied to the highway capacity.***
    - Water use from Todd Creek should result in no modifications of the water level in Todd Lake and no significant depletion of water needed by the riparian plants along Todd Creek.
    - Use of mass transit will increase.
    - ***The road system serving the mountain will be upgraded so that 90 percent of the users will be able to reach the ski area within one hour travel time from Bend.***
    - The mountain will be a center for both alpine and Nordic skiing.
    - Skier densities will be no more than 4-8 skiers/acre in order to maintain the uncrowded feeling for which the area is known.

  Discussion: As described in the preceding sections, the Proposed Action includes parking improvements that are intended to better balance with historic peak visitation and the resulting traffic volumes on Hwy. 46. It is this historic visitation that defines the demand on Hwy. 46 during the winter months. The drive time from Bend to Mt. Bachelor is projected to remain under 1 hour, as described in section 3.5.6.3.2.

3.6 OTHER DISCLOSURES

3.6.1 FOREST PLAN AMENDMENTS

No amendments of the Forest LRMP would be required for the Proposed Action or alternatives.

3.6.2 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA requires that an EIS considers "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). This includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and to fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA, Section 101).

Mt. Bachelor's SUP allocates the National Forest System lands occupied by the ski area to provision of winter recreation opportunities through the term of the permit. The Forest LRMP's designation of the area as MA 11 – Intensive Recreation supports this land use. This land use has some inherent impacts. This analysis identifies several adverse environmental effects (sections 3.6.3 and 3.6.4), but few have important implications for the long-term productivity of the site. Surface and subsurface water systems are not notably affected. Soil loss and fertility decreases are minimal. Vegetation changes may even increase productivity and, in any case, are reversible through succession. The question here is whether this land use justifies any loss in long-term productivity of the resources involved.

Through issuance of ski area SUPs, the Forest Service helps provide outdoor recreation for a high number of visitors on a relatively small proportion of our National Forest System lands; in 2008, the most recent year for which Forest visitor data is available, Mt. Bachelor accounted for 22 percent of the total recreational site visits on the DNF but involved only 0.5 percent of the Forest's area. Mt. Bachelor is the only ski area on the DNF, so Forest users have no other option for the types of recreation offered there.

In short, the potential impacts of this proposal on the long-term productivity of the resort's SUP area are minimal, especially in relation to the value of the short-term use. No important distinction among the Proposed Action and alternatives can be drawn.

3.6.3 Unavoidable Adverse Effects

Some environmental impacts identified in this analysis are unavoidable, despite efforts to mitigate them. By resource, these are as follows:

Air Quality (section 3.4.1). Emissions of NO_x and CO_2 would increase due to the proposed biomass plant, but these impacts would be more than offset by elimination of the propane burners that the plant would replace.

Geology and Soils (section 3.4.2). Facilities construction would result in 34 new acres of permanent detrimental soil condition, primarily building footprints or parking lots, under the Proposed Action or Alternative A.

Water and Watershed Resources (section 3.4.3). No unavoidable adverse effects.

Vegetation (section 3.4.4). About 212 acres of permanent vegetation cover conversion to ski run or developed cover types under Proposed Action, 201 acres under Alternative A. Roughly 6 acres of habitat for whitebark pine, a candidate for federal listing and a Forest Service Sensitive species would be cleared under both the Proposed Action and Alternative A.

Wildlife (section 3.4.5). About 8.9 acres of potential northern spotted owl habitat, determined to be currently unsuitable, would be removed or degraded under the Proposed Action or Alternative A. Dead wood habitat on 147 forested acres would be removed through clearing, grading, or excavations under the Proposed Action and 10 acres less under Alternative A. Connectivity would be reduced due to conversion of mountain hemlock stands (212 acres) and mixed conifer stands (44 acres) to non-forest cover types under the Proposed Action and similar impact under Alternative A. Noise and human activity would increase during construction and operation phases, both summer and winter. Other Unavoidable Adverse Effects to wildlife under the Proposed Action and Alternative A include:

- May affect, not likely to adversely affect northern spotted owl.
- May impact wolverine, Pacific fisher, or Townsend's big-eared bat individuals or habitat but would not likely contribute to a trend toward federal listing or loss of viability to the population or species.
- Would affect less than 0.85 percent of potential Forest-wide reproductive habitat for the most limited species, the peregrine falcon, and less than 0.08 percent for the remaining Management Indicator Species.

Undeveloped Land (section 3.5.1). Potential Wilderness Area would be reduced by 447 acres under the Proposed Action, 280 acres under Alternative A.

Safety (section 3.5.2). Elimination of the lower catchline would increase risk of skier stranding under Alternative A.

Recreation (section 3.5.4). Relocation of the tubing hill and snowplay area under the Proposed Action or Alternative A would add slightly to the noise level in the vicinity of the Nordic Lodge and on the re-aligned portion of Blue Jay's way.

3.6.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitment of a resource means that, once committed to a given use, the resource is lost to other uses. In general this term applies to non-renewable resources (e.g., minerals, geologic features, or historic sites) or to resources which are renewable only over a very long period of time (e.g., soil fertility or perhaps old-growth forests). Most of the impacts identified in this analysis do not fall in this category. If the decision were made to terminate the resort's permit, the site could be reclaimed, and most resource functions could be returned to their previous levels. However, there may be some exceptions:

- Soil productivity at some of the larger grading areas, such as the Eastside pod and the Sunrise and West Village parking lots, would not return to previous levels for a long time, if ever.
- Succession to pre-disturbance vegetation types would also be a slow process, particularly for old-growth forest stands.
- Alteration of lava outcrops and other geologic features would clearly be irreversible.

Irretrievable commitments of resources involve lost use or productivity of resources. Any lost use or production resulting from this proposal's commitment of resources to recreation development would fall in this category. This would include some minor impacts such as timber not harvested, or water used for snowmaking rather than other downstream uses. But the most important irretrievable impact is probably to backcountry recreation and the amenity values lost when a natural site like the Eastside pod is developed. While Mt. Bachelor would retain a basically natural character under this proposal, evidence of the area's allocation to developed recreation would never be far from sight.

While this proposal involves both irreversible and irretrievable commitments of resources, most of the commitments were made decades ago when the ski area was developed, and they are likely to continue. The incremental impact of this proposal would be minimal, and no important distinctions can be made among the Proposed Action and alternatives in this regard.

3.6.5 INCOMPLETE AND UNAVAILABLE INFORMATION

No information necessary to appropriate analysis and disclosure of the environmental effects of the Proposed Action and alternatives was incomplete or unavailable.

3.6.6 ENERGY REQUIREMENTS

Most visitors to Mt. Bachelor currently travel to the ski area in private vehicles, and both the Proposed Action and Alternative A include parking lot expansions to accommodate these vehicles. However, as discussed in the air quality analysis (section 3.4.1) and transportation analysis (section 3.5.6), the objective of these improvements is to achieve the visitor levels previously recorded in the mid-2000s, so anticipated increases in energy use to get to the ski area are within the range experienced in the past. Furthermore, as discussed under cumulative effects (section 3.30, the DNF is working with local and regional transportation services to identify and implement alternative ways of transporting recreational visitors to the Forest.

The other important aspect of energy use to note is the proposed biomass plant (section 2.2.3.3). This plant would replace the propane burners currently used to produce steam to melt walkways and heat buildings at the ski area. Converting from propane to biofuel that generally goes to waste in the area at

this point would result in considerable energy savings. The change is discussed in terms of emissions reductions, a reciprocal of energy savings, in the air quality analysis (section 3.2.1.3.2).

Beyond that, implementation of the Proposed Action or Alternative A would increase energy demands over the next 10 years in terms of construction vehicles and machinery. In the longer term, the additional ski lifts and buildings would consume energy, but the increase would be offset by removal of less efficient, older facilities. Overall, the Proposed Action and Alternative A would not entail significant energy requirements.

3.6.7 CLIMATE CHANGE

The Forest Service has characterized the agency's response to the challenges presented by climate change as "one of the most urgent tasks facing the Forest Service" and stressed that "as a science-based organization, we need to be aware of this information and to consider it any time we make a decision regarding resource management, technical assistance, business operations, or any other aspect of our mission." Accordingly, it is agency policy to consider, when appropriate, the effects of a proposed project on climate change (i.e., greenhouse gas [GHG] emissions and carbon cycling) as well as the effects of climate change on a proposed project. However, the agency also recognizes that it is not currently feasible to quantify the indirect effects of individual or multiple projects on global climate change and therefore determining significant effects of those projects or project alternatives on global climate change cannot be made at any scale. (Forest Service 2009.)

Regarding this project's potential effect on climate change, the Intergovernmental Panel on Climate Change has summarized the contributions of human activity to climate change in its *Fourth Assessment Report* (IPCC 2007). The top three human-caused contributors to greenhouse gas emissions (1970 – 2004) are fossil fuel combustion (56.6 percent of global total), deforestation (17.3 percent), and agriculture/waste/energy (14.3 percent). This project would potentially affect the first two contributors.

In terms of fossil fuel combustion, two sources are most important in terms of lasting effects, vehicle use by ski area visitors and energy use to heat buildings and melt snow on walkways. Most visitors to Mt. Bachelor currently travel to the ski area in private vehicles, and both the Proposed Action and Alternative A include parking lot expansions to accommodate these vehicles. However, as discussed in the air quality analysis (section 3.4.1) and transportation analysis (section 3.5.6), the objective of these improvements is to achieve the visitor levels previously recorded in the mid-2000s, so anticipated increases in energy use to get to the ski area are within the range experienced in the past. Furthermore, as discussed under cumulative effects (section 3.3), the DNF is working with local and regional transportation services to identify and implement alternative ways of transporting recreational visitors to the Forest. As a result, the potential for increases in vehicular emissions is minor.

In terms of energy use for heating buildings and walkways, the Air Quality (section 3.4.1) concludes that emissions of NO_x and CO_2 would increase due to the proposed biomass plant, but these impacts would be more than offset by elimination of the propane burners that the plant would replace. Again, no notable increase in GHG is anticipated. See also section 3.6.6 above.

The primary potential effect on carbon cycling is associated with vegetation removal, particularly conversion of forest or other vegetated cover to bare ground or developed cover type (e.g., buildings and parking lots). As indicated in the geology and soils analysis (section 3.4.2), only 34.3 acres, or 4.5 percent of the project area, would be converted to a detrimental soil condition incapable of supporting vegetation under the Proposed Action or Alternative A.

Given these minor effects on GHG and carbon cycling, the direct and indirect effects of the Proposed Action or Alternative A to GHG on climate change at the global scale would be negligible. Because the

direct and indirect effects would be negligible, contributions to cumulative effects on climate change would also be negligible.

Regarding the impact of climate change on the proposed project, climate change is a significant concern to the ski industry. The University of Washington's Climate Impacts Group examined climate change scenarios for the Pacific Northwest generated by 10 different climate models. All models projected temperature increases throughout the year, and most predicted the greatest increases during the summer. Most also predicted small decreases in summer precipitation but small increases in winter precipitation, with little change in mean amounts through mid-century. However, the precipitation projections were more variable than the temperature forecasts, and the precipitation predictions fell within the variation experienced through the 20th century. (Climate Impacts Group 2006.)

While climatic change may be a factor in precipitation and snowfall predictions, and therefore on the long-term economic viability of a ski area, the inherent uncertainty regarding its implications makes meaningful impact assessment and responsive planning impossible. However, while a ski area cannot predict the snowfall in any given year, it can adjust operations to account for year-to-year variation. Given the uncertainty as to future effects of climate change, Mt. Bachelor's demonstrated ability to manage successfully in a variable environment is anticipated to preclude any major climate change impact on the ski area or on the prospects for this proposed project.

3.7 CONSISTENCE WITH LAWS, REGULATIONS, POLICIES, AND PROCEDURES

3.7.1 ENDANGERED SPECIES ACT

The analysis of potential impacts on federally listed plant and wildlife species documented in sections 3.4.4 and 3.4.5, respectively, and in the Biological Assessment prepared for this analysis (and incorporated by reference) document compliance with the Endangered Species Act. About 6 acres of a forest type that includes whitebark pine, a candidate for federal listing, would be cleared or graded under the Proposed Action or Alternative A. Both the Proposed Action and Alternative A may affect but are unlikely to adversely affect the threatened northern spotted owl due to removal or degradation of potential habitat that has been determined to be currently unsuitable.

3.7.2 CLEAN WATER ACT

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of all waters of the U.S. in order to protect their beneficial uses – in this case, those assigned by the Oregon Department of Environmental Quality (ODEQ). Beneficial uses reflect resources or activities that would be directly affected by a change in water quality or quantity.

As noted in section 1.7 and discussed in detail in the water and watershed resources analysis (section 3.4.3), the project area includes no live water and has no surface hydrologic connectivity with waters outside the project area. These factors limit the scope of potential impacts on water quality. The disturbed site rehabilitation practices, design criteria, and mitigation measures (section 2.2.6) include a requirement for DNF approved site rehabilitation plans incorporating BMPs, including those described in *Ski Area BMPs: Guidelines for Planning, Erosion Control, and Reclamation* (Forest Service 2001a). However, given the lack of surface water and hydrologic connectivity, such mitigative considerations bear more on soil loss and productivity than water quality.

The only issue addressed in the water and watershed resources analysis (section 3.4.3) that falls under the purview of the Clean Water Act is the potential for groundwater contamination associated with the proposed parking lots and drain field expansion. As this analysis concludes, no reduction in groundwater

quality would occur as a result of these actions under the Proposed Action (section 3.4.3.3.2) or Alternative A (section 3.4.3.3.1).

Table 1-1 identifies responsibilities of other agencies regarding compliance with the CWA, including the EPA and COE. Based on the conclusions noted above and the fact that there are no wetlands in the project area, the only relevant responsibility is EPA review of pertinent findings of this EIS.

3.7.3 SURVEY AND MANAGE DIRECTION

All Forest Service projects, programs, and activities in the NWFP area are reviewed for possible effects on Survey and Manage species. On July 2011, the Survey and Manage Settlement Agreement was signed, which directs the Forest Service to use the list of Survey and Manage species provided with the new settlement agreement for decisions signed after September 30, 2012 (Forest Service/Bureau of Land Management 2011).

As detailed in the vegetation analysis (section 3.4.4) and wildlife analysis (section 3.4.5), pre-field analysis was completed to identify Survey and Manage species potentially occurring in the project area, and surveys for these species have been conducted in accordance with the 2001 ROD's standards and guidelines. Conclusions can be summarized as follows.

The only three wildlife Survey and Manage species potentially occurring in the project area are the evening fieldslug, Crater Lake tightcoil, and great gray owl. There are no known occurrences of either species within the project area or in a 0.25-mile buffer around the project area. There is no suitable evening fieldslug or Crater Lake tightcoil habitat, and the project area is considered marginal habitat for great gray owl due to several factors discussed in the analysis. Furthermore, pre-disturbance surveys are not required for the great gray owl when proposed activities are located above elevations of 6,000 feet (Quintana-Coyer et al. 2004). Surveys conducted for great gray owl were completed in the area adjacent to the Mt. Bachelor SUP area for a different project in 2011. None were detected.

Pre-field review determined that 28 plant species which require pre-disturbance surveys could occur in the project area. All are nonvascular plants, specifically fungi. Because old growth forest occurs throughout the project area, protocol surveys are being completed for these fungi species. The first year's spring surveys were completed during summer of 2011, and the first year's fall surveys were completed in October 2011. No Survey and Manage species were located during these surveys. The second year's spring and fall surveys were conducted in 2012. Based on survey results, no Survey and Manage plant species are carried into the impact analysis as none are known to occur in the project area.

3.7.4 PERSONS WITH DISABILITIES

In accordance with Forest Service regulations, compliance with the accessibility guidelines of the Americans with Disabilities Act of 1990 (ADA) and Uniform Federal Accessibility Standards (UFAS) of Section 504 of the Rehabilitation Act of 1973 apply to the design of structures proposed as part of this project. The ADA applies because Mt. Bachelor operates as a "public accommodation," that is, it is a business open to the public. Section 504 applies because ski areas operate under special-use permits authorized by a federal agency, the Forest Service. Implementation guidelines for Section 504 that apply to recreation special-use permit holders are located in 7 CFR 15b.

UFAS of Section 504 and ADA accessibility guidelines were combined in November 8, 2005, and are now known as the Architectural Barriers Act Accessibility Standard (ABAAS). The ABAAS replaces the former guidelines as the current standard for federal agencies, including the Forest Service. These guidelines are reflected in the *Accessibility Guidebook for Ski Areas Operating on Public Lands – 2005 Update* (Forest Service 2005). DNF engineering review of construction plans prior to notification to proceed will ensure compliance with ABAAS.

3.7.5 Executive Order 11644 - Use of Off-Road Vehicles on Public Lands

Public use of off-road vehicles is not authorized within Mt. Bachelor's SUP area. Only the ski area is authorized to use such vehicles in conducting authorized activities. The Proposed Action and Alternative A would not alter this, so this order is not relevant.

3.7.6 Executive Orders 11988 and 11990 - Protection of Floodplains and Wetlands

As discussed in the vegetation analysis (section 3.4.4), there are no wetlands in the project area and thus no potential for direct effects. The water and watershed analysis (section 3.4.3) states that there are also no surface waters and thus no floodplains subject to direct effects. The lack of surface hydrologic connectivity effectively eliminates the potential for indirect impacts on these resources.

3.7.7 Executive Order 13186 - Protection of Migratory Birds

This order and the protection it affords to migratory birds is discussed in the wildlife analysis (section 3.4.5). That analysis concludes that potential impacts on reproductive habitat Forest-wide for the migratory birds in the MIS category (i.e., Cooper's hawk, northern goshawk, red-tailed hawk, peregrine falcon, black-backed woodpecker, three-toed woodpecker, and pileated woodpecker) would be minimal, between 0.08 and 0.85 percent. As these species represent other species utilizing similar habitats, impacts on other migratory birds are also projected to be minor. Analysis of Alternative A reaches the same conclusion.

3.7.8 Executive Order 12898 - Environmental Justice

The Proposed Action or Alternative A would not have a disproportionately high or adverse effect on minority or low-income populations. Scoping did not reveal any issues or concerns associated with the principles of environmental justice. No mitigation measures to offset or improve adverse effects on these populations have been identified. All interested and affected parties will continue to be involved with the public involvement and decision process.

3.7.9 USDA Civil Rights Policy

The Proposed Action and Alternative A would not result in any civil rights impacts on Forest Service employees, visitors to Mt. Bachelor, or the general public. All would be free from reprisal or discrimination based on race, color, national origin, sex, religion, age, disability, sexual orientation, marital or familial status, political beliefs, parental status, receipt of public assistance, or protected genetic information.

3.7.10 Prime Farmland, Rangeland, and Forest Land

The Proposed Action and Alternative A do not include any use of prime farmland or rangelands and the term "prime forest land" does not apply to the National Forest System lands. Under the Proposed Action and Alternative A, National Forest System lands would be managed with sensitivity to the effects on adjacent lands.

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CHAPTER 4: LIST OF PREPARERS

Forest Service Personnel		
Name	**Title**	**Responsibility**
Amy Tinderholt	ID Team Lead/Recreation Team Leader	Project management and oversight.
Brant Petersen	Deputy District Ranger	Project management and oversight.
Barbara Webb	District Wildlife Biologist	Technical oversight for Wildlife.
Tom Walker	District Fisheries Biologist	Technical oversight for Fisheries and Aquatics.
Rick Wesseler	District Recreation Special Uses	Technical oversight for Recreation.
Penni Borghi	Forest Archaeologist	Technical oversight for Cultural Resources.
Charmane Powers	District Botanist	Technical oversight for Vegetation.
Robin Gyorgyfalvy	Forest Landscape Architect	Technical oversight for Landscape Architecture and Scenic Resources.
Rob Tanner	Assistant Forest Hydrologist	Technical oversight for Water.
Peter Sussman and Todd Reinwald	Forest and District Soils Scientists	Technical oversight for Soils.
Nick Swagger and Alex Enna	District Fire Management Ecologists	Technical oversight for Fire Management.
Pete Powers	District Silviculturist	Technical oversight for Silviculture.
Beth Peer	District NEPA Coordinator	Project management and oversight.
Alan Buehrig	Forest Geotechnical Engineer	Technical review of Proposed Action.
Lisa Anheluk	Forest Facilities Engineer	Technical review of Proposed Action.
Maureen Durrant	District GIS Specialist	Technical oversight for GIS.
Rick Dewey	Botanist	Survey and technical oversight for non-vascular plants.
Cirrus Team Members		
Neal Artz	Project Manager	Project management, NEPA oversight and technical editing.
Bill Granger	Principal, ReAlign Environmental	Recreation, Scenic Resources, Undeveloped Land, Safety, and Transportation analyses.
Eric Duffin	Watershed Hydrologist	Geology and Soils, Watershed and Water Resources analyses.
Tim Royer	Terrestrial Ecologist	Wildlife and Fisheries analysis.
John Stewart	Terrestrial Ecologist	Vegetation analysis.

Cirrus Team Members (cont'd)		
Kaleb Evans	Landscape Architecture Technician	Landscape architecture analysis.
Clay Lebow	Principal Investigator, Applied Earthworks, Inc.	Cultural Resources analysis.
Victoria Smith	Staff Archaeologist, Applied Earthworks, Inc.	Cultural Resources analysis.
Lori Marquez	Principal, Marquez Environmental	Air Quality analysis.

CHAPTER 5: CONSULTATION AND COORDINATION

5.1 PRE-NEPA PHASE

Mt. Bachelor's MDP process included a significant amount of interaction by Mt. Bachelor, Inc., with key stakeholders, the general public, and the DNF prior to submission of the MDP and initiation of this NEPA review, as summarized below.

Timeline

August, 2009	Draft MDP delivered to Mt. Bachelor by Ecosign Mountain Resort Planners, Ltd.
September, 2009	Key stakeholder presentation/feedback meetings commence: • 9/10 Oregon Department of Transportation & DNF road planners. • 10/20 Mt. Bachelor management team. • 10/22 Elected officials (City of Bend, Deschutes Co., congressional reps). • 10/26 Oregon Wild. • 10/27 Mt. Bachelor Ski Education Foundation board of directors. • 10/27 Central Oregon Visitors Association board of directors. • 10/27 Bend Backcountry Alliance. • 10/29 Bend Chamber of Commerce board of directors.
October, 2009	Public presentation/feedback meetings commence: • 10/29 Boys & Girls Club, Bend, OR. • 11/4 Holy Trinity Catholic Church, Sunriver, OR. • 11/6 Portland Ski Show, Expo Center, Portland, OR. • 11/10 Riverhouse Convention Center, Bend, OR.
Winter/spring 2010	Analysis of public feedback and review of MDP revisions with DNF.
May, 2010	Cirrus Ecological Solutions, LC, retained as NEPA contractor.
Summer/fall, 2010	Ongoing analysis, review, revision of Draft MDP.
November 3, 2010	Final MDP submitted by Mt. Bachelor to DNF .
January 14, 2011	MDP accepted by DNF.
March, 2011	NEPA process began; NOI published and scoping began.

Prior to stakeholder meetings *An Informational Guide for Key Stakeholder Meetings* was emailed to each meeting participant. The 6-page Guide included historical background on Mt. Bachelor and how the business has evolved since opening in 1958, existing conditions (visitor patterns, level of competition, customer preferences, changing customer mix, weather impacts), the specific goals for the MDP, a narrative summary of the proposed projects within the MDP, and a summary table of capacities for the proposed MDP compared to prior Forest Service capacity approvals. In addition, a series of maps was included as an addendum to the Guide. Participants were asked to consider the Guide, the presentation

and their own experiences at Mt. Bachelor when making their suggestions and comments with respect to the proposed MDP.

A press release and emails to local pass holders and non-local customers announced four public meetings to present the MDP and solicit comments. In the release, the public was invited to review the informational guide online prior to meetings on Mt. Bachelor's website. At each public meeting, verbatim comments were recorded in order to weight and prioritize the input. Public input was reviewed and considered, with numerous instances where the MDP was revised to incorporate stakeholder and public feedback and suggestions in the final version submitted to the DNF.

Reflecting this collaborative process, the final version of the MDP submitted to the DNF included changes and improvements to the original draft as a direct result of input by stakeholders, the general public and DNF personnel.

5.2 PUBLIC SCOPING

In March 2011, the DNF issued public and government-to-government scoping notices summarizing the Proposed Action and inviting comments regarding the scope of the associated NEPA and National Historic Preservation Act (NHPA) review.

A public scoping notice was mailed to 180 agencies, organizations, and individuals on the DNF mailing list, and a separate notice providing more detail on NHPA review was mailed to 19 Tribal representatives. The notices were also posted on the DNF website at http://www.fs.fed.us/r6/centraloregon/projects/ and made available on CD or in hard-copy form to anyone requesting them. The mailing list is available in the Project Record.

The scoping period formally began on April 26, 2011, when the DNF's Notice of Intent to Prepare an EIS (NOI) appeared in the Federal Register, and closed on May 26, 2011. Comment letters were received from 2 agencies, 4 organizations, and 13 individuals. The scoping notice and comment letters are available in the Project Record.

A scoping report was prepared that assessed all comments received to determine which affected the scope of the analysis documented in this EIS. A copy of the report is included as Appendix A to this EIS. Concurrently, the DNF and contractor Interdisciplinary Team (ID Team) assembled to complete this EIS reviewed and discussed the Proposed Action to determine the scope of the analysis.

Mt. Bachelor invited two of the Nordic skiers who had raised concerns regarding the relocation during scoping to tour the proposed site and discuss the project. This occurred on April 3, 2012. According to Mt. Bachelor's report, the Nordic skiers' concerns were allayed reducing the impetus to consider an alternative to the proposed tubing hill relocation (section 2.4.2).

5.3 NOTICE AND COMMENT ON THE DRAFT EIS

The DNF prepared a Draft EIS addressing proposed improvements at Mt. Bachelor in accordance with agency NEPA procedures (36 CFR 220). On May 21, 2012, a letter was sent to 198 agencies, Tribal groups, organizations, and individuals on the project mailing list notifying them of the document's availability on the DNF website and providing instructions on submitting comments. Several hard copies of the document were mailed to individuals who had previously requested them. The Notice of Availability of the Draft EIS was published in the Federal Register on June 1, 2012, initiating a 45-day comment period, as stipulated in the agency's notice and appeal regulations (36 CFR 215). Comments were received from 3 agencies, 9 organizations, and 16 individuals.

A report identifying commenters, detailing the comments received, and providing DNF responses to substantive comments, in accordance with agency regulations at 36 CFR 215.6, is attached as Appendix A to this Final EIS.

Comments on the Draft EIS included the standard EPA and the Department of the Interior reviews of the adequacy of the Draft EIS. Their conclusions, respectively, were as follows:

> Because our review did not identify any environmental impacts that should be avoided in order to fully protect the environment, we [the EPA] have rated this EIS as Lack of Objections (LO).

> The Department [of the Interior] does not have any comments to offer.

These letters are attached as Appendix D to this EIS.

5.4 OTHER CONSULTATION

As noted in the vegetation analysis (section 3.4.4.5), no federally listed plant species occur on the DNF or would be affected by the Proposed Action or alternatives. Therefore, no ESA consultation is required for plant species.

The wildlife analysis notes that a biological assessment has been prepared as part of this NEPA review, addressing the northern spotted owl occurrences documented during the protocol surveys conducted for this analysis. It provides more detailed analysis supporting a conclusion that the Proposed Action may affect but is unlikely to adversely affect the northern spotted owl. Informal consultation was completed between the DNF and the FWS on April 13, 2012. Section 2.2.6 notes two measures regarding seasonal restrictions on activity around the new activity center and calling for spot check surveys in 2013 and 2014. These measures will be made a condition of approval in the DNF decision based on this EIS. The Oregon Department of Fish and Wildlife was also consulted in regard to wildlife concerns regarding the Proposed Action (Ardt, G. 2011).

As discussed in the heritage resources analysis (section 3.5.3.5), all consultation regarding heritage resources required under the National Historic Preservation Act, Executive Order 11593 has been completed. A specialist report (Smith et al. 2011) was submitted for SHPO review, and concurreence letters dated February 1 and 2, 2012, are included in the Project Record.

In completing the transportation analysis (section 3.5.6), consultation with the Deschutes County Roads Department (Deschutes County Roads Dept. 2011) and ODOT (ODOT 2011a and ODOT 2011b) took place.

5.5 DISTRIBUTION OF THE EIS

The following agencies, organization, and individuals were notified of the availability of the Draft and Final EIS:

5.5.1 AGENCY

Advisory Council on Historic Preservation, Planning and Review
Arnold Irrigation District, Attn: Shawn Gerdes
Blue Ribbon Coalition, Attn: Joni Mogstad
Bureau of Reclamation, Bend Field Office, Attn: Kathleen Cushman
Bureau of Reclamation, Bend Field Office, Attn: Leo Busch
Burns Paiute Tribe, Attn: Amos Firstraised, Natural Resources

Burns Paiute Tribe, Attn: Dean Adams
Burns Paiute Tribe, Attn: Diane Teeman
Burns Paiute Tribe, Attn: Kenton Dick,
Burns Paiute Tribe, Attn: Teresa Peck, Cultural Resources
Burns Paiute Tribe, Attn: Wanda Johnson
Central Oregon Irrigation District, Attn: Steve Johnson
Chief of Naval Operations (N45), Energy and Environmental Readiness Division
City of Bend, Attn: Roger Prowell
Confederated Tribes of the Warm Springs, Attn: Brigette M. Whipple, Geo Visions/CR Dept.
Confederated Tribes of the Warm Springs, Attn: Clay Penhollow
Confederated Tribes of the Warm Springs, Attn: Lonny Macy
Confederated Tribes of the Warm Springs, Attn: Robert Brunoe
Confederated Tribes of the Warm Springs, Attn: Ron Suppah
Confederated Tribes of the Warm Springs, Attn: Sally Bird
Confederated Tribes of the Warm Springs, Attn: Scott Turo
Deschutes County Health Department, Attn: Dan Peddycord
EPA Region 10, Attn: Lynne McWhorter, EIS Review Coordinator
Federal Aviation Administration, Northwest Mountain Region
Federal Highway Administration, Phillip A. Ditzler (Division Administrator)
LaPine Chamber of Commerce Attn: Dan Vercoe
Natural Resources Conservation Service, National Environmental Coordinator
NOAA Fisheries Service NW Region, Habitat Conservation Division
NOAA Office of Policy and Strategic Planning
North Unit Irrigation District, Attn: Robert Ringering
Northwest Environmental Defense Center
Northwest Mountain Region
Northwest Power Planning Council
Oregon Department of Fish and Wildlife, Attn: Glen Ardt
Oregon Department of Forestry, Attn: Stuart Otto
Oregon Department of Transportation, Region 4, Attn: Rick Williams
Oregon Parks and Recreation Department, Attn: Letha Sanderson
Senator Jeff Merkley, Attn: Susanna Julber
Sunriver Utilities, Attn: Terry Penhollow
The Klamath Tribes, Attn: Gary Frost,
The Klamath Tribes, Attn: Les Anderson
The Klamath Tribes, Attn: Perry Chocktoot, Cultural and Heritage Department
The Klamath Tribes, Attn: Will Hatcher
Upper Deschutes Watershed Council, Attn: Ryan Houston
US Army Corps of Engineers, Northwestern Division
US Army Corps of Engineers, Southwest Division
US Coast Guard, Environmental Impact Branch
US Department of Energy, Office of NEPA Policy and Compliance
USDA APHIS PPD/EAD
USDA National Agricultural Library, Acquisitions & Serial Branch
USDA Office of Civil Rights
USDI Fish & Wildlife Service, Attn: Nancy Gilbert
USDI Office of Environmental Policy and Compliance

5.5.2 ORGANIZATIONS

Bigfoot Guide Service, Attn: Craig Vaage
Blue Mountains Biodiversity Project, Attn: Karen Coulter
Blue Ribbon Coalition, Attn: Joni Mogstad
Bonneville Power Administration, Attn: Libby Johnson
Bozarth's Offroad Service Specialties, Attn: Rick Bozarth
Cascadia Wildlands Project, Attn: Dan Kruse
Cascadia Wildlands Project, Attn: Josh Laughlin
Central Electric Cooperative Inc.
Central Oregon Flyfishers
Central Oregon Visitor's Assoc., Attn: Alana Audette
Century Tel, Attn: James Reeves
CLM Services dba Northwest Land Mgmt, Attn: Eric Mart
Conservation Northwest, Attn: Paul Bannick
Crane Prairie Resort, Attn: Pat Schatz
Department of Geology and Mineral Industries, Attn: Dr. Vicki McConnell
Deschutes County 4-Wheelers, Attn: Ed Duffy
Deschutes River Conservancy, Attn: Scott McCaulou
Deschutes River Woods Homeowners, Attn: Stan Martineau
East Cascades Audubon Society, Attn: Judy Meredith
East Lake Resort, Attn: David Jones
Eastern Oregon Forest Protection Association, Attn: Lynne Breese
Fall River Fish Hatchery, Attn: Phil McKee
Gaia Ki, Attn: Asante Riverwind
Garrison Guide Service
Gas Transmission NW Corp., Attn: Steven J. McNulty
International Mountain Bicycling Association, Attn: Jeremy J. Fancher, Esq., Policy Analyst/In-House Counsel
JTS Animal Bedding, Attn: Jim Wilson
Mickey Finn Guide Service, Attn: Pat Schatz
Moon Country Snowmobilers, Attn: Bruce Cunningham
Motorcycle Riders Association, Attn: David Lexow
Mountaintime Vacation Rental LLC, Attn: Randall Balsiger
Mule Deer Foundation, Attn: Matt Bales
Nature Photographers of the Pacific Northwest, Attn: Robert Petit
NPS Partnerships Programs, PWR, Attn: Debbie Allen
Oregon (HAD-OR), Attn: David Cox
Oregon Chapter, Sierra Club
Oregon Grotto, Attn: Charlie Larson
Oregon Hunter's Association, Attn: Rod Adams
Oregon Marine Board, Attn: Paul Donheffner
Oregon Marine Board, Attn: Randy Henry
Oregon State Snowmobile Association, Attn: Peggy Spieger
Oregon Wild, Attn: Doug Heiken
Oregon Wild, Attn: Tim Lillibo
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Public Affairs Committee Chair, SROA
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Sierra Club, Oregon Chapter, Attn: Larry Pennington
Ski Area Citizens' Coalition, Attn: Ben Doon
Sunriver Owners Association
Sunriver Owners Association, Attn: John McKenzie
The Bulletin, Attn: Kate Ramsayer
Tom's World of Wheels, Attn: Tom Street
Tumalo Langlauf, Attn: Barbara McAusland
Univ. of Oregon, Attn: Mark Dunaway, Pine Mountain Observatory
Upper Deschutes River Coalition, Attn: Jim Larson
Upper Deschutes River Natural Resources Coalition, Attn: Don Mercer
Vulcan Power Co., Attn: Lou Gillette
Wanderlust Tours, Attn: David Nissen
Warm Springs Forest Products, Attn: Chris Ketchum
Warm Springs Forest Products, Attn: Claude Smith
Wild Wilderness, Attn: Scott Silver
Willamette Valley Grotto, Attn: Dennis Glasby
Woodside Ranch Homeowners Association, Attn: C. Gary Frazier

5.5.3 INDIVIDUALS

Jim Anderson
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Susan Jane Brown
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Henry William Burwell
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Dr. A. Eugene Carlson
Mark Davis
Franklin Engel
Wade N. Foss
Lowell Franks
Don Franks
Dale Friedkin
Peter Geiser
Patti Gentiluomo
Ronald Hart
Ray Hatton
Arlie Holm
Irwin Holzman
Leonard Houston
Lawrence Huntley
Gene Keane
Edward Kerber
Donald Kerr
Dennis Krakow
George Law
Kreg Lindberg
E. Clark Matschek
Larry McGlocklin
Harry C. Miller
Patricia Moore
Robert Mullong
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Jon Pyland
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CHAPTER 6: REFERENCES

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APPENDIX A:

RESPONSE TO COMMENTS ON THE DRAFT EIS

THE COMMENT PROCESS

The Deschutes National Forest (DNF) prepared a Draft Environmental Impact Statement (DEIS) addressing proposed improvements at Mt. Bachelor Ski Area (Mt. Bachelor) in accordance with agency National Environmental Policy Act (NEPA) procedures (36 CFR 220). On May 21, 2012, a letter was sent to 198 agencies, Tribal groups, organizations, and individuals on the project mailing list notifying them of the document's availability on the DNF website and providing instructions on submitting comments. Several hard copies of the document were mailed to individuals who had previously requested them. The Notice of Availability of the DEIS was published in the Federal Register on June 1, 2012, initiating a 45-day comment period, as stipulated in the agency's notice and appeal regulations (36 CFR 215). Comments were received from 3 agencies, 9 organizations, and 16 individuals.

This report identifies commenters, details the comments received, and provides DNF responses to substantive comments, in accordance with agency regulations at 36 CFR 215.6.

RESULTS

Table 1 lists each comment letter (including emails and other forms of communication), identifying the code number assigned to it, the name and address of the commenter, and the topic or resource area addressed by the commenter. In the results section that follows, each quoted comment is followed by a comment code, made up of the letter code (A = agency, O = organization, I = individual), and the number of that individual comment within the letter (e.g. A1-2 is the second comment in letter A1). All original comment letters are included in the Project Record.

Table A-1. Comment log.

Number	Name	Comment Category
A1	McCarroll, Joel ODOT Region 4 Traffic Manager	Transportation.
A2	O'Brien, Allison US DOI	Adequacy of the EIS.
O1	Casey,Tim Bend Chamber	Support Based on Economic and Social Benefits.
O2	Hall, Scott Sunriver Owners Association	General Support.
O3	Heiken, Doug Oregon Wild	Alternatives, Adequacy of EIS, Air Quality, Geology and Soils, Vegetation, Wildlife, Safety.
O4	Hughson, Alana Central Oregon Visitors Assoc.	Support Based on Economic and Social Benefits.
O5	Kaden, Scott PNSAA	Adequacy of EIS, Safety, Support for Eastside Pod, Support for Summer Activities, Support for Mountain Bike Park, Support for Base Area Improve-ments, General Support.

Table A-1 (cont'd). Comment log.

Number	Name	Comment Category
O6	McGavin, Linda A NW Ski Club Council	Alternatives, Adequacy of EIS, Support for Summer Activities, Support for Mountain Bike Park, Support for Nordic Center Improvements, Support for Base Area Improvements, General Support.
O7	Rathbun, Dave Mt. Bachelor Inc.	Support for Eastern On-Mountain and Base Facilities, Eastside Pod, Summer Activities, Mountain Bike Park, Tubing Hill Reloca-tion, Base Area Improvements, Biomass Plant, Race Program Improvements, Snowmaking Improvements, and General Support.
O8	Davidson, Todd, Travel Oregon	Support Based on Economic and Social Benefits.
I1	Brennan, Jim	General Support.
I2	Bryant, Neil R Bryant, Lovlien, and Jarvis, PC	Support Based on Economic and Social Benefits.
I3	Danforth, Luann	Proposed Action, Opposition to Removal of Snowmobile Trail No. 40 from the Trail System.
I5	Fery, Frank	Proposed Action, Alternatives, Support for Eastside Pod, Support for Eastside Pod, Support for Base Area Improvements.
I6	Johnson, Keith	Proposed Action.
I7	Krakow, Dennis	Proposed Action, Alternatives.
I8	Mitchell, Stephen	Opposition to Eastside Pod, Issues Not Addressed.
I9	Public, Jean	General Opposition.
I10	Roadman, Ken	Opposition to Closure of Snowmobile Trail No. 40.
I11	Schiemer, John	General Support.
I12	Smit, Bob	General Support.
I13	Stevenson, Lee	Proposed Action.
I14	Ulrich, Larry and Joanne	General Support.
I15	Van Gelderen, Pieter	Opposition to Removal of Snowmobile Trail No. 40 from the Trail System.
O9	Johnson, Rebecca L. Oregon State University-Cascades	Adequacy of the EIS, Support Based on Economic and Social Benefits, General Support.
I16	Jeffery L. Payne	General Support.
A3	Christine B. Reichgott, EPA Region 10	Proposed Action, Adequacy of the EIS, Water and Watershed Resources.

PROCESSING OF COMMENTS

Methodologically, a key step in the comment process is determining which comments are substantive and which are not. Regulations at 36 CFR 215.2 define substantive comments as those that are:

- within the scope of the proposed action,
- are specific to the proposed action,
- have a direct relationship to the proposed action, and
- include supporting reasons for the Responsible Official to consider.

Substantive comments on the DEIS must be responded to (36 CFR 215.6[3][iii]). Non-substantive comments may be considered by the Responsible Official, but no response is required. Substantive comments and responses to them are provided below.

COMMENTS AND RESPONSES

PROCESS

Proposed Action

> *In our April 29 scoping comments, the EPA…referenced Executive Order (EO) 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) and suggested that the proposed construction presents an opportunity to utilize sustainable building and water management practices.*
>
> *In responding to these suggestions, the DEIS states on page A-4 that the MDP commits to having all facilities and activities, both summer and winter, located, constructed and undertaken in an environmentally responsible manner (MDP p. IV-I). We appreciate the response and support this direction. As the final EIS is developed, we continue to encourage the Deschutes National Forest to incorporate additional detail as it relates to the sustainable building practices. In particular, we would like to see the FEIS contain detail related to waste reduction efforts and management of construction and demolition debris. We would also like to see additional information about efforts to reduce the consumption of energy, water, and materials. We recognize that compliance with E.O. 13423 is not mandatory for facilities developed by private entities using National Forest System lands under permit but we believe that providing this information would help the public and reviewers to understand how the direction in the MDP will translate into the actions on the ground. We also believe that including this information could help to maximize the sustainability of the proposal and resort's energy conservation.* (A4-2)

Response: As design and engineering of the proposed facilities has not progressed during this NEPA process, the FEIS cannot realistically "incorporate additional detail as it relates to the sustainable building practices." The cited guidelines provided by the EPA during scoping are very general, introduced as guidance that "may be helpful to guide facility planning and conservation efforts." These guidelines have been forwarded to Mt. Bachelor for their consideration as the move into the design and engineering phase following NEPA review. DNF engineering review of final plans will also consider this guidance. Mt. Bachelor's response to the National Ski Areas Association's Sustainable Slopes program questionnaire this year is relevant to this comment as well. That response reads:

"Mt. Bachelor has been at the forefront of the environmental movement within the ski industry for many years. We offset 100% of our electrical use with renewable energy credits from wind power. Since 2005, Mt. Bachelor has purchased 30,608,066 kWh of wind energy; the equivalent to taking 3,049 cars off the road each year. Mt. Bachelor recycles used cooking oil for the production of bio-fuel and exclusively uses B-10 biofuel in our buses, snow plows and grooming equipment to help our area reduce its carbon footprint. From an internal "Green Team" comprised of managers and frontline staff to establish ongoing

environmental initiatives, our environmental programs and awareness are engrained as part of our employee culture. In 2011, Mt. Bachelor installed a solar panel array on the roof of its bus barn and office location in Bend, which now generates enough electricity to power the Carrousel beginner lift. Mt. Bachelor employs the following in support of the Sustainable Slopes program:

- Use of partially recycled paper products in all restrooms, sourced from a local vendor to reduce shipping-related carbon emissions.
- Recycling containers in all F&B and public locations throughout the resort.
- Use of non-petroleum based cleaners for housekeeping.
- Use of wax-free recycled paper for insulated beverage cups.
- Reuse of signs and sign materials.
- Retro-fitting of lightning in all resort facilities to low power CFL devices.
- Use of china dishware and stainless flatware in F&B outlets.
- F&B considers suppliers' environmental policies as part of the bid process.
- Use of bulk container food items for kids ski school lunches.
- Bulk cardboard recycling across the company.
- Online job application process rather than use of paper.
- Installation of solar panels in downtown call center.
- Use of recycled paper for copiers/fax machines.
- No-idling program for vehicles.
- Use of B-10 biodiesel fuel in company rolling stock.
- Partnership with Cascade East Transit and the USFS to provide 7 new, more efficient buses for the Bend-to-Mt. Bachelor shuttle service."

Once again the opportunity to help resolve the Dutchman parking issue between motorized and non motorized has been missed. Bachelor/Powder Corp. could simply allow paid trailer parking in the north lot which would relieve the pressure off Dutchman Flat parking lot and the questionable conflict issue that is continually talked about by the Forest Service. One begins to wonder if the conflict issue really exists.

I would hope that this parking issue would be considered in this DEIS as it would help to relieve congestion (not conflict) in the Dutchman Flat area. (I3-2)

Response: Allowing snowmobile trailer parking in the north lot will not be considered in the FEIS for several reasons. First, the lot is part of a permitted ski area, and there is no Forest LRMP direction to

provide services for snowmobiles at the ski area. Second, such use would not be consistent with the stated purpose and need for the Proposed Action (EIS section 1.4) as it has nothing to do with the permitted ski area operation. Third, as discussed in the EIS Transportation section (3.5.6), additional parking is being proposed just to meet the needs of ski area visitors on peak days. Issues associated with snowmobile parking at Dutchman are outside the scope of this analysis and decision. Note, however, that the Kapka Sno-park will be constructed soon, relieving congestion at Dutchman.

> *The Sunrise lift may eventually need to be upgraded to a six pack, but the upgrading the Pine Martin to a six pack should be the top priority instead. Pine Martin is the primary route out of the main base to access all the other lifts. In addition, it services terrific terrain that is underutilized due to the lift lines that develop. When conditions close the Summit and Northwest Express then Pine Martin is the only source of advanced and expert terrain, further exacerbating the crowding. A six pack would also be able to more often operate in high wind conditions.* (I5-1)

Response: According to the analysis completed for Mt. Bachelor's MDP process, the capacity of Pine Marten will be adequate through this planning horizon. However, the lift is central to Mt. Bachelor's operations, and an upgrade would be considered if its capacity became a limiting factor in skier distribution and circulation.

> *However I have concerns that the base of the Eastside lift has a gradient that is too flat. With an E-NE exposure, the morning sun will soften the base and create slow conditions and "mashed potatoes". I would like to see the base moved up 90' from 6260 elevation to 6350, and lower sections of trails re-routed accordingly. Rather than looping north, the return trail from Flying Dutchman should be cut due east back to the lift line.* (I5-3)

Response: From a topographic map, it may appear that a better gradient could be obtained at a higher location for the terminal, but actual on-the-ground investigation indicated that the higher site was flatter and surrounded by small basins that would impede access.

> *There are 3 trails on the skiers right of the lift line, but only 2 on skiers left. I would suggest an additional trail be cut starting at the 6900' elevation of Flying Dutchman going right along a small valley and connecting with the next trail closer to the lift at the 6500' elevation. This short connector would bring three benefits; 1) allow skiing of upper Flying Dutchman while avoiding the flat section of the looping return trail, 2) avoid the skier traffic of that return trail, which is the primary access to the Eastside lift, and the only access when the Summit lift is closed, 3) add an additional trail for skier dispersion, variety, and interest.* (I5-4)

Response: Similar to the preceding response, the proposed trail layout reflects intensive, on-the-ground investigations to achieve alignments that flow with adequate grade to the lower terminal.

> *If Mt. Bachelor wants to use more public land, add more lifts, and build more trails they need to revise their lift ticket pricing so all members of the public can access at least one chair lift for a fee a service worker, for example, can afford. Mt. Bachelor should not be just for the wealthiest among us, but for all of us. Lift tickets should be differentiated for certain chair lifts and ski runs so even the poorest among us can afford to enjoy some part of the national forest and winter sports therein. Powder Corp. does not have the right to exclude the majority of the public by their pricing structure, and the Forest Service must continue representing the majority of the public, not just the wealthiest.* (I6-1)

Response: Through its operation, Mt. Bachelor helps the DNF meet its mandate to provide a range of recreational opportunities on the Forest, including downhill skiing. This Proposed Action does not

include any additional public land, as all elements lie within the ski area's current SUP boundary. The permit under which Mt. Bachelor operates does not include agency authority to set lift ticket pricing. That is a business decision at the discretion of the ski area and is outside the scope of the EIS

> *The resort plans to offer a 700-900 square foot building for users of the tubing hill. It also says that there will not be additional use of the existing Nordic Lodge due to the relocated tubing hill. This can only be achieved if the tubing hill building is heated and has restrooms inside the building. Also, ticket sales must occur at the tubing hill area. The DEIS says that this is included in the MDP. As the Nordic Lodge is inadequate and the resort does not intend to expand or remodel within the next ten years, USFS should insist that restrooms, changing areas and ticket sales occur within the heated tubing hill building.* (I7-1)

Response: As noted in the comment and in the EIS's description of this project (section 2.2.3.4), ticket sales and restrooms are among the services to be provided in the tubing hill buildings, and it is anticipated that they would be heated.

> *I will take the resort at its word that music will not be played at the tubing hill. It is important to nordic skiers that the quiet nature of cross country skiing be preserved.* (I7-3)

Response: As indicated in EIS sections 2.4.2, 3.5.4.2.1, and others, Mt. Bachelor does not play music at the tubing hill and does not plan to in the future, though special events may be an exception.

> *The trail from the Sunrise base to the summit of Mt. Bachelor has, unfortunately been neglected for years. Blown down trees, erosion, deferred maintenance and errant hikers have made this once popular trail a very disappointing outdoor experience in scenic Central Oregon. This trail is a valuable, overlooked gem, which should be restored, protected and promoted… Suggested action to be taken:*
>
> - *Improve parking, and public access. (e.g. off highway parking)*
> - *Install Signage, (Trailhead, PoI, etc.)*
> - *Correct / Improve:*
> - *Switchbacks (& protect from short cutters)*
> - *Protect increased erosion on some ski runs*
> - *Install water bars, as needed.*
> - *Seasonal maintenance as needed…*
>
> *I use this trail in the summer and fall and regularly pick up litter, move rocks from the trail and move downed limbs …but this trail needs regular oversight. As a volunteer in our community and National Forests, I look forward to assisting in the efforts to restore and maintain this unique trail.* (I13-1)

Response: The referenced trail (shown in EIS Figure 2-1) is a historic hiking trail; however, it has never been established as a National Forest System trail (i.e., those trails that are actively managed and maintained by the Forest Service). While the trail and experience of hiking Mt. Bachelor is a valued experience for many people, there is no plan to add this trail to the trail system or to make any improvements in alignment of the trail at this time. The public will be able to continue to access the trail. Although not responsible to do so, the ski area replaced and has maintained signage that was on the trail. When the ski area is closed, the Sunrise gate is locked for security and fire safety reasons, but trail users can and do park outside the gate or across Century Drive at the Dutchman trailhead.

Alternatives

The DEIS should have considered more alternatives. The DEIS presents the project as almost "all or nothing" when in fact there are many independent components that could be approved in different combinations. We would like to see the effects of alternatives without the lift-assisted mountain biking and within [sic] the loss of old growth and potential wilderness. (O3-7)

Response: The Council on Environmental Quality (CEQ) states that the range of alternatives should be "reasonable," and that the reasonable number depends on the "nature of the proposal and the facts in each case" (*Forty Most Asked Questions Regarding CEQ's National Environmental Policy Act Regulations*, questions 1a and 1b).

The alternative formulation process for this EIS is described in section 2.3. In brief, only one issue, the potential for additional fragmentation of undeveloped areas east of the developed resort, could be more effectively addressed through an alternative than through mitigation. This was the basis for Alternative A - No New Catchline.

This EIS analyzed three alternatives in depth (the Proposed Action, No-Action Alternative, and Alternative A) and considered two other alternatives identified through scoping (a higher-elevation catchline and an alternative tubing hill site) but did not carry them into in-depth analysis for the reasons outlined in EIS section 2.4. The DNF considers this a reasonable range of alternatives based on the nature of this proposal and the issues that arose during scoping.

In regard to an alternative eliminating the proposed mountain bike park, analysis documented in the EIS does not indicate any serious impacts that warrant such an alternative (also see responses to comments O3-2, O3-3, and O3-4 below). Beyond that, the mountain bike park is a substantial component of efforts to increase summer recreational opportunities at Mt. Bachelor (see EIS section 1.4, particularly S&G 11-11), so an alternative without it would not meet a key element of the stated purpose and need for the Proposed Action.

Note also that the Responsible Official has the authority to not approve any specific element or elements of a proposed action or an action alternative based on the analysis documented in an EIS (see EIS section 1.5).

As noted in EIS section 3.4.2.2, old growth occurs at Mt. Bachelor throughout mountain hemlock stands in discontinuous patches in the proposed sites of the Eastside pod and the relocated tubing area. Design criteria and mitigation measures (EIS section 2.2.6) are proposed to limit impacts on old growth, so that only about 6 percent of the old growth within the SUP area would be affected (EIS Table 2-1). In that impacts on old growth would be minimized, would affect a small percentage of the total in the area, and would occur within a permitted ski area, this effect does not warrant an alternative either. And given the importance of the Eastside pod, an alternative that eliminated it would not meet purpose and need.

Finally, in regard to loss of potential wilderness, Alternative A – No New Catchline was developed specifically to address this concern (see EIS section 2.5.2).

A restroom facility at the base of Skyliner Express, which is presently very isolated from the other base areas, would help both the skiers and the people who park at the base of that chair (mainly season passholders, since there are no ticket sales at that location). (O6-2)

Response: The lower terminal of the proposed Eastside Express lift is less than a mile from Sunrise base area restroom facilities along a groomed skiway. Given this location and the financial and environmental effects of developing permanent restroom facilities there, this suggestion is not viewed as necessary or feasible at this time.

> *While politically correct, Biomass generation would be better suited to a lower elevation, less sensitive location closer to Hwy 97. The biomass materials would have to be trucked up to the mountain, which is less efficient then trucking diesel or propane.* (I5-7)

Response: Comment is noted, but a lower location would not serve the needs of steam heat to melt snow on the ski area's walkways. Also, it is likely that a portion of the biomass fuel will come from projects at or close to the mountain (e.g., see EIS sections 2.2.1, 2.2.3.3, 3.2, and 3.3, as well as the response to scoping comment I13-1 in DEIS Appendix A).

> *I wish Mt Bachelor will put some money into the Nordic Lodge and not worry about Bob's Bungalow.* (I7-2)

Response: According to Mt. Bachelor's MDP, upgrade of the Nordic Lodge is not warranted at this time, so it is not part of the Proposed Action and does not constitute an alternative. The purpose and need for the renovation of Bob's Bungalow is provided in EIS section 1.4.

Forest Plan Compliance

> *The DEIS did not clearly show how lift-assisted mountain biking is compatible with or will enhance natural resources consistent with S&G M11-11. Frequent braking by mountain bikers will cause erosion and vegetation impacts that will not enhance natural resources.* (O3-3)

Response: The cited Forest LRMP direction (M11-11. Year-round recreation activities will be encouraged. Summer facilities that are compatible with or enhance natural resource-based facilities will be permitted) states that summer recreation facilities should be compatible with or enhance natural resources. This EIS, particularly the Geology and Soils and the Vegetation sections (3.4.2 and 3.4.4, respectively), indicate the compatibility of this mountain biking with natural resources in the permit area. See also the response to comment O3-1 above.

> *Also, M11-15 clearly contemplated multiple-use paths for both biking and hiking. It is unlikely that the downhill bike trails will be safe for hikers. This is a strong indication of incompatibility.* (O3-4)

Response: The cited Forest LRMP direction (M11-15. New trails constructed in this Management Area will emphasize walking, bicycle riding and hiking opportunities…) does not stipulate that trails be multiple-use, but rather that these uses be accommodated in the system. As noted in EIS section 2.2.5, the proposed trails are single use, and the potential safety impacts are addressed in section 3.5.2. The downhill bike trails would be closed to hikers, and hiking trails would be closed to bikes.

Issues Not Addressed

> *I would like to call attention to the amount of trash that has been left behind on the mountain from past years of resort operations. I find it sad when I hike in the summer how much garbage is visible all over the mountain. I feel the resort is only concerned with the proper maintenance of the land when the mountain is operational and generating profit. In the summers when the time is perfect for cleaning up, nothing is done. Perhaps there should be a further focus on maintaining the land already in use as opposed to developing more land in the future. There is*

plenty to go around as long as it is done so efficiently, intelligently, and most importantly without greed in mind. (I8-1)

Response: The issue of littering is an ongoing problem in areas with concentrated public use. Within the ski area permit area, the permittee is responsible for litter removal and the Forest Service ensures their compliance. Mt. Bachelor conducts trash pickup operations every summer (involving summer operations and grooming personnel, ski patrol, and various youth groups), provides on-mountain recycling bins, and conducts anti-littering campaigns.

Adequacy of EIS

The Department [of the Interior] does not have any comments to offer. (A2-1)

Because our review did not identify any environmental impacts that should be avoided in order to fully protect the environment, we [the EPA] have rated this EIS as Lack of Objections (LO). (A4-3)

On behalf of the PNSAA Board of Directors, and PNSAA member ski areas, I write to support the purposes and need for facility enhancements at the Mt. Bachelor developed recreation site (hereafter abbreviated Mt. Bachelor), as detailed in the proposed action of the May 2012 Draft Environmental Impact Statement (hereafter abbreviated 2012 DEIS). The Association has reviewed the 2012 DEIS and believes there is ample evidence to select the proposed action as the 2012 DEIS's preferred alternative. (O5-1)

The Northwest Ski Club Council wholeheartedly supports the purposes and need for the proposed actions outlined in the 2012 DEIS. I have provided input from the recreational skiers on ski area development, master plans, and proposals in Oregon and Washington for almost thirty years. I have observed that the process has been so extensive, exhaustive, and time consuming that it becomes almost a crippling potential financial drain on ski areas. A vocal minority of opponents has been able to stretch out the process, and the expense, by demanding exhaustive additional studies on very narrow issues. This should not be allowed to happen here. (O6-6)

I am writing in support of Mt. Bachelor's proposed action as the preferred alternative in the "Draft Environmental Impact Statement: Mt. Bachelor Ski Area Improvements Project." I have read the DEIS and believe that the Forest Service did a comprehensive analysis of the possible impacts from the proposed action. Those impacts occur within the Special Use Permit boundary, and the proposal includes numerous actions to mitigate or lessen the impacts. In no case does there appear to be impacts that are severe enough to offset the many benefits from this proposal. (O9-1)

Response: The Responsible Official will consider these comments.

Oregon Wild's May 2011 scoping comments expressed concern about several things: … (O3-11)

Response: This comment went on to reiterate scoping comments previously submitted. The Scoping Report prepared for this project (see DEIS Appendix A) provided responses describing the treatment of each comment in the DEIS. While the current comment referencing the previous scoping comments did not question their treatment in the DEIS, all the reiterated comments were reviewed to ensure that they were in fact addressed as indicated in the Scoping Report.

THE PHYSICAL AND BIOLOGICAL ENVIRONMENT

Air Quality

We disagree with the assertion that CO_2 from burning biomass should not be counted. Woody biomass has a lower heat content than fossil fuels, so more CO_2 is emitted per unit of energy output. This results in a "carbon debt" from biomass energy production. It is not clear how of [sic] when that debt is repaid. The Agency should conduct a careful review of the carbon consequences of biomass-to-energy conversion. Consider the analyses in Manomet Center for Conservation Sciences. 2010. Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources. Walker, T. (Ed.). Contributors: Cardellichio, P., Colnes, A., Gunn, J., Kittler, B., Perschel, R., Recchia, C., Saah, D., and Walker, T. Natural Capital Initiative Report NCI-2010-03. Brunswick, Maine. http://www.mass.gov/Eoeea/docs/doer/renewables/biomass/Manomet_Biomass_Report_Full_LoRez.pdf According to the authors,

> *"state-of-the-art, thinking on the impacts of forest biomass combustion on greenhouse gases" requires consideration of several factors: "high productivity and efficiency in use favor the bioenergy option. Low productivity land may be better used for carbon sinks, … The fossil fuel system to be displaced …; The initial state of the land converted to carbon sinks or bioenergy plantations (and of land elsewhere possibly impacted indirectly…); … the timescale that is used for the evaluation … [C]arbon sinks can be viewed as a way to buy time for the advancement of climate-friendly energy technologies other than bioenergy. [quoting the 2009 IEA Bioenergy Report] … Bioenergy therefore reduces greenhouse gases only if the growth and harvesting of the biomass for energy capture carbon above and beyond what would be sequestered anyway and thereby offset emissions from energy use. This additional carbon may result from land management changes that increase plant uptake or from the use of biomass that would otherwise decompose rapidly. [quoting Searchinger, et al. (2009)] … In general, the scientific literature on the GHG impacts of forest biomass appears to be in agreement that impacts will depend on the specific characteristics of the site being harvested, the energy technologies under consideration, and the time frame over which the impacts are viewed (IEA, 2009). Site-specific factors that may have an important influence include ecosystem productivity, dynamics and disturbance (e.g., dead wood production and decay rates, fire, etc.); the volume of material harvested from a site for biomass; the efficiency of converting biomass to energy; and the characteristics of the fossil fuel system replaced. … [B]iomass generally produces greater quantities of GHG emissions than coal, oil or natural gas. … The benefits of biomass energy accrue only over time as the "excess" GHG emissions from biomass are recovered from the atmosphere by growing forests. …* ***[I]t is also important to note that the point at which the cumulative carbon flux from biomass just equals the cumulative flux from fossil fuels (the point at which the biomass carbon debt is paid off) is not necessarily the point at which a policymaker is indifferent between the biomass and fossil fuel scenarios. For example, the policymaker might only be indifferent at the time when the discounted damages resulting from the excess biomass emissions just equals zero—this is the point in time at which early damages due to increased GHG levels from biomass are just offset by lower biomass damages in later years when net cumulative GHG flux from biomass is below that of the fossil fuel alternative. In this case, longer time periods are needed to reach the point defined as "fully-offset damages.*** *… A key finding of our work is that the magnitude and timing of carbon dividends can be quite sensitive to the forest*

management practices adopted by landowners. Carbon recovery times can differ by decades depending upon assumptions about (1) the intensity of harvests; (2) the silvicultural prescriptions and cutting practices employed; (3) the fraction of the logging residues removed from the forest for biomass; and (4) the frequency at which landowners re-enter stands to conduct future harvests. … [T]he key question remains one of the appropriate weighting of near-term higher GHG levels with long-term lower ones. Policymakers will need to sort out these issues of societal time preferences and weight near term higher GHG emissions against longer term lower ones. … **"**

Recent modeling indicates that the reaching carbon parity takes much longer than just repaying the carbon debt, so the best way to use forests to mitigate climate chane [sic] might be to just let them remain forests.

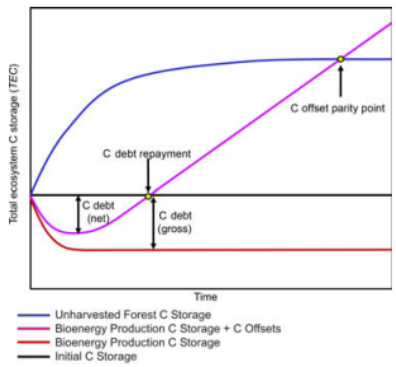

Fig. 1 Conceptual representation of C Debt Repayment vs. the C Sequestration Parity Point. C Debt (Gross) is the difference between the initial C Storage and the C storage of a stand (or landscape) managed for bioenergy production. C Debt (Net) is C Debt (Gross) + C substitutions resulting from bioenergy production.

Mitchell, Harmon, O'Connell 2012. Carbon debt and carbon sequestration parity in forest bioenergy production. GCB Bioenergy (2012), doi: 10.1111/j.1757-1707.2012.01173.x http://ncfp.files.wordpress.com/2012/05/carbon-debt-paper.pdf ("Here, we used an ecosystem simulation model to ascertain the effectiveness of using forest bioenergy as a substitute for fossil fuels, drawing from a broad range of land-use histories, harvesting regimes, ecosystem characteristics, and bioenergy conversion efficiencies. Results demonstrate that the times required for bioenergy substitutions to repay the C Debt incurred from biomass harvest are usually much shorter (< 100 years) than the time required for bioenergy production to substitute the amount of C that would be stored if the forest were left unharvested entirely, a point we refer to as C Sequestration Parity. The effectiveness of substituting woody bioenergy for fossil fuels is highly dependent on the factors that determine bioenergy conversion efficiency, such as the C emissions released during the harvest, transport, and firing of woody biomass. Consideration of the frequency and intensity of biomass harvests should also be given; performing total harvests (clear-cutting) at high-frequency may produce more bioenergy than less intensive harvesting regimes but may decrease C storage and thereby prolong the time required to achieve C Sequestration Parity")

Note: If any of these web links in this document are dead, they may be resurrected using the Wayback Machine at Archive.org. http://wayback.archive.org/web/ (O3-10)

Response: The cited research is based on a scenario where biomass is harvested specifically to fuel biogeneration – biomass that would otherwise continue to function as a forest, sequestering carbon and thus reducing GHG. However, as indicated in EIS section 2.2.3.3, "Fuel would consist of low-grade logs and slash from timber sales, salvage cuts, thinning projects, and other public and private land projects in the region. Slash generated by the Proposed Action may also be used, all or in part, as fuel." In other words, this fuel would be waste generated by forest management and other types of projects. We are not assessing the tradeoff between fossil fuels and green forests which reduce GHG, but rather the tradeoff between fossil fuels and dead wood that would otherwise either decompose or be used for firewood or chips, all of which add to GHG. Section 3.4.1.3.2 quantifies the net change in GHG associated with the project as a whole and the proposed biomass plant.

The cited research also suggests that in the long term, biogeneration does reduce GHG relative to fossil fuel burning; it may just take longer than anticipated. The effect of this project should therefore be positive over time.

Finally, this project would generate only 1 – 2 megawatts, a tiny amount of energy relative to most generation facilities. The net impact on GHG would be correspondingly small and, as noted above, positive. Based on these factors, further analysis of this issue is not necessary for an adequately informed decision regarding the project.

Sections 2.2.3.3 and 3.4.1.3.2 of the FEIS have been revised to clarify these points. It should also be noted that the EPA reviewed the DEIS and rated it "Lack of Objections," indicating no concerns with the air quality analysis.

Geology and Soils

> *The DEIS does not clearly disclose or adequately analyze the adverse long-term impacts of lift-assisted downhill mountain biking. Over time, frequent, repeated braking by downhill bikers will cause severe soil erosion. Intense spring run-off events will exacerbate these effects.* (O3-1)

Response: The impacts of braking on mountain-bike trails are a small subset of the Proposed Action's soil disturbance but are included in analysis of the larger issue. EIS section 3.2 summarizes the grading procedure used in bike trail construction, notes the dimensions of disturbance during trail construction, and specifies the disturbed acreage by trail type and in total (10.1 acres of the total of 190.4 graded acres under the Proposed Action). Section 3.4.2.3.2 assesses the impacts of grading projects on soil productivity. Section 2.2.6 stipulates the rehabilitation practices, design criteria, and mitigation measures that would be required for the bike park, including the requirement that "Bike park staff will continuously monitor trail conditions in the park to ensure that erosion or sediment mobilization away from trail corridors is not occurring and/or to implement corrective action…" This provides adequate documentation of the potential impacts of the bike park on soils. However, the design criterion noted above, regarding monitoring by the bike park staff to detect and correct erosion issues, has been modified to specifically focus on steep turns where braking impacts are most likely.

Water and Watershed Resources

> *In our April 29, 2011 scoping comments, the EPA emphasized the need to protect water quality and watershed health. We believe the DEIS adequately analyzes and addresses these issues.* (A4-1)

Response: The Responsible Official will consider this comment.

Vegetation

We are concerned that selective tree removal and "glading" in relatively high elevation forests is likely to cause damage to residual trees and long-term deterioration in the health of the stands. Mountain hemlock is shallow rooted and susceptible to blowdown and heart rots, root rots, and wound invaders. (O3-5)

Response: EIS sections 2.2.6 and 3.2, respectively, describe design criteria for these two treatments (e.g., that no trees larger than 8 inches dbh would be removed through selective tree removal and none larger than 21 inches dbh through glading) and what these treatments entail overall. Selective tree removal would involve scattered single trees or small clumps of saplings, and only hand tools would be involved. Residual trees and long-term stand health would not be affected by this low-intensity treatment. Glading could involve logging equipment, resulting in some damage to adjacent trees. However, as noted in section 3.4.4.2.1, mountain hemlock is the most prevalent land cover type in the permit area at 65.3 percent, and it remains generally healthy despite ski area development to date. The minor incremental increase in disturbance associated with low-intensity selective tree removal and limited glading (7.5%, shown in Table 3-19) is not anticipated to cause any long-term deterioration.

The DEIS analysis is not very site specific. Where will the old growth be logged? (O3-6)

Response: EIS section 3.4.4.2.1 presents the estimated acreage of old growth in the permit area (1,138 acres, primarily in the mountain hemlock cover type), and section 3.4.4.3.2 notes that less than 6 percent of this total would be affected, mostly by grading. Since development of new Eastside pod ski trails accounts for most grading, those trails are where most old growth would be removed.

Wildlife

The DEIS analysis of impacts to wildlife is inadequate. The only meaningful disclosure of impacts to wildlife is found in one paragraph in the DEIS at page 135:

> *The Proposed Action would have a small negative impact on potential reproductive habitat of northern goshawk, sharp-shinned hawk, red-tailed hawk, pileated woodpecker, three-toed woodpecker, great gray owl, American marten, and mule deer. The amount of potential reproductive habitat impacted by the Proposed Action, relative to the amount present on the DNF, is extremely small (Table 3-28), ranging from 0.002 percent (northern goshawk) up to 0.05 percent (pileated woodpecker). The impact on potentially reproductive habitat, relative to the amount present within the four 6th-field subwatersheds originating on Mt. Bachelor, would also be small, ranging from 0.001 percent (three-toed woodpecker) up to 0.4 percent (pileated woodpecker). Considering the small amount of potential reproductive habitat impacted for these eight species, the Proposed Action would result in a small negative trend of habitat. The loss of habitat will be insignificant at the Forest scale.*

This is not adequate. Which activities will have the greatest impact on which species? The EIS fails to inform the decision-make on ways to mitigate adverse impacts by (for instance) approving independent parts of the project with the least impact. This project will have disproportionate adverse impacts on pine marten but the EIS just lumps the discussion of effects to pine marten with effects on a host of other species. (O3-8)

Response: This comment is difficult to interpret in that section 3.4.5.3 includes over 10 pages of discussion of potential impacts on various categories of wildlife, while the comment notes only one paragraph, dealing with the impacts of one alternative on one category, MIS species. Beyond that, the impact analysis is based on characterizing impacts on key wildlife habitats, building on information

presented in preceding sections of the EIS, and on habitat connectivity and human noise, as described in section 3.4.5.3.2:

> The Proposed Action would result in disturbance of the project-area land cover types described previously (section 3.4.4.2.1) due to selective tree removal, glading, clearing, grading, and excavation. Table 3-2 discloses the impact each element or class of elements comprising the Proposed Action would have on the various land cover types by type of disturbance. Table 3-19 shows these impact acreages as percentages of the total acreage in that land cover type in the SUP area. The effects of each type of disturbance on the land cover and forest structure were also discussed previously (section 3.4.4.3.2). With this background information in place, the effects of these disturbances on key wildlife habitat, habitat connectivity, and timing and location of human noise are discussed below.

This approach allows determination of which activities affect which species but does so in a summary fashion, consistent with regulations directing that EISs be analytical rather than encyclopedic analysis (40 CFR 1502.2a), that impacts be discussed in proportion to their significance (40 CFR 1502.2b), and that EISs be concise, no longer than necessary to comply with NEPA and regulations on its implementation (40 CFR 1502.2c). The more detailed analysis summarized in this EIS is documented in the biological assessment and biological evaluation, included in the project record.

Overall, the analysis identifies no wildlife impacts requiring more in-depth analysis (40 CFR 1502.2b). Section 2.2.6 includes a number of design criteria and mitigation measures to avoid or minimize damage to wildlife habitat including old growth forest, northern spotted owl activity centers, and areas threatened with the introduction or spread of noxious weeds. Note also that the Responsible Official has the prerogative to disapprove any element of the selected alternative or impose additional mitigation requirements in the Record of Decision.

Potential impacts on American marten are discussed in sections 3.4.5.3.1 (as an MIS species which as a class would be unaffected), 3.4.5.3.2 (specifically noting impacts on marten due to removal of dead-wood habitat and potential reproductive habitat), and 3.4.5.3.3 (noting minor reduction in impact on dead-wood habitat on which the species depends). Table 3-28 notes the exact projected impact on marten reproductive habitat under the Proposed Action and Alternative A, in acres and as a percentage of such habitat within the DNF. Collectively, this provides adequately detailed analysis of impacts on this species, and it does not indicate any "disproportionate" impact.

> *The DEIS p 135 also says "The Proposed Action is consistent with the Forest Plan, and thus continued viability of northern goshawk, sharp-shinned hawk, red-tailed hawk, pileated woodpecker, three-toed woodpecker, great gray owl, American marten, and mule deer is expected on the DNF" The conclusion that compliance with the LRMP assures maintenance of viable populations is unsupported by the evidence. There has been no validation modeling to show that LRMP standards are adequate. In fact, there is evidence that LRMP stands [sic] for dead wood are inadequate and new standards are needed to ensure retention of much higher levels of dead wood recruitment and green tree replacements. See Rose, C.L., Marcot, B.G., Mellen, T.K., Ohmann, J.L., Waddell, K.L., Lindely, D.L., and B. Schrieber. 2001. Decaying Wood in Pacific Northwest Forests: Concepts and Tools for Habitat Management, Chapter 24 in Wildlife-Habitat Relationships in Oregon and Washington (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001) http://web.archive.org/web/20060708035905/http://www.nwhi.org/inc/data/GISdata/docs/chapter24.pdf The DEIS fails to sully [sic] disclose the ecological importance of dense forests with abundant down wood that will be removed or degraded by this project.* (O3-9)

Response: The cited, confusing sentence regarding Forest Plan compliance has been removed from the FEIS, leaving discussion of that topic to section 3.4.5.5.

The issue of "validation modeling to show that LRMP standards are adequate" is beyond the scope of this analysis. As stated in EIS section 1.1, the Forest LRMP "provides primary guidance for permit administration. This EIS is tiered to the Final EIS on the Forest LRMP, which is incorporated by reference." Revision of standards is a matter to be addressed through the processes of amending or revising the LRMP, and this analysis suggests no need to amend the plan. Beyond that, in accordance with the Forest LRMP, we use the most current science as well as standards and guidelines to assess impacts.

The cited chapter is from a textbook, and it notes that some undefined management direction does not reflect the importance of dead wood habitat in the Pacific Northwest. It makes no specific mention of the DNF or the Forest LRMP and its standards and guidelines in this regard.

Consistent with the regulations cited in the preceding response (i.e., 40 CFR 1502.2a, 40 CFR 1502.2b, and 40 CFR 1502.2c), the EIS need not "fully disclose the ecological importance of dense forests…" Rather it should assess the potential impacts of the Proposed Action and alternatives in proportion to their significance. The EIS discusses the extent of forested habitats (section 3.4.4.2), their habitat function and values, including their dead wood component (section 3.4.5.2.1), and the potential impacts on them, (sections 3.4.4.3 and 3.4.5.3). We believe this meets the requirements of NEPA.

THE HUMAN ENVIRONMENT

Safety

DEIS page 162 mentions the likelihood that cross-country mountain bike use would likely increase as a result of the development of the lift-assisted bike development. The EIS needs to disclose where increased use is likely to occur, whether the facilities are adequate, what the impacts are, and the site and character of potential resource degradation and conflicts. (O3-2)

Response: The cited discussion is in the Safety section of the EIS, and section 3.5.2.2.2 has been revised to identify the areas where cross-country bicycle use currently occurs, specifically on the one existing cross-country trail, on the summer access road from West Village to Sunrise, and on the Rescue Road from Sunrise to where it intersects Snowmobile Trail No. 40. No facilities are involved. Section 3.5.2.3.2 has been reworded to clarify that these are the areas where potentially hazardous conflicts among bicyclists and other users could occur. This section also outlines the steps the ski area would take to mitigate such conflicts if they did arise. This mitigation is reiterated in EIS section 2.2.6. Beyond this possible safety issue, no other impacts are anticipated. Increased bicycle use of the existing cross-country trail and access roads would not result in increased resource degradation.

Public safety issues pertinent to ski area operations are different than those encountered by the broader USDA Forest Service recreation program. Ski area operators must plan and set up operations with sizeable winter- and summer-time visitation in mind. From time to time, ski area operators must request permission to conduct ground disturbing activities for the sole purpose of addressing public safety concerns, like decreasing the response time associated with reaching an injured or lost individual. Mt. Bachelor's lower elevation catchline is one such proposal.

Mt. Bachelor's use of catchlines is critically important given the conveyance provided by the Summit Express Chairlift. Mt. Bachelor's staff has decades of experience with catchlines, which make valuable contributions to the ski area's overall public safety program. The

proposed catchline will help reduce the number of overall search and rescue missions and will expedite the transport of injured guests. (The transport time for injured forest visitors requiring advanced care will decrease when snowmobiles are utilized to transport toboggans via the proposed catchline.) Lives may be endangered if the proposed catchline is not constructed – as proposed. (O5-4)

Response: These comments are consistent with the analysis documented under the first issue, the safety of off-piste skiers, in the Safety section (3.5.2) or the EIS.

Transportation

ODOT recommends that actual traffic count data be collected. If the FEIS schedule does not allow for the data to be used the document, it will be useful for development of a management and operations plan. (A1-1)

Response: The DNF concurs that peak-day counts would be useful for future planning by ODOT, the Forest Service, or other entities. However, we believe that the analysis of transportation impacts documented in EIS section 3.5.6, as revised on the basis of ODOT comments below, is adequate to support a well-reasoned decision.

It would be helpful to have a table that converts users to vehicles based on the 2.5 people per car (or the 3.5 people per car based on our recent conversations.) (A1-2)

Response: This table has been added to the FEIS, reflecting 3.5 people per car and 40 people per bus. See Table 3-36.

This section [3.5.6.2.4] should be renamed. It doesn't address the capacity of Hwy. 46; it addresses the demand on Hwy. 46. (A1-3)

Response: The section has been retitled as suggested.

Was the travel time data collected? There should be an effort to collect the data for future operations and management planning. The statement that "During bad weather, the speed of vehicles along the highway is a function of the weather and not the road capacity." is not a complete explanation. It should be revised to note that maintenance and operations activities have an effect on travel time as well as the weather. Also, later in the section "Forest Plan Compliance", the hour one [sic] trip time is not limited to only good weather conditions. (A1-4)

Response: Yes, travel time data was collected, as documented in section 3.5.6.2.5 of the FEIS. Maintenance and operations activities have also been added to the text on reasons for delays. As to the 1-hour travel time standard, the DNF interprets the 90 percent threshold to apply to all traffic, year-round, and that weather conditions resulting in longer drive time would reduce the percentage. Maintenance and operations activities would not.

From the 9 AM to 10 AM arrival time, it indicates that the hourly volume is 2,529. The Highway Capacity Manual lists the capacity of two lane rural roads as 1,700 passenger cars equivalent per hour per lanes (pce/ph/pl). The percent of arrivals from Sunriver versus Bend is key to understanding the impacts. Unless at least 800 (more than a third) are arriving from Sunriver then the section from to Bend to Sunriver Jct, where there is only one lane in each direction will be over capacity. Similar issues would be seen in the PM peak… Based on our follow up meeting on 6/28/12, it appears that vehicle occupancy may be higher than 2.5 people

per car and that the number of trips with origins and/or destinations in the Sunriver area is approximately 40%. This would address the concerns raised above. (A1-5)

Response: Section 3.5.6.3.2 of the FEIS has been amended to reflect a revised ridership of 3.5 people per car, 40 people per bus, and approximately 40 percent of vehicles coming from Sunriver on peak days.

… at peak departure times, the queue from [Mt. Washington/Reed Market] roundabout can be quite lengthy. Adding additional traffic would seem to exacerbate queuing at the roundabout. This seems to be a bigger concern than the capacity/speeds of the highway from Mt. Bachelor to City Limit. I don't see similar issues with the AM peak but that could be because the underlying volumes are higher in the PM peak... ODOT's jurisdiction ends at the City Limit of Bend. The portion of Century Drive within City Limits is under the jurisdiction of the City of Bend. We suggest that you consult with them if you haven't done so. Should the analysis address the roundabout or is outside the scope of this effort? (A1-6)

Response: The roundabout is within the City of Bend's jurisdiction rather than ODOT's or the DNF's. Neither the City nor Deschutes County made comment regarding traffic at the roundabout. Prior to the publication of the DEIS, Deschutes County indicated that the roundabout operates effectively during peak ski area visitation. The FEIS has been updated to include this reference.

If there are proposed driveway modifications, they will need to be reviewed, approved and permitted by ODOT. It would be good to address those in the FEIS, particularly if there was a need to widen the highway for left turn channelization. (A1-7)

Response: The proposed revisions to the Sunrise entrance would result in a turning movement into Sunrise under the exact same parameters as the existing turn. No new turn lane is proposed. Section 3.5.6.3 of the FEIS has been updated to include a discussion about the effects of modifying the Sunrise entrance.

3.*5.6.5 Forest Plan Compliance…Parking capacity will be tied to the highway capacity: This statement needs clarification. How will it be tied? There are no plans to increase the capacity of the highway. Is it a ratio? What is it? If it is 1:1 then we need to address the volume split between Bend and Sunriver because capacity essentially doubles at this point.* (A1-8)

Response: The capacity of the highway is the limiting factor in terms of the number of cars that can reach Mt. Bachelor – that is, Mt. Bachelor does not propose parking with a capacity that is higher than the volume of cars that Hwy 46 could deliver. On this basis, the demand on Hwy. 46 is "tied" to the parking capacity. The Transportation analysis in the FEIS has been updated to include the split between Bend and Sunriver and the doubling of highway capacity west of the intersection of Hwys. 46 and 45.

3.5.6.5 Forest Plan Compliance…The road system serving the mountain will be upgraded so that 90 percent of the users will be able to reach the ski area within one hour travel time from Bend. The statement seems to conflict with ODOT's performance metrics for the highway. These are defined in the Oregon Highway Plan. Also, road and weather conditions will likely have a far more significant effect on drive time than the increase traffic volumes. We recommend that ODOT, Mt. Bachelor and the USFS collaborate on a maintenance and operations plan that focuses on achieving safe and efficient operations, particularly in inclement weather. Some of this is already addressed in the Deschutes County ITS plan. (A1-9)

Response: The FEIS has been updated to include an analysis of trip times from Bend to Mt. Bachelor, as well as maintenance and operations described in the ITS Plan. The collaboration between ODOT, Mt. Bachelor, and the DNF for maintenance and operations is outside of the scope of this analysis.

> *The discussion section says, "It is the historic visitation that defines the capacity of Hwy. 46 during the winter months." The historic visitation defines the demand. The capacity of the highway is driven by factors such as the number and width of the lanes, the width of the shoulders, the grade of the road and the percentage of heavy vehicles. The capacity can also vary because of road and weather conditions and the level of service of maintenance and operational activities such as anti-icing and snow plowing.* (A1-10)

Response: This language has been clarified in the FEIS to indicate that the historic visitation has defined the demand on Hwy. 46 and that the highway's capacity has been sufficient to accommodate the demand.

> *Conclusion:…The volume data from the DEIS suggests that there would be operational/capacity concerns with the proposed action. However, from our observations of existing conditions, it appears that the additional traffic from the proposed action would not cause significant concerns on the rural section of Century Drive.* (A1-11)

Response: Section 3.5.6.2 of the FEIS has been revised to clarify this conclusion. Specifically, the AVO has been revised from 2.5 to 3.5 people per car, bus trips have been added, and the analysis has been revised to recognize the Hwy. 46/45 split, where the capacity of the highway increases (westbound).

> *Go beyond predicting volumes, and put it in terms of more typical measures of effectiveness like V/C, LOS, predicted travel times etc.* (A1-12)

Response: The FEIS has been updated to include V/C ratio as a measure of effectiveness (See Tables 3-37 and 3-39).

OPPOSING COMMENTS

The following comments express opposition to the Proposed Action or specific elements of it, in general terms or for specific reasons. These comments will be considered by the Responsible Official but will not affect the content of FEIS.

Opposition to Closure of Snowmobile Trail No. 40

> *I am against the closure of snowmobile trail #40 as part of this DEIS.*
>
> *If Powder Corp wants to close multi-use trail #40 then we would hope that another access for motorized would be made available. Access to the Northern parking lots and at least one to a public lodge would be preferable. It is unacceptable to exclude motorized trail access to a entire area of accessible public land.* (I3-1)

Response: Any decision to remove Snowmobile Trail No. 40 from the trail system would be the DNF's. The impacts of such a closure on other forms of recreation, including snowmobiling, are the second issue addressed in the EIS Recreation section (3.5.4) which assesses and discloses those impacts. As noted in the response to comment I3-2 above, use of ski area parking lots by snowmobilers would be inappropriate for several reasons, and snowmobilers in the area have access to the lodge at Elk Lake Resort. This is a short, lightly used trail developed specifically to provide access to Sunrise Lodge, and such access is no longer viable due primarily to safety concerns, which would be exacerbated by the proposed development

of the Eastside pod and the Sunrise base area. The DNF provides ample opportunities for snowmobile use, and closure of this trail to motorized use is entirely consistent with Forest LRMP direction.

> *I am not in favor of closing Trail 41 [sic], as it is used by many groups to access the south side of Century Drive to the mountain. The Great Nordeen Race is but one user of this trail and it would greatly impact whether we could even have the race if it was closed.*
>
> *My high school ski team also uses this for practices occasionally during our ski season. I know that snowmobilers use this trail as well, because I have encountered them as I descended the trail.*
>
> *This will also have a great impact on Jerry Scdoris, the owner of the sled dog concession, as this is the main trail he uses for his out and back short trips from Sunrise Lodge. I would like to see this trail remain open.* (I10-1)

Response: To clarify, it is Snowmobile Trail No. 40 that is being considered for removal from the trail system. Grooming of the trail outside the ski area boundary would likely be discontinued. Beyond that, the closure would not affect non-motorized access, access for races or other permitted non-motorized events, or use by the dog sled concession. Snowmobile use of the trail is relatively low, and there are ample options for snowmobile use on the DNF.

> *I oppose the closing of snowmobile trail #40 to Sunrise Lodge and its amenities. You talk about existing use conflicts and safety issues. The only use conflict is you want the land for your own use. You talk about worsening safety issues as use increases. This will only come from the skiers you move into the area, not from snowmobilers.*
>
> *If you insist on closing trail #40, you should make provisions for the snowmobile community to access the Westside Lodge, with a short trail to Century Drive (trail #5). You talk about the need to bring in more money, but you want to stop serving a certain group of people, how does this work? You could even allow snowmobile parking in your Westside parking lot. Think of all the extra money you could bring in from the food and beverage sales to snowmobilers, this surely could not harm your bottom line. This would display Powder Corp intent to embrace ALL variations of winter recreations.*
>
> *Powder Corp has snowmobiling activities at their other resorts, is it not time to bring it to Mt. Bachelor resort?* (I15-1)

Response: See responses to comments I3-1 and I10-1 above. In short, Mt. Bachelor is a ski area, and continued public snowmobile use of Trail No. 40 is not compatible for the reasons outlined in EIS section 3.5.4.2.2. Ample trails and lodge access are available elsewhere in the area.

Opposition to Eastside Pod

> *I refer specifically to the new proposed lift line on the east side of the mountain entitled, "Eastside Express." As someone who has enjoyed the area within the resort boundaries, in the backcountry, and hiking in the summer season I have a good familiarity with that part of the mountain. I would like to express my concern over the amount of old growth trees that would have to be cut in order for this lift to be constructed. I feel this is a great disservice to our national lands, and that the ends do not justify the means. Mt Bachelor can barely maintain and upgrade the services that are already in place. Building a new lift line seems unnecessary and unwarranted on a relatively flat part of the mountain. Do the extra profits that may be generated for this company justify the cutting of some trees that must be near 400 years old?*

I understand that they have many other plans to renovate and expand the area that is already in use, and I would fully support and advocate these improvements. But, I wholly disagree with the idea of the Eastside Express lift line. In addition it would greatly reduce the already small area of land that is accessible to backcountry pursuits, specifically in the area of the Gate heading towards Kwohl Butte. I site the concerns brought up on page S-4 of the draft that acknowledges the potential environmental impacts of removing old growth pine trees. This seems to be a clear cut example of a company pushing forth with profits in site while national lands bear the true costs. (I8-1)

Response: The Responsible Official will consider this comment. All aspects of Mt. Bachelor within the managed ski area boundary (i.e., within the catchline) are generally open to skiing. As a result, the ski area offers more "side-country" (i.e., undeveloped, off-piste terrain that is lift accessed) than most ski areas. Creation of the proposed new catchline would increase the acreage of such terrain by more than 300 acres, improved through selective tree removal and with safe egress to the Sunrise base area (EIS section 2.2.1.2). The Kwohl Gate, a signed opening in the closed boundary line on the existing East Catchline providing access to the Kwohl Butte area, would be moved downslope to a corresponding location on the new catchline under the Proposed Action, so this opportunity would not be affected. EIS section 2.2.1.2 has been revised to include this action. Impacts on old growth forest and on whitebark pine are discussed in EIS section 3.4.4.3.2,

i very much oppose allowing mt bachelor to expand. there is no need for more ski areas in a warming climate. you are decimating the forest which needs protection for birds and wildlife. stop letting mankind take 99% of all land. this is a bad plan and it needs to be shut down. send me paper copy of any further expansion plans. (I9-1)

Response: The Responsible Official will consider this comment. The purpose and need for the Proposed Action is defined in section 1.4 of the EIS.

SUPPORTING COMMENTS

The following comments express support for the Proposed Action or specific elements of it, in general terms or for specific reasons. These comments will be considered by the Responsible Official but will not affect the content of FEIS. They generally do not require responses.

Support Based on Economic and Social Benefits

Mt. Bachelor has been a key contributor to the success of Bend's community for over 50 years and continues to be an economic driver today. The company's ten year vision not only takes into account the heritage of the region, but it is also innovative in its approach to ensure we are serving the needs of current and future generations.

The Bend Chamber is excited to see the plans of Mt. Bachelor come to fruition and turning the resort into a year-round destination for visitors. The addition of summer activities like downhill mountain biking, trails and a canopy zip line tour will move us forward in enhancing the experience in our national forests.

We are also pleased to see the addition of the Eastside Express, thus offering more skiing and recreational opportunities for our winter tourists. With more area for skiers and recreational enthusiasts, we are solidifying Central Oregon as the place to be during winter.

The creation of a year-round, long-term plan by Mt. Bachelor will turn seasonal employment into an opportunity for more sustainable year round jobs. The local economy will benefit from

employees having gainful year-round employment, as well as improve the stability and quality of life to those who are employed.

Mt. Bachelor is an integral part of Central Oregon not only from a recreational and economic perspective, but also through its support of the local community. The organization has increased its support over the last few years through a variety of revolutionary fundraising programs unique to Mt. Bachelor and Central Oregon.

Through the Charity Ski Weeks program, Mt. Bachelor has donated $340,825 to local beneficiaries since the program's inception in 2009, averaging over $85,000 per year, with a record breaking contribution last winter of$99,200. A total of 15 Central Oregon non-profit organizations have benefited with cash contributions over the past 4 years.

Previous beneficiaries include: The Environmental Center, Big Brothers/Big Sisters, Boys & Girls Club, United Way, MBSEF, Oregon Adaptive Sports, Saving Grace, CASA of Central Oregon, Sparrow Clubs, Family Access Network, Neighbor Impact, Volunteers in Medicine, The Tower Theatre, Girl Scouts, and Boy Scouts.

During the past seven years with its Ski for Schools fundraiser, Mt. Bachelor has generated over $100,000 in proceeds for Bend-La Pine and Redmond school.

Mt. Bachelor also recently announced its participation in OSU-Cascades 'Ascending New Heights' fundraising initiative to establish a 4-year university in Bend, with a pledge of$250,000.

Through the above efforts, Mt. Bachelor has assisted local charities, non-profit organizations and now OSU-Cascades by offering a discount ticket voucher, whereas upon redemption, 100% of the proceeds are donated directly back to the issuing organization. This is a 'win-win' for Mt. Bachelor, the participating charities, as well as the community by offering local skiers and snowboarders a discounted full-day lift ticket to benefit a worthy cause!

In addition to the aforementioned programs, Mt. Bachelor has contributed to charities through a variety of fundraising channels. From ongoing annual events such as the Dirksen Derby and Oregon Special Olympics, to fulfilling ongoing donation requests with unique product contributions, giving back and supporting the local community is a foundation of Mt. Bachelor's philosophy.

Mt. Bachelor has long been known as a gem in the Pacific Northwest. Above all, this plan will ensure the future growth of the mountain compliments the needs of the community and visitors it serves, as well as enhance the local economy. (O1-1)

Response: The Responsible Official will consider these comments.

On behalf of the more than 500 business members of the Central Oregon Visitors Association (COVA), it is a privilege to convey the importance of Mt. Bachelor Ski Area Improvements Project, and its role in the economic viability and sustainability of Central Oregon's year-round tourist industry.

COVA strongly supports approval of the Mt. Bachelor Master Development Plan. Upon its completion, this project will expand and enhance the guest experience for winter and summer leisure opportunities on Mt. Bachelor and the Deschutes National Forest. By this addition of new summer activities, such as downhill mountain biking, new hiking trails, canopy zip line tour

and climbing wall, this will serve the varied interests of summer recreation enthusiasts and create year-round employment and operations stability for locals and Mt. Bachelor. It will also introduce first-time guests to Mt. Bachelor Resort and induce future visits in the winter and shoulder seasons.

Central Oregon welcomes over 2.5 million overnight visitors each year, generating total economic impacts of more than $674 million annually for the region's economy. The improvements incorporated at Mt. Bachelor will aid in enhancing the overall visitor experience and lends itself to the viability of our region as a viable winter destination.

The ski and summer resort at Mt. Bachelor is a vital component in Central Oregon's ability to attract business and visitors to the region. Mt. Bachelor's proposed improvements create an enhanced experience for new visitors, playing an important role for future business diversification and expansion that is critical for the continued economic vitality of the region. (O4-1)

Response: The Responsible Official will consider these comments.

Mt. Bachelor has been a major attraction in Central Oregon for many years, and has contributed greatly to the local economy. Not only are visitors attracted to the area, many permanent residents and businesses have located here in part to enjoy the winter recreation available on Mt. Bachelor. Similarly, OSU-Cascades uses Mt. Bachelor in its enrollment marketing, and attracts students who are interested in winter recreation. OSU-Cascades is now expanding into a 4-year university and is planning on having 5,000 students by 2025 (we currently have 760). Many of those students will be interested in the amenities at Mt. Bachelor, and the proposed expansion will accommodate more skiers, reduce congestion, and increase summer recreation opportunities – all things that will be attractive to students. Thus, the expansion at Mt Bachelor will be well-timed with the expansion of OSU-Cascades, providing mutual benefits. (O9-2)

Response: The Responsible Official will consider this comment.

The importance of Mt. Bachelor to the community's economic way of life is clear. What is most impressive is the fact the mountain has expanded to a variety of summer activities, that are not only fun but create a year round economic engine for Central Oregon.

In my law practice, I primarily represent small and medium size businesses. Business is most active during the summer. Our weather allows more construction and outside activities. Golf, fishing, hiking, and bike riding are easily accessible. Summer has become our primary tourist season, and Mt. Bachelor is an important part.

What saves our community during our long winters is Mt. Bachelor. The mountain still brings thousands of new visitors to Bend each year and attracts new residents.

In addition to being an economic engine, Mt. Bachelor is also a solid community citizen. Its officers and employees participate in a wide variety of non-profit activities. This increases collaboration and makes Mt. Bachelor a better partner in our community.

I have briefly reviewed the Master Development Plan 2010 ("MDP"). The projects being evaluated lie within the existing Special Use Permit boundary. All of the proposed new activities have been thoughtfully proposed and betted. I urge the Forest Service to support the

MDP. Increased development on Mt. Bachelor will provide new jobs to our area and improve the economic climate for everyone. (I2-1)

Response: The Responsible Official will consider these comments.

On behalf of the Oregon Tourism Commission, dba Travel Oregon, I am writing in support of the Mt. Bachelor Ski Area Improvements Project. The proposed actions would greatly benefit Central Oregon's tourism economy.

We believe that this project aligns with our state's commitment to our environment, our culture and the well-being of our citizens to keep Oregon the special place that it is. Mt. Bachelor's proposed projects lie within the existing Special Use Permit boundary, through which the US Forest Service helps provide outdoor recreation opportunities for a high number of visitors while continuing to protect the majority of our National Forest System lands.

Mt. Bachelor is an important part of the state's $8.8 billion tourism industry that accounts for 92,000 Oregon jobs. The development of additional summer activities will convert what are currently winter-seasonal jobs into year round jobs for Oregonians. With their commitment to Oregon's tourism and hospitality industry, and collaboration with key stakeholders, Mt. Bachelor's Master Development Plan 2010 (MDP) will showcase Oregon's natural beauty and Mt. Bachelor's history and heritage.

Mt. Bachelor's proposed actions will be an important stimulus to Oregon, and Central Oregon's tourism economy. Thank you for your consideration and for the Forest Service's continued support of Oregon's tourism economy. (O9-1)

Response: The Responsible Official will consider these comments.

Support for Eastern On-Mountain and Base Facilities

These projects are concentrated in the eastern part of the resort and are intended to provide skiers and snowboarders with more of the most popular intermediate and low intermediate terrain, as well as a larger staging and skier services center located in the part of the mountain that is the most protected from the weather (including a more concentrated and comprehensive Learning Center). The expansion of parking and skier services also helps Mt. Bachelor operations to balance the mountain better and provide a more adequate level of parking and skier services on the busier days.

On days of inclement weather, the winds and cold temperatures generally come from the west, causing a number of closures of the Summit, Northwest and Outback lifts. The Pine Marten and Skyliner lifts are also affected by these weather events, but less severely than the western part of the ski area, although comfort is definitely better as you move eastward. As one moves across the ski area towards the east, the weather becomes less of a factor on those inclement days, and is even considerably more comfortable on the best of days. Bad weather is an especially important factor in beginner's and intermediate's enjoyment and more eastern locations will increase the quality of their experience and the likelihood of their future return.

The Rainbow chair is currently underutilized primarily due to the extremely long lift ride time (due to its length and slow operating speed), while the Sunrise chair, which services similar terrain, experiences extremely high and consistent utilization. The Sunrise Lodge is frequently overcrowded, even on the less busy days, due to the proximity to the popular Sunrise and Skyliner lifts and the warmer, wind protected location on the eastern flank of the mountain.

The Sunrise Base is the smaller of the two main base areas, with a capacity of about 1,900 skiers, primarily arriving by car. On busy days, this base area will typically fill long before the other parking areas get very busy. This is primarily due to the fact that it is the first entrance to the ski area, the most weather protected, the easiest walk to the lifts and also because of its proximity to the intermediate and low intermediate terrain. (O7-2)

Response: The Responsible Official will consider these comments.

The existing Rainbow triple chair is extremely underutilized due to its long ride time and old technology. This lift will no longer be as important in its current alignment to service the Flying Dutchman and I5 trails due to the presence of the new Eastside detachable chairlift. Analysis of the terrain adjacent to the bottom third of the lift reveals it is suitable for novice skiers, while terrain in its mid elevations is more suitable for low intermediates. Shortening this lift by moving the top terminal down the line would not only reduce the ride time considerably, but would also make the lift available to a lower skilled class user group, which may enable it to be used as part of the Sunrise Learning Center. However, the top terminal should be high enough so that it can provide a secondary access to the Eastside lift. Two alternatives for shortening this lift were evaluated; one would create a segregated novice skier zone with a very short lift (terminating at the 6,660 foot elevation) and the other would create a longer lift and larger low intermediate zone in the lower elevations of the current Rainbow area.

The longer alternative became the proposed action. The top terminal will be moved down to the 6,970 foot elevation. This would result in a lift only about 60% of its current length (about 3,150 feet long) and a much shorter ride time. A lift in this configuration would service the Rooster Tail and lower I5 trails in the low intermediate skill class and the Carnival trail, in the novice skill class, while the existing Carousel lift would be retained to provide the beginner/novice skiing as part of the Sunrise Learning Center. This lift will also provide a secondary lift access to the new Eastside lift if the Sunrise lift is busy or out of service and not operating.

As part of the new focus on children and learning in the Sunrise area, it is proposed to create even more attractions for children in this area which will enhance enjoyment of their ski day. A major effort towards this is creation of a forested Kids Adventure zone, complete with tree fort, characters and snow play features. The forested areas between the Rainbow lift and the Carrousel/Carnival trail and the area east of lower I5 will be used for this purpose. Narrow trails just wide enough to accommodate grooming machines will be constructed through these areas using limited selected tree removal and a 'tree fort' discovery and play structure will be constructed in the location. This fort will be designed and constructed to fit into the forest both visually and practically. The entire Adventure Zone will require minimal changes to the forest itself and will appear very like the existing undisturbed forest. (O7-4)

Response: The Responsible Official will consider these comments.

As mentioned previously, new trails will be constructed in the Eastside and (shortened) Rainbow pods. These include several traditional trails cut on average 150 feet wide through the forest, zones of braided "groomed glades", natural glades and meadows, constructed glades and connector trails and skiways.

In order to relieve congestion in the Rainbow/Sunrise area, a ski route has been proposed to connect the bottom of the Rainbow lift with the bottom of the Eastside lift. This route would be located mostly on the existing roadbed (known as the power line road or snowmobile trail 40)

along the side of the Sunrise septic field and into the forest, diverting towards the existing lift after traveling a short distance in the forest. This trail will mostly be too flat to maintain any speed, but if skiers are willing to skate several hundred feet, they will not have to wait in line at the Sunrise lift or ride the Rainbow lift to get to the new Eastside lift on the busiest days.

A lower catch line for the east side of the mountain is proposed, collecting skiers who wish to ski in the trees below the existing catch line and make their way back to the Eastside lift. The new, lower catch line is an important element of the Eastside lift and trail design: it provides the final safety line clearly delineating the ski area boundary and significantly reducing the potential for skiers to become stranded off-piste, and it will provide lift access to a very desirable, naturally gladed skiing experience that can be further enhanced by selective tree removal of small, individual trees and tree clumps to eliminate choke points and improve skier flow.

Mt. Bachelor's program of minor trail renovation will continue, including widening bottle necks, removing hazard trees and re-grading where necessary. These minor renovations will be ongoing, when deemed necessary, and included in annual summer grooming plans. (O7-6)

Response: The Responsible Official will consider these comments.

Due to the location of the new Eastside lift base, creation of the Eastside lift access trail described above, and the re-organization of the area around Sunrise Lodge as a Learning Center, it is proposed to seek a closure of snowmobiling trail 40 from its intersection with the Mt. Bachelor Permit Area. This will end public snowmobile access to the Sunrise Lodge, but it will also eliminate current and future conflicts between motorized trail users and skiers on the trail and in/around the Sunrise base area. (O7-7)

Response: The Responsible Official will consider this comment.

Support for Eastside Pod

Mt. Bachelor proposes to install a high speed chairlift in the eastern portion of the special use permit (SUP). This portion of the SUP is designated for intensive recreation (Management Area 11). Contemplated since the 1960s, the Eastside Express would help bring to fruition the full alpine skiing potential of the Mt. Bachelor SUP. The Eastside Express would serve highly desirable intermediate terrain, which is important to Mt. Bachelor's family-friendly reputation (needing terrain appropriate for every family member). If approved, this chairlift upgrade would accomplish the following:

- *Shorten lift line queues on Mt. Bachelor's other high speed chairlifts;*
- *Improve skier circulation between the east and west sides of the mountain (i.e., modern lift technology and compelling terrain would make the Eastside Pod a popular destination, thus increasing the overall utilization of the eastern portion of the SUP);*
- *Address the guest safety aspect of chairlift load/unload sequences (i.e., the lift's detachable grip technology increases the likelihood of safe carrier loading and unloading);*
- *Provide a high quality uphill conveyance in this portion of Mt. Bachelor; and*

- *Enable the chairlift to operate in a broad range of inclement weather (i.e., detachable grip carriers are heavier and less impacted by episodes of high winds).*

Equally important, the Eastside Express installation would help 'weather proof' Mt. Bachelor's ski lift operations. When weather conditions prohibit the operation of the Summit, Outback, and Northwest lifts, the Eastside Express would likely run because of its profile, elevation, and protection from prevailing winds. (O5-2)

Response: The Responsible Official will consider these comments.

The Eastside Express detachable quadruple chairlift is proposed for a pod of low intermediate to intermediate terrain on the eastern edge of the existing ski area. The bottom terminal is proposed to be located close to the existing "rescue" road. The top terminal is proposed to be located southeast of the top of the Rainbow chair, about 88 feet higher than the Rainbow top terminal at the 7,693-foot elevation. This lift will have a total length of approximately 6,800 feet and a ride time of about 6.8 minutes. It is proposed to install this lift with a rated capacity of 2,400 pph to provide comfortable, efficient loading for the intended users, most of which will likely be in the intermediate skill classes. The top terminal is located near the edge of the natural tree line and has been confirmed to be well protected from the weather, while providing good skier distribution and skier access to the West Village Getback skiway back to the West Village.

Trails serviced by this lift will be a combination of trails currently serviced by the Rainbow chair, and new trails winding through natural openings in the trees and cut through the denser forest. The top half of the pod has moderately sloping gradients in naturally gladed trees, while the bottom of the pod flattens somewhat in denser trees. New trails will be designed to respect the natural topography as much as is practical, as well as taking advantage of natural clearings in the trees to create interesting ski trails. Tree skiing will also take place in the natural glades in the mid-mountain zone and in glades created or enhanced using selective tree removal in the denser forest of the lower mountain. In some areas where the topography flattens substantially, trail design will attempt to spur interest for the skier by creating a gladed feeling by constructing several winding, narrower, "braided" routes through the forest (similar to Vail's Blue Sky Basin area). In other areas, simple collector trails will be built to bring skiers to the bottom terminal. (O7-3)

Response: The Responsible Official will consider these comments.

I strongly support the Eastside lift, as I think the Rainbow lift has nice trails but too long of ride time. In addition to being sheltered from the wind, it has a warming, sunny exposure for cold mornings. It opens up new intermediate and lower intermediate terrain that is so popular with the bulk of the skiing public. Some of this kind of terrain was lost at the Skyliner lift with the development of terrain parks. (I5-2)

Response: The Responsible Official will consider this comment.

For the Eastside pod trail cutting, I applaud the concept of allow cutting to evolve slowly, over many years (p.22-23). Too often ski areas take out too many trees when trails are originally cut. I suspect that this is because it may be difficult to get permission from the Forest Service for additional cutting/thinning in later years. Cut conservatively, then selectively cut trees in subsequent years after seeing how the run skis, where skier traffic goes, and where pinch points develop. Tree islands are welcome, and the runs cut for the Timberline Jeff Flood lift were

well done and are a great example. With an E-NE exposure, it is critical that the trail cutting considers the solar exposure of each trail, and retains any large trees on the south (skiers right) to provide adequate shade for snow preservation. In spring conditions, skiers will hug the shaded right side of the trail. Where the trail is wide (150'), or at exposed rises and knolls, then tree islands should be left in place. (I5-5)

Response: These considerations are consistent with the Mt. Bachelor and DNF approach to trail development at the ski area.

Support for Summer Activities

The development of additional summer amenities in the base area elevations – canopy zip line, climbing wall, hiking trails, etc. – will help meet existing marketplace demand for these activities. Summer amenities at Mt. Bachelor are appropriate for the following reasons:

The Northwest's population, and demand for outdoor recreation, continues to grow. Existing ski area infrastructure should be utilized to help relieve summertime congestion at other developed recreation sites, visitor centers, trail heads, and recreation trails.

There may be fewer burdens placed on more resource-sensitive tracts of land if more year-round recreational use takes place at Mt. Bachelor. Allowing more recreational use of ski area lands concentrates resource impacts within the managed setting of SUP-holders like Mt. Bachelor, Inc. This factor was taken into consideration when the U.S. Congress passed, and President Barack Obama signed into law, the Ski Area Recreational Opportunity Enhancement Act of 2011.

Commerce that is based upon outdoor recreation is sustainable in the long run and will be of tremendous human and economic benefit to Central Oregon's stressed economy. Additional recreational amenities would allow Mt. Bachelor to bolster its year-round employment, and provide additional health and fitness benefits to the recreating public. (O5-3)

Response: The Responsible Official will consider these comments.

It is highly desirable for a ski area to be able to utilize its facilities and terrain year round, for obvious financial reasons. In addition, ski areas are located in the mountains, in areas which people frequent for various recreational activities year round. Most ski areas in the Pacific Northwest are closed in summer, and the only recreational activity on site is hiking. Some ski areas are able to utilize a lift in the summer to transport tourists to scenic spots, and a very few are able to offer lift assisted mountain biking on their trails. None of those ski areas are close enough to Mt. Bachelor to appeal to the Bend area population…

New hiking trails from the Pine Marten Lodge to the top of the Northwest Express lift, around an interpretive loop above the Lodge, and down to the West Village base area would also be accessible from the lift. This would be another wonderful family opportunity, with easy hikes and stunning views. The proposed rock climbing structure and zipline course would appeal to many adventurous people and help make Mt. Bachelor an even more attractive summer destination. All of these summer activities would help Mt. Bachelor to offer year-round employment opportunities and to bolster the local economy.

The Forest Service Plan objectives include a goal to manage the ski areas within their boundaries to offer recreational opportunities to the public year round. It is more desirable to have this type of activity at an area which is already used in the winter than to have

unauthorized, unmanaged, unsafe trails being built on NFS land. Mt. Bachelor is a perfect location, and this development of summer usage will take away some of the congestion at the Forest Service's other visitor centers, trail heads, and developed recreational sites. (O6-6)

Response: The Responsible Official will consider these comments.

Summer activities are extremely important to the success of a ski area's year round recreational operations. These activities can make use of some of the infrastructure and facilities already in place for winter recreation, as well as other improvements which add diversity to the overall recreation potential. The Deschutes National Forest is currently quite well utilized in summer and Mt. Bachelor has a limited summer recreation program including sightseeing, chairlift rides, dining, disc golf, hiking, dry land dog sledding and USFS interpretive activities (talks and hikes). The surrounding forest contains many mountains, lakes and trails and activities including sightseeing, scenic drives, hiking, camping, fishing, cross-country mountain biking, horseback riding, boating, etc. Mt. Bachelor proposes to increase the diversity of the summer recreational activities offered to supplement the region's attractiveness. The following is a list which describes anticipated or potential summer activities within the Permit area for Mt. Bachelor, supplementing the activities already occurring at the ski area:

- *Downhill, Lift Serviced Mountain Biking*
- *Zip-Line Tours*
- *Summer Tubing*
- *Night Time Stargazing*
- *Horseback Riding*
- *Rock Climbing Wall*
- *New Hiking Trails*
- *On Mountain Dining, Family Gatherings and Retreats*
- *Arts, Crafts and Cultural Festivals*
- *Other Appropriate Temporary Family Attractions*

Several specific activities that Mt. Bachelor has explored in some detail are listed below…

During the summer, foot-passengers venture out from the Pine Marten Lodge location for hiking. The hiking program will continue to include nature and geological interpretive talks and hikes, with USFS staff assisting with these activities. Indoor and outdoor interpretive displays could also be installed in and around the lodge facilities. Mt. Bachelor proposes to create several new hiking trails emanating from the Pine Marten Lodge to make Mt. Bachelor more attractive to guests. A new trail will be constructed from Pine Marten lodge all the way down to West Village, winding its way through the forest and across ski trails with multiple opportunities for differing and expansive views. Hikers will also be encouraged to walk up the access road to the Northwest quad to obtain views to the south and west. A small interpretive loop will also be constructed approximately 350 feet to the south of the Pine Marten Lodge. This loop will be about 2,000 feet in length and will include interpretive features, views and several benches for resting and simply enjoying the views…

The mountain restaurants will be used for social events such as weddings, parties, conferences, seminars and group dinners associated with these gatherings. The opportunity to meet and have

a meal in a unique setting with spectacular views for one day of a multi-day conference will provide a unique attraction for groups coming to Bend, Sunriver and Mt. Bachelor.

Several evenings per season could be centered on stargazing, with telescopes and informative displays available at the mountain restaurants. Special events can also be planned for observation of astronomical displays such as meteor showers, etc.

Recreational events, festivals or specific events associated with regional festivals/gatherings could take place at Mt. Bachelor on selected weekends and/or weeks. Some of the activities associated with these events are anticipated to take place on the mountain, as well as in the base area. (O7-15)

Response: The Responsible Official will consider these comments.

Climbing walls are also very popular at ski /snowboard resorts and translate well to the natural surroundings and can provide the first stepping stone towards rock climbing and mountaineering (which is readily available nearby, in Smith Rock State Park). The climbing structure proposed is located on the Pine Marten Lodge "beachfront", a highly visible location and the center of summer activity animation at the resort. If design parameters permit, it is envisioned the climbing wall could be used year round, possibly converted to an ice climbing tower in the winter. (O7-17)

Response: The Responsible Official will consider this comment.

A zipline is essentially a pulley suspended on a wire cable on an inclined slope which allows the user to traverse from the top to the bottom of the cable at speed, suspended above the ground. This has become a popular recreational activity at many mountain resorts as it allows the user to get a unique and exciting gravity experience while traversing through the forest. Mt. Bachelor proposes to install a series of 3 zip lines on the front side of the mountain, traversing across the mountain eventually dropping from the Pine Marten Lodge down to the West Village lodge. The top zipline is the shortest and flattest line, which would allow beginners, or guests who are nervous, to get a small zipline experience before deciding whether to get the whole mountain experience. The proposed lines travel over and through forest and cleared areas, as well as visiting a small natural cone topographical feature and offering incredible views. A zipline tour of this nature, in combination with the other summer activities proposed, would create broader interest and appeal for visitors to the Deschutes National Forest to consider making a day at Mt. Bachelor part of their summer vacation plans well into the future. (O7-18)

Response: The Responsible Official will consider this comment.

Support for Mountain Bike Park

The principals of supply and demand validate the need for the proposed mountain bike park. With the advent of full suspension mountain bikes, downhill mountain biking has become the fastest growing segment of cycling. Currently, the supply of ski lift-assisted, downhill mountain biking is limited. The local and regional demand for downhill mountain biking trails and skills park technical terrain features (TTF) is projected to increase, and this expanding demand will not be met by the existing mountain bike park operations at Willamette Pass Resort and Mt. Hood Skibowl (Timberline Lodge & Ski Area is doing NEPA analysis on a mountain bike park). Mt. Hood Skibowl Mountain Bike Park facilities provide extensive opportunities for cross country mountain bike touring and lift-served, downhill mountain biking for accomplished intermediate and expert ability levels. The topography of the terrain served by Mt. Hood

Skibowl's Sky Chair makes it very difficult to develop downhill routes for cyclists new to the sport (i.e., first-time beginner, advanced beginner, novice, and low intermediate). Mt. Bachelor's proposal will accommodate the full spectrum of skill levels – with an emphasis on downhill offerings for beginners and intermediates. Willamette Pass Resort is too far of a commute to effectively serve the majority of the demand for downhill mountain biking (demand created by cyclists in the greater Redmond-Bend-La Pine area, as well as visitors from other West Coast locales. (Ski lift-assisted, downhill mountain biking infrastructure exists at Stevens Pass Mountain Resort in Washington state. However, this facility is too distant to routinely serve the Redmond-Bend-La Pine area.)

What was once the domain of young, hard-core, X-Games athletes, downhill mountain biking is now an activity embraced by a broader spectrum of recreationists. Mt. Bachelor hopes the proposed infrastructure will attract bikers of all backgrounds, including families of cyclists comprised of two and three generations. Downhill mountain bike parks (trails and TTF) must provide a carefully planned progression of trails and structures – bike offerings that help guests develop skills and gain confidence in a safe and resource-appropriate setting. An optimally designed skills park will provide a first-time beginner with a rewarding, introductory experience. The downhill terrain and uphill conveyance will allow guides (i.e., bike park instructors) to nurture the guest along the learning curve – helping build athleticism and bike handling skills, which positively reinforces a guest's sense of overall competence. Increased proficiency, in turn, leads to a bigger mountain experience (i.e., guests are able to safely enjoy a broader spectrum of the trail network and TTF), higher levels of guest satisfaction, and the higher likelihood of return visits to this carefully managed portion of the forest. Currently, friends and family members provide the majority of the mountain bike instruction on an informal and somewhat capricious basis. Mt. Bachelor is committed to developing a top-notch skills park and assembling a corps of talented guides to ensure first-time beginners are exposed to the basic biking skills and etiquette necessary for a safe and rewarding experience. Mt. Bachelor will employ a full-time crew for instruction, facility maintenance, and emergency medical assistance.

Without the infrastructure outlined in the proposed action, demand for mountain biking will continue to outpace supply, which will cause access issues as well as a management quandary for land managers hoping to protect NFS lands from the unauthorized construction of poorly designed, built, and maintained mountain biking structures and trails. The proposed action will help the USDA Forest Service meet the long-term demand for downhill trails/TTF, and will help the USDA Forest Service personnel address existing forest resource damage and safety concerns associated with unauthorized and unmanaged structure/trail building on the Deschutes National Forest. (O5-6)

Response: The Responsible Official will consider these comments.

Mountain biking is an increasingly popular outdoor sport in the Northwest, and is especially popular in the Bend area. It encourages families to enjoy activities together in the outdoors. There is a growing demand, and not a lot of facilities in the entire Pacific Northwest which can meet the demand. By offering lift assisted mountain biking with specially developed trails for all levels of bikers, some of the riding on illegally constructed trails and unauthorized freeride areas which are unsupervised and causing damage to the forests will be alleviated.

A skills park would be constructed near the base of the Pine Marten chairlift, accessible from the parking lot, which would have appeal to all ages and abilities. The skills park would provide riders an introduction to the sport and a place to practice the basic skills required in a

controlled, gently sloped, less difficult setting. It would include both natural and man-made "technical terrain features." This would be a wonderful opportunity for families to have a place to bring their children to learn mountain biking (and the tricks and jumps that both children and adventuresome adults crave) safely. The proposed lift assisted trails serviced by the Pine Marten chairlift will offer rides for all levels of riders in a scenic setting, using portions of existing ski runs and including natural berms, jumps, and other features built from natural wood and stone products. (O6-7)

Response: The Responsible Official will consider these comments.

The Bend area has a very vibrant biking community ranging from a large contingent of road bikers, who regularly use Century Drive from Bend to Mt Bachelor, to cross-country mountain and free-ride bikers who have several hundred miles of mostly smooth single-track to choose from. There is a growing demand for downhill free ride type trails that could be met with lift serviced mountain biking. A downhill mountain bike park at Mt. Bachelor will satisfy the demand by advanced riders in the Bend area who experience a lack of options on more technical trails or gravity fed riding. Many people in the established mountain bike community not only desire this type of recreational activity but are also generally enthusiastic promoters of their recreation, encouraging many others to get active. Surveys at established mountain bike parks confirm that a significant proportion of users fall across every age demographic from ages 10-55. Due to the gravity fed nature of this recreation and the design of trails across every skill level, downhill mountain biking is fast becoming a main stream activity doable by almost anyone that has had some experience riding a bike. A well designed, constructed and operated mountain bike park could also be a regional attraction, helping support tourism in the summer and introducing users to the Forest.

Mt. Bachelor proposes to offer lift serviced mountain biking, similar to other ski areas on USFS land (Winter Park, Keystone, Mammoth, etc.). We have engaged the premier mountain bike park designers in the world, Gravity Logic, to come up with an initial plan for the trails and facilities required for a world class downhill mountain bike park. The proposed biking trails wind across the mountain face in and out of the trees, moving from the Outback zone almost into the Sunrise zone of the mountain. The topography and terrain found on the mountain is exceptionally good with gullies and knolls and ridges found throughout the area which will allow for a fantastic variety of trail experiences. Mt. Bachelor is poised to offer Central Oregon riders a unique riding experience unlike anything found in the Bend area. Unparalleled views, a dramatic volcanic landscape up high and stunning old growth hemlock forests down low. It is proposed that the Pine Marten chair will be fitted with bicycle carriers to accommodate bikers, in addition to transporting foot-passengers, and the Skyliner chair may be used when the Pine Marten is full or unavailable.

It is also proposed to build one or two "pump/freestyle" tracks in the base area and one to three "skills parks" on the mountain as part of the mountain bike park. A pump/freestyle track is a nearly level loop or series of loops comprised of small berms, rollers, etc. (generally 1-3 feet high) which enable the user to build skills by either pedaling around the circuit or 'pumping' the bike using their whole body to create momentum. A skills park is an area where bikers can increase their skills on a variety of features ranging from dirt jumps to technical sections, drop-offs, technical features constructed of wood (elevated trails including drops, step-ups, jumps, twists and turns, teeter-totters, etc.). Each park could consist of two or three features or tens of features to provide skills practice at intervals along the downhill trails. (O7-16)

Response: The Responsible Official will consider these comments.

Support for Nordic Center Improvements

Nordic skiing is becoming increasingly popular. At present beginning Nordic skiers do not have easy access to the Mt. Bachelor trail system, as they have to travel sections of more advanced trails to get to the easier trails. The new learning area and two easier new trails to connect to the existing trail system will assist beginners to have an enjoyable experience and keep them interested in the sport. Improvements to the Nordic trails and to the overcrowded Bob's Bungalow warming hut are needed. (O6-5)

Response: The Responsible Official will consider this comment.

While the Mt. Bachelor Nordic Center sees a significant number of guests in a season, we do not feel there is pressure at this time to expand the facility significantly due to the number of visitors. However, we do feel there are several measures that would vastly improve the guest experience and the programs offered. Improvements proposed include building a new, easier trail for low intermediates to access the trail network form the Nordic Lodge and a new route to replace the trail which cuts across the proposed tubing area.

The main Nordic Lodge is located at the trailhead and is generally used by skiers at the beginning and/or end of their skiing day. The Bob's Bungalow facility is the only place out in the trail network where skiers can rest or relax. We believe this facility is too outdated and too small for the number of current and potential users, therefore, it is proposed to expand the capacity and improve the ambiance of Bob's Bungalow by adding an outdoor deck for seating and a wood burning fire pit to create a "destination" experience within the trail network.

Currently, the trail which provides access to the main trail network has a significant amount of vertical and is not ideal for lower skilled skiers. Therefore, it is proposed to build a new trail around the north side of the Old Maid, at a fairly constant elevation, with less up and down than the existing trail to make access to "the Lowers" much easier and appealing.

The relocation of the tubing hill severs an expert route from the Nordic Lodge to the trail network, therefore it is proposed to construct a new expert route that serves the same function, but bypasses the tubing hill. (O7-14)

Response: The Responsible Official will consider these comments.

Support for Base Area Improvements

On days of peak demand, Mt. Bachelor's day lodges are not adequate to support important guest services like restrooms, ski patrol/first aid, food & beverage offerings, food service seating (both inside and outdoor), equipment repair, and retail opportunities. The 10 years of base area improvements – analyzed in the 2012 DEIS – would accomplish the following:

- *Greatly reduce day lodge congestion on days of peak demand (improving the guest experience);*
- *Improve the capacity balance between the base area and the lift and trail networks;*
- *Improve the circulation of guests from parking areas, through plazas and day lodges, and onto desired ski lifts and terrain;*

- *Improve employee spaces for shipping and receiving, refrigerated storage, 'prep' areas, dry storage, and waste management-associated infrastructure; and*

- *Improve the energy efficiency of the day lodge buildings.*

The base area enhancements will make Mt. Bachelor a more attractive year-round destination for recreationists and Century Drive travelers alike. Improving base area facilities – and the interface between the day lodges and the mountain infrastructure – will benefit the resort's summer- and winter-time operations. (O5-5)

Response: The Responsible Official will consider these comments.

The proposed Eastside Express Chairlift has been under consideration since the 1960's,and will be a very exciting addition to complete Mt. Bachelor's 360 degree skiing. There are many times when the prevailing winds cause the Summit, Northwest, and Outback chairlifts to be closed, which causes the remaining lifts and trails to become more crowded. Having a new high speed quad in the more protected east side of the mountain would enable the skiers to spread out and would enhance safety. There are times when my friends and I have headed over to the east side to do some tree skiing, but a ride or two on the old slow double Rainbow chairlift usually is enough to send us back west again. There is some very nice tree skiing terrain which would be included in the area covered by the new lower catch line, which I have looked at with longing while following the existing catch line. Proposed new runs off of this lift are in a wonderful skiing area. All of this would integrate very well with the Summit chairlift, as well as the Sunrise area expansion. (O6-2)

Response: The Responsible Official will consider this comment.

The Sunrise Express and the Sunrise base area lodge can both be very crowded, since it I the first place for skiers to turn off and park at Mt. Bachelor. The proposed six-pack Sunrise Express chairlift would alleviate the lift crowding. The expansion of the lodge, parking lot, and access road are greatly needed, especially with the expansion of the skiing in this section of the mountain. This already is a wonderful family area, and adding the Sunrise Learning Center and Kids Adventure Zone would make it even better.

I have just mentioned the shortcomings of the uncomfortable double Rainbow Chairlift, and like the proposals, both to shorten it and to make it a high speed quad. The lift presently can encounter some wind at the top, and the proposed configuration will make it more sheltered and highly desirable for beginner and intermediate skiers. All of the terrain can be reached from the Sunrise and new Eastside Express chairs…

These east side improvements are the most exciting of all the proposals as far as the skiing experience, as they open up more skiing in an area of Mt. Bachelor that is more sheltered from the prevailing winds, and offers some excellent skiing terrain for all abilities. By spreading out the skiers over more terrain into an underutilized area, the overall skiing experience and safety is enhanced for all. (O6-3)

Response: The Responsible Official will consider these comments.

There are so many excellent improvements in the West Village area that it is hard to know where to begin in expressing support. All users' experiences will be enhanced by all the proposed improvements, starting with driving into the lot with expanded parking, having the tubing hill off in a separate new area (spreading out the parking among tubers, Nordic skiers,

and downhill enthusiasts), and enjoying much needed expanded day lodge facilities. Even on days without peak visitation, the West Village Lodge is crowded, especially the bar area and deck.

Expanding snowmaking on the most heavily used trails will help with early season safety and the overall guest experience, alleviating crowding on the trails. Ski racing continues to be popular, and it would be desirable (and safer) to have an area dedicated to racing without interaction with all types of skiing abilities. The Red Chairlift has not been utilized for years, and with the removal of the tubing area is the perfect place to concentrate race training. The Alpine Training Center right at the base of that lift is an excellent location of facilities for race training. Many of our clubs are involved in racing, and our PACRAT racing league has held recreational races at Mt. Bachelor in the past, and might be more inclined to hold races there in the future with this area in place. The proposed biomass co-generation facility to replace the existing diesel and propane sources of heat and emergency power is an environmentally friendly and cost effective solution. (O6-4)

Response: The Responsible Official will consider these comments.

Due to the favorable weather, close-in parking, gentle terrain and general "coziness" of the area surrounding the Sunrise base, it is proposed to move a significant proportion of learning skiers/riders from the West Village to the Sunrise area. Part of the existing Sunrise Lodge would be converted into a children's learning center and several beginner lifts (moving carpets) would be installed on the terrain at the east end of the parking lots and below the Sunrise Lodge. The learning terrain is segregated from the higher level skiers, but is directly accessible from either level of the existing day lodge and also provides access to the top level of the Sunrise lodge (and the Sunrise lift) from either the bottom of the Rainbow lift or from the lowest proposed parking lot.

The Carrousel lift will remain in its current configuration to provide the next level of skier training (and chairlift familiarization) once students have graduated beyond the moving carpet zone adjacent to the Sunrise lodge. (O7-5)

Response: The Responsible Official will consider these comments.

Mt. Bachelor's water needs are currently supplied by two wells with a 1,600 gallon per minute (gpm) capacity and surface rights to 50 gpm from Todd Creek; this should be adequate for the potable water and snowmaking water needs for the ski area development described in MDP 2010. Reservoirs for potable water are located above the Pine Marten and West Village lodge areas. These reservoirs have more capacity than currently required for those lodges, but may easily be increased if business levels increase substantially and on a sustained basis. However, the current water system is inadequate at Sunrise for the fire suppression flows that will be required with expansion of the base. It is proposed to construct a new 125,000 gallon reservoir above the Sunrise base area. This tank would be supplied using the existing lines from West Village, but would be connected to the Sunrise base with a new 10" pipe.

The ground surrounding the West Village septic field has soils capable of processing larger amounts of wastewater than needed, along with additional permitted reserve land for future expansion of this field. The existing septic field at Sunrise is balanced quite well between actual peak usage and designed capacity, however addition of a new lodge will require additional septic field capacity. WH Pacific studies show that the surrounding ground has enough additional capacity to accommodate the new flows required, therefore, this field will simply be

expanded. In addition, during design of the expanded Sunrise Base Lodge space, consideration will also be made to installing fixtures and instituting operational procedures which use less water.

The linear parking area 150 yards beyond the JRC building and above the Skyliner Express has long been the preferred parking area for local season pass holders who do not desire typical skier services. This area provides parking close to the snow and lift, where it is easiest to retreat for breaks during the day and when the weather is nice, to retire for après ski "tailgating" at the end of the day. It has been observed that skiers parking in this area, as well as those using the Skyliner lift for return cycle skiing, have no easily accessible restroom facilities; anyone skiing here must go to West Village or Sunrise and then restage back to the Skyliner area using one of the very busy lifts emanating from those base areas. It is therefore proposed to construct basic restroom facilities here, accessible from both the snow front and parking lot, in the form of a manufactured 2 hole vaulted outhouse. It is also proposed to include garbage and recycling services at this restroom location to address the chronic trash disposal issues from the Skyliner parking lot as well. (O7-8)

Response: The Responsible Official will consider these comments.

It is proposed to increase the capacity of the West Village parking area by creating a new overflow/employee lot to the east of the existing parking lot covering approximately 2.5 acres. This lot would have the space to accommodate a further 350 cars, which would be used both by employees and guests. We anticipate a small increase in bus, shuttle and drop-off use, as well as a more significant increase in visitors to the snowplay and cross-country facilities. Although the overall West Village parking capacity and arrivals by other means increase somewhat, the anticipated increase in the number of tubers, snow players and cross-country skiers means that the number of alpine skiers staging through this base only increases marginally, by about 500 people per day.

The creation of a new parking area in the West Village is a fairly low priority at this time, but will be made necessary if the West Village parking lots start filling up on a more regular basis. This project would likely take place several years after the Sunrise parking expansion, depending on the guest demand.

Between the parking expansion at Sunrise, the parking expansion at West Village, the anticipated increase in the number of people arriving by other means and the anticipated increase in use by non-skiing guests, Mt. Bachelor should have enough parking capacity to accommodate approximately 13,120 people at one time. It is anticipated that the number of non-alpine skiers will rise from a present 769 at one time (cross-country, tubers, sightseers and employees) to approximately 1,122 at one time, however many snow players and tubers will arrive in the afternoon once a number of alpine skiers have started leaving the ski area, freeing up parking spaces. These parking capacity and use changes should result in the capacity for alpine skiers rising from the existing 9,281 skiers at one time up to approximately 11,998 skiers at one time, without having to rely on parking on Mt. Bachelor's internal and access roadways. With an anticipated increase in future skier visits on a peak day, this may still result in several days per year when overflow conditions will exist and cars will need to be parked on internal and access roads as they are now on peak days. (O9-12)

Response: The Responsible Official will consider these comments.

The West Village Base area currently is the primary arrival point for most of Mt. Bachelor's guests, and therefore, provides the entire scope of skier services in several skier service buildings. These buildings currently provide about 59 % of the total skier service floor space while the base area provides about 71% of the total base area staging capacity.

The two small buildings off the east end of the West Village lodge are somewhat unsightly and will likely be removed in the medium term. The building containing ski patrol, mountain clinic and administration space will be removed when space can be found in the existing West Village buildings (through reconfiguration of the space) or in one of the expansions to the West Village lodge. The other building contains infrastructure including back-up power generators, electrical switching equipment and the company's voice and data network equipment which will be relocated when practical. The relocation of these services and decommissioning of the building are tied directly to the potential development of a co-generation biomass plant in conjunction with the USFS and other entities. The timing of this is dependent on many external factors including technology, permitting, securing grant funding, etc.

As described earlier, although it is proposed to add some capacity to the parking in the West Village area, the anticipated increase in the number of parking spaces used by snow play guests and cross-country users will result in a relatively small increase in the number of skiers arriving at the West Village base. Therefore, with the minor increase in the number of arrivals at this base and the addition of a significant amount of skier service space in the Sunrise base, only minor additions to the skier service space will be required in the West Village Base. The only significant additions of skier service space in the West Village are proposed to be relatively small additions to the West Village Lodge, which will not only add ski patrol/clinic, bar/lounge, lockers and general seating floor space, but will also be strategically located and designed to enhance the appearance of the West Village Lodge. (O7-12)

Response: The Responsible Official will consider these comments.

The Parking upgrades are welcome and important. Mt Hood Meadows has a huge parking problem, with inconveniently placed lots that are not lift serviced and require clumsy and inefficient shuttle buses. I applaud the additional parking to prevent such problems at Mt Bachelor. (I5-6)

Response: The Responsible Official will consider this comment.

Support for Biomass Plant

Mt. Bachelor and the USFS have been in discussions in the last few years regarding the viability of a biomass fuel electricity/heat generating plant to be located in Mt. Bachelor's base area (close to the maintenance shop). This facility would serve two complimentary purposes; it would create localized demand for woody mass generated by USFS forest management procedures and provide Mt. Bachelor with a low cost and environmentally friendly fuel source for generating electricity and heat for the ski area operations. Both parties are currently examining factors including environmental impacts, constancy of fuel supply, construction and operating costs, availability of grants for funding and practicality of this solution. This facility would consist of a building housing the burner and generator, an underground supply distribution network and a storage facility for the fuel. As well as having a new power generation source, this measure will also provide some efficiencies by centralizing power supply and switching at Mt. Bachelor in a new, modern facility (thus allowing for the removal of the generator building from West Village). (O7-13)

Response: The Responsible Official will consider this comment.

Support for Race Program Improvements

Currently, alpine race training is heavily concentrated in the Cliffhanger/West Village Getback area, right in the middle of the busiest part of the ski area. Training not only uses a major trail which would see high use by the public if open, but racers have to mix with skiers of all skill classes to get to and from the lift, creating a potential for skier/guest conflicts. A better situation would be to have training located on lifts and trails which have little attraction for the skiing public with direct access to lift terminals, which not only opens up potentially popular trails to the public on busy days, but also limits potential conflicts between racers and others. It is therefore proposed to create an Alpine Training Center in the Red chair zone, which not only has suitable, underutilized terrain, but also has an underutilized chairlift.

Several trails serviced by the Red Chair will be used exclusively for training on select days, with the Red Chair itself being used for lift access for racers (it will also be open for public on busy days as well). The Red chair will be shortened in order to reduce the ride time, which will give racers quicker lap times and easier access to the training runs. The top terminal will be moved to the 7,185-foot elevation, just above Tower 15. This location would reduce the length of the lift to about 2,990 feet and is high enough to allow access to the Outback and Northwest zones via Ed's Garden. Snowmaking will be extended from the proposed top of Red to the existing snowmaking on Thunderbird. The tubing hill will be removed from the area between the Ski and Sports building and the Red Chair; the proposed Alpine Training Center will be constructed in that space. Some renovations may also be needed on the trails themselves to suit the needs of the race courses; this will be determined in conjunction with the future users and may include limited tree removal, minor grading and underground or on-ground services, such as timing and communications cables. The use of these slopes as an Alpine Training Center will only occur after the tubing slopes are moved across the parking lot.

The "headquarters" for the Alpine Training Center will be a 2-story building with a footprint in the range of 2,500-3,000 square feet in size. The center will contain meeting rooms, restrooms, equipment storage, etc., and will be installed at the bottom of the training area. Small start huts and finish huts will also be installed where needed, along with the associated power and communications lines required. (O7-9)

Response: The Responsible Official will consider these comments.

Support for Snowmaking Improvements

Mt. Bachelor's current snowmaking system covers approximately 30 acres stretching from the top to the bottom of the Pine Marten lift, quite a small proportion of its skiable terrain. It is proposed to expand the system moderately: extending into the Sunshine pod, connecting the existing snowmaking to the top of the Red Chair and extending the snowmaking coverage to provide snow cover to the top of the Olympian run from both the Pine Marten and Skyliner lifts. In order to cover this expanded area (25.4 acres) to a depth of 2 feet, a further 9.1 million gallons of water would be required (a rough estimation assuming an industry average conversion factor of 0.55 ft3 of water required to produce 1.0 ft3 of snow (4.1 gallons water = 1 ft3 snow)).

The existing water wells have a capacity of about 1,600 gpm, which should be adequate to expand the snowmaking as described above, supplying the required water in a total of 4.2 days if the system were running at maximum capacity constantly (an improbable situation). The

snowmaking expansion is envisioned to provide supplemental coverage for early season, and to provide in-season resurfacing of high traffic areas during dry spells and areas susceptible to early melt-out during warm periods at the end of the season using the existing system capacity of approximately 1,000 gpm water flow.

As the snowmaking pipes age, they will begin to corrode and will need to be repaired or replaced. Much of Mt. Bachelor's snowmaking system is only about 7 years old, therefore, pipe replacement is not an immediate concern however it will need maintenance and/or replacement in the future. (O7-10)

Response: The Responsible Official will consider these comments.

Support for Tubing Hill Relocation

Mt. Bachelor currently operates a tubing area between the Ski and Sports building and the Red Chair. This site is less than ideal due to the fairly gentle and consistent slope, which is not steep enough for a really enjoyable ride in sticky conditions, the need for using straw and a counter slope at the end of the slope to help stop tubers from gliding into B-net safety fence above the parking lot in faster conditions, and the lack of flat space surrounding the slope for services and other activities. Although less than ideal, it is still quite a significant recreational draw with up to 275 tubers at one time in attendance and up to 730 people in one day.

Mt. Bachelor would like to increase the quality of its tubing offering, as well as extend a variety of snowplay options to non-skiing guests including very basic skiing and snowboarding for children. In order to accomplish this, a new site has been chosen from an analysis of several potential sites, which contains a better slope profile for tubing, more flat land for snowplay activities and gentle slopes for introduction to snow sliding.

The knoll located directly across the parking lot from the West Village skier services (the Old Maid) has been identified to have many of the qualities desired for the type of facility envisioned. The knoll and adjacent areas have moderately steep slopes with a long flat run-out for tubing, flat areas for pure snowplay, gentle slopes for "tiny" beginner skiing, snowboarding and tubing slopes, etc. This knoll is also located at the farthest end of the West Village parking lot from the skiing, meaning that the skiers' least valuable parking spaces would be the snow players' and tubers' most valuable parking spaces, meaning that everybody will get the closest possible parking for their activity on all but the busiest days of the season.

The new tube park and snowplay center consists of multiple tubing lanes and a surface lift, a couple of service buildings, one with outdoor patio and a large, mostly flat area containing multiple activities. The tube facility should be serviced with a moving conveyor lift to service approximately 80-100 feet of vertical. There will be a minimal amount of grading required in order to establish the start zone and the proposed tubing lanes. The ground profile in this location is more suited for tubing, as it has a moderately steep slope followed by a flat run-out. With this steeper profile on the upper section, tubers will be able to get speed in any snow conditions and the main difference in differing snow conditions will be how far they slide in the run-out zone. No counter slope or straw use will be necessary to stop the tubers at the end. It will be possible for people using the tube facilities to walk directly from the parking lot to the base of the tube hill where they can buy tickets and begin their activity. The tubing area will be located adjacent to the snowplay zone, but can operate as a stand-alone activity.

The snowplay area can potentially contain multiple features and activities including a first time learn to ski/snowboard/tube experience for small children, a tubing merry-go-round, large piles

of snow for free play, mini z's (mini snowmobiles), igloos, ice castles, walk up carpets, etc. Several of these features will be free, but many could be contained within a single fenced zone where the children will pay a fee to enter and experience all the activities (including use of skis, snowboards and small tubes). This facility is based on the very successful model offered by Mt. Bachelor's sister resort, Soda Springs, in the Lake Tahoe area.

Three small buildings, a small one for tubing storage located next to the bottom of the tubing lanes, another small one in the "Adventure Zone" to accept tickets and to store and distribute children's ski, snowboard and tubing equipment, and the largest building (likely 700-900 sq. ft.) for ticket sales, hot chocolate and snack sales and accessory retail (attached to this largest building would be space for vaulted restrooms). An outdoor deck or on-snow seating area is planned adjacent to the largest building to accommodate guests in nice weather and for "brown bag" food service seating during good weather.

Relocating the tubing area is a high priority for Mt. Bachelor, as it is a big draw for non-skiing guests. The new site with expanded activities would allow the facility to operate on a more regular basis; this new site will mitigate many of the negative weather and snow condition issues that plague the existing site. By creating a more consistent experience, with a more exciting ride, guests will likely have a better experience and demand will grow. (O7-11)

Response: The Responsible Official will consider these comments.

General Support

On behalf of the Sunriver Owners Association (SROA) we would like to express our support for the proposed improvements scheduled to occur at Mt. Bachelor Ski Area over the next ten years… Skiing, both downhill and cross-country, snowboarding, snowmobiling and tubing have always been extremely important recreation activities for our owners and visitors. The proposed additions of a rock climbing wall, a zip line course and hiking and biking trails will provide fantastic opportunities for Sunriver owners and guests to visit and enjoy the mountain year round. Additionally, giving folks upgraded facilities will greatly enhance their Central Oregon recreational experience and help support increased visitations to both Sunriver and the Mt. Bachelor Ski Area. (O2-1)

Response: The Responsible Official will consider this comment.

For nearly 55 years, Mt. Bachelor, Inc. has demonstrated unrivaled business acumen as a ski area operator. For more than five decades, Mt. Bachelor, Inc. has served as a major, private sector source of investment capital for the Deschutes National Forest's recreation program. As a recreation provider, Mt. Bachelor is an attentive steward of NFS lands. Mt. Bachelor can be counted upon to 'do things to standard', and often, above and beyond 'standard'. Mt. Bachelor's staff is very familiar with the terrain, has an intimate working knowledge of the federal regulations that shape federal land management practices, and understands the ramifications of ground disturbing activities. By instituting progressive operations and subscribing to a comprehensive collection of best management practices, Mt. Bachelor will harmonize the proposed recreational infrastructure with the natural functions of the ecosystem. Proposed actions will result in a very minor impact on the forest in terms of stand structure, canopy closure, density and seral stage, and will involve only the removal of scattered trees and small clusters of saplings from discrete locations. Proposed actions will be consistent with the conservation of endangered, threatened, and sensitive species. Proposed actions will conform to all requirements of the Deschutes National Forest Land and Resource Management Plan, as amended by the Northwest Forest Plan.

The PNSAA is confident that all environmental issues will be disclosed in the ongoing NEPA process. Further, the PNSAA has every confidence that Mt. Bachelor will: (1) continue to be dedicated stewards of the land, (2) carry forward first class resort operations, and (3) continue to invest strategically in the Deschutes National Forest's MA 11 lands.

In conclusion, the PNSAA Board of Directors and PNSAA member ski areas wholeheartedly support the purposes and need for the proposed actions outlined in the 2012 DEIS. The Mt. Bachelor staff is attempting to prepare its mountain and base area facilities for the projected demand for year-round recreation. It is gratifying to see the staff address the human and economic dimensions of the Northwest Forest Plan by helping sustain forest-based commerce in an ecologically credible and scientifically sound manner. (O5-7)

Response: The Responsible Official will consider these comments.

I write this letter on behalf of our member skiers and snowboarders, who are typically part of the "silent majority," and would rather ski/board than concern themselves with writing letters. I have been involved with NWSCC since its inception as the Portland Area Ski Club Council in 1979, and since that time have had input into practically every ski area master plan proposal on Mt. Hood in Oregon and for other ski areas in the Pacific Northwest, as well as Department of Transportation plans for highway development and improvement. I am very pleased to have this opportunity to have input on behalf of Mt. Bachelor, and am excited by the proposed much needed improvements. Overall, our member clubs have run hundreds of trips to Mt. Bachelor over the years, so we have seen the mountain as it has developed and are excited at its future prospects. In addition, we have club members who either live in the Bend area currently or who are moving to Bend within a few years, where Mt. Bachelor will be their home mountain.

I write in support of the proposed improvements at Mt. Bachelor as detailed in the proposed action of the May 2012 Draft Environmental Impact Statement ("2012 DEIS"). Every proposal will have a highly positive impact upon the recreational experience at Mt. Bachelor, both in winter and in summer. (O6-1)

Response: The Responsible Official will consider this comment.

On behalf of Mt. Bachelor, Inc., I write to support the purposes and need for facility enhancements at Mt. Bachelor, as detailed in the proposed action of the May 2012 Draft Environmental Impact Statement (DEIS). Mt. Bachelor believes there is ample evidence to support selection of the proposed action as the preferred alternative.

Modern mountain resorts require the most efficient and user-friendly lift and trail systems possible, with a good balance of terrain type and variety, adequate parking and skier service facilities. Mt. Bachelor's MDP 2010 was constructed as the direct result of collaboration between many key stakeholders, including public agencies and elected officials, the business and tourism communities, environmental groups and recreation organizations, Mt. Bachelor customers and employees, and the general public. The plan successfully aligns an economically viable and achievable vision for the next 10 years with Mt. Bachelor's current conditions and its history and heritage.

Since environmental stewardship is of the highest priority, all facilities and activities, both summer and winter, will be located, constructed and undertaken in an environmentally responsible manner. Mt. Bachelor ski area is committed to sustainable development. Mt. Bachelor ski area will develop and submit environmental plans for the improvements as required by the National Environmental Policy Act (NEPA), which may include Erosion and

Sediment Control, Water Management, Watershed Protection, Solid Waste Management, Liquid Waste Management, Drainage Control and Stormwater Management, Vegetation Management, Air Quality Management and Monitoring, Energy Management and Conservation, and Wildlife Management.

Likewise, a central goal is to reduce the resort's carbon footprint. Mt. Bachelor is committed to explore and implement the most efficient alternative energy technology available, such as biomass co-generation, geothermal, solar and wind power. The resort will make every effort to continue to use bio fuels and leading technology in our vehicle fleet (currently B-10 in all diesel rolling stock and grooming machines). This could include bio diesel, ethanol, propane, natural gas and hybrids.

When designing a system of lifts and ski trails, the ultimate development should be planned in order that future lifts and additional ski trails will not create conflicts, congestion, crowding or worn-out snow conditions. Utilization of various lift loading and unloading patterns, as well as ski trail grading can direct skiers onto preferred ski trail systems to improve trail utilization and skier distribution or avoid major congestion areas.

Ski trails and slopes should be designed to provide the best skiing opportunities and then, subsequently, lifts located to best serve these ski trails since lifts are merely a means of access. The type of lift may vary, depending on the natural terrain it must cross and serve, as well as the required hourly capacity and type of skier being served.

Lifts should not be located simply because good upper and lower terminal locations have been selected, or to minimize construction costs. There are many lift design alternatives available to accommodate a wide variety of sites. Lift construction costs, although important, should normally be a secondary consideration when compared to skiing quality, aesthetics or environmental factors. Ski lift loading and unloading terminals are preferably located in protected areas on slopes less than 20 percent.

Adequate space must be allotted for lift queues, safe stopping, unloading areas and general congregation areas at both the upper and lower lift terminals. As a general rule, between 15 and 25 square feet per skier are required for these congregation areas, depending upon anticipated queues and the capacity and type of lift.

During the resort design process, it is critical to balance all facilities, so that guests receive the same quality of experience regardless of which facility they use. The MDP 2010 uses the unit "skiers per day" to more easily compare the capacities of these diverse facilities. Facilities which must be balanced include: lifts, ski trails, grooming equipment, skier service building floor space, food service seating, lift staging capacity, parking and base area capacity.

Base area land uses include terrain dedicated to winter and summer recreational activities, access roads, day use parking lots, base lodge(s), the lower terminals of the ski lifts and other infrastructure. Since the function, convenience, character and aesthetics of the base area and resort facilities all contribute to the visitor experience the base area plays a critical role in the success of a resort. The base area requires a distinct spatial organization to effectively move visitors from the point of arrival to easily accessible parking lots, through the skier, snowboarder and other activity staging areas, up the hill and onto the slopes.

The base area day lodge is the "heart and soul" of the resort and its successful operation pumps life into the area and creates a sense of place, strengthens the resort's identity and provides a lively and memorable guest experience.

The MDP 2010 continues the progression toward Bill Healy's vision of a true mountain resort and recreation center at Mt. Bachelor. While most of his historical vision has been retained, many details have been re-worked and priorities re-set to reflect current technology, management best practices, and market conditions. (O7-1)

Response: The Responsible Official will consider these comments.

In conclusion, Mt. Bachelor has been a positive force for Central Oregon's tourism economy for over 50 years, effectively managing the resort and facilities to the terms of its SUP with the US Forest Service and in the process improving access to the forest for the recreating public. The institutional knowledge of the staff combined with the company's commitment to its core values, particularly the value of environmental and winter recreation stewardship, where we constantly seek opportunities to minimize environmental impact and spread the word about the positive outcomes of sustainability programs and initiatives, should provide the USDA Forest Service with ample evidence Mt. Bachelor is serious about protecting the lands which we have been entrusted. Likewise, through the successful application of management best practices, Mt. Bachelor has been recognized over the decades as an industry leader and innovator in the business of ski area operations. The company will continue to evaluate and implement new technologies and practices to enhance the human experience while protecting the natural ecosystem. New infrastructure, recreation activities, and replacement of outdated facilities and equipment will lead to short- and long-term job creation and the migration of seasonal jobs to year 'round jobs. Through this ongoing process, Mt. Bachelor will continue to engage with representatives of the USDA Forest Service, recreation user groups, key community stakeholders, and the general public in an open and collaborative manner to ensure all parties' objectives are appropriately aligned with one another. From our experience the outcomes created from a collaborative effort are the most sustainable and therefore, most desirable. (O7-19)

Response: The Responsible Official will consider this comment.

OSU-Cascades is also starting a club ski team, and Mt. Bachelor will be a key partner in that effort. The expansion plans will help to disperse use on the mountain, and reduce user conflicts between ski racers and recreational skiers. Increased parking and capacity will also enhance the ability to host competitions with multiple university ski teams. Such competitions will have an economic impact on Central Oregon from the associated spending on food and lodging.

OSU-Cascades has a number of degree programs that are related to Mt. Bachelor, including Tourism and Outdoor Leadership, Exercise and Sport Science, Natural Resources, Sustainability, and Business. In addition, we are in the planning stages of a Hospitality Management program. All of these programs encourage student to do internships, and some require internships. Mt. Bachelor has been a great partner in providing both internships and jobs for OSU-Cascades students, and has also hosted a Ski Area Management course on their mountain, giving students exposure to all aspects of the business. An expanded Mt. Bachelor will provide more internship and job opportunities for OSU-Cascades students. An expanded summer program will be even more beneficial, since most students are not taking classes in the summer and will have more summer job opportunities at Mt. Bachelor.

In summary, Mt. Bachelor's proposed expansion will provide significant benefits to Central Oregon, while mitigating the minimal negative impacts. Mt. Bachelor has involved many key stakeholders in their planning process which has allowed them to develop a proposal with

*minimal negative impacts. I fully support Mt. Bachelor's proposed action as the preferred alternative. (*O9-3)

Response: The Responsible Official will consider these comments.

Mt. Bachelor does a great job. It brings many to central oregon. (I1-1)

Response: The Responsible Official will consider this comment.

I believe the expansion plans at Mt. Bachelor are critical for the long term success of Mt. Bachelor Ski resort and the Central Oregon region. The proposed action is a well thought out plan that takes into consideration the environmentally sensitive surroundings of the Deschutes National Forest. It provides for good stewardship of the mountain resources and could move much of the activity that occurs there during the winter months to an area that is served by better weather. It is no secret that the eastside of the mountain in most cases has less severe weather than the west village area. Expanding the eastside of the mountain will be safer for the visitors of the resort and will improve the mountain experience for local residents as well as out of town visitors. The year-round aspect of the proposed action will allow visitors to experience Mt. Bachelor with the potential to participate in healthy outdoor activities during all four seasons of the year. Our family has been participating in winter activities at Mt. Bachelor for over 25 years. Until recently there has not been a clear vision with a defined actionable plan on the future activities at Mt. Bachelor. I believe the DEIS provides the vision for the foreseeable future and provides specific direction on the best use of this natural resource for the years to come.

In closing, I commend the work Mt. Bachelor Ski resort has done to complete the Draft Environmental Impact Statement and the resort's partnership with the Forest Service. I believe the necessary oversight and management by the Forest Service has created a transparent and seamless relationship with a private entity which benefits the public and the users of the Deschutes National Forest. (I11-1)

Response: The Responsible Official will consider these comments.

I am in support of this project and further development of Mt. Bachelor. It is an appropriate use of NFS land. It furthers economic development for this area. It has minimal adverse impact on environment. It brings national attention to Oregon as a destination for healthy living. (I12-1)

Response: The Responsible Official will consider this comment.

Mt. B is already ruined for looks compared to when I was a kid. No ski trails then. But everyone should be able to pursue his or her recreational choices. I think that most of the proposed changes are needed. I think the Mt. bike lift and trail is a great idea. The idea of using facilities years around appeals to me and just makes sense. Much like Edison Snopark is used in the winter for over-snow and in the summer for mt. bikes and OHVs. (I14-1)

Response: The Responsible Official will consider this comment.

I find the intensification of the "interface" recreation sites, such as Mt. Bachelor, of great value and benefit tot visitors and to the deeper forest and habitat.

The proposal by Mt. Bachelor seems fitting to the need, responsible to the terrain and should financially help their stewardship of this beautiful area. The expansion area is in a direction

already impacted by various winter sports including snowmobiles thus it seems reasonable the area will suffer no significant degrading as a result of the improvement.

Not only will the residents of central Oregon benefit but the make-over should attract tourism and in turn, economic growth for this region.

It is a "win – win" scenario for all. (I16-1)

Response: The Responsible Official will consider this comment.

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APPENDIX B: PLANT LISTS

Table B-1 shows the Sensitive plant list for the Deschutes National Forest which was derived from the Regional Forester's List. This List includes 60 taxa either known (26) or suspected (34) to occur on the Forest and provides relevant information concerning their known or probable occurrence in the Mt. Bachelor Improvements Project area. Codes used in the table include: VP = vascular plant; B = bryophyte; L = lichen; F = fungus.

Table B-1. R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Agoseris elata (VP)	Washington, Oregon, California; Western and Eastern Cascades in Oregon.	Somewhat diverse; typically lower elevation forest openings and alluvial terraces.	No/Yes	Low
Alpova alexsmithii (F)	Washington, Oregon; Western Cascades in Oregon.	Coniferous forest, particularly including Pacific silver fir, lodgepole pine, Engelmann spruce and mountain hemlock. This is a mycorrhizal species.	No/Yes	Moderate
Arabis suffrutescens var. horizontalis (VP)	Oregon, California; Western Cascades in Oregon.	Alpine to subalpine meadows, woods; summits, ridges; steep exposed rock outcrops.	No/No	Moderate
Arnica viscosa (VP)	Oregon, California; Western Cascades in Oregon.	Subalpine or higher scree, talus gullies and slopes w/ seasonal water runoff; lava flows; may be in moraine lake basins or crater lake basins.	No/Yes	Moderate
Astragalus peckii (VP)	Southern to central Oregon; Eastern and Western Cascades.	Basins, benches, gentle slopes, pumice flats; generally non-forest but known from five sites in lodgepole pine openings.	No/Yes	Low
Barbilophozia lycopodioides (B)	Oregon and Washington; Blue Mountains and Western Cascades in Oregon	On peaty soil on damp ledges of rock outcrops and cliffs at elevations of 3400-7500 feet.	No/No	Low
Brachydontium olympicum (B)	Oregon and Washington; Western Cascades in Oregon	On subalpine or higher rock or soil in boulder fields, moraines, cliff ledges, often in areas of late snowmelt.	No/No	Moderate

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Botrychium pumicola (VP)	Central Oregon	Alpine-subalpine ridges, slopes and meadows. Montane forest openings, open forest in basins with frost pockets, pumice flats.	Yes/Yes	Moderate
Calamagrostis breweri (VP)	Oregon, California; Western Cascades in Oregon.	Subalpine to alpine meadows, open slopes, stream banks, lake margins.	No/No	Low
Carex abrupta (VP)	Oregon and California; Blue Mountains, Western Basin and Range and Western Cascades in Oregon	Subalpine and higher; moist meadow, lake shore, dry grassy hillside and bare roadside.	No/No	Moderate
Carex capitata (VP)	Washington, Oregon, California	Montane to alpine fens/bogs, wet meadows	No/Yes	Low
Carex diandra (VP)	Washington, Oregon, California; Eastern Cascades and Western Cascades in Oregon.	Floating sphagnum bogs	No/No	Low
Carex lasiocarpa var. Americana (VP)	Washington, Oregon, California; Blue Mountains, Eastern and Western Cascades in Oregon.	Fens/bogs	No/Yes	Low
Carex livida (VP)	Oregon, Washington, California; Klamath Mountains, Western Cascades and Coast Range in Oregon.	All forest types; peatlands, wet meadows with still or channeled water.	No/No	Low
Carex retrorsa (VP)	Washington, Oregon; Blue Mountains, Columbia Basin, Willamette Valley in Oregon.	Wet, swampy, frequently inundated areas.	No/No	Low
Carex vernacula (VP)	Washington, Oregon, California; Blue Mountains, Northern Basin and Range, Eastern Cascades and Western Cascades in Oregon.	Subalpine and higher wet/moist meadow complexes, springs, terraces, benches, moist/dry slopes on rocky, gravelly soils.	No/No	Low

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Castilleja chlorotica (VP)	Central Oregon	Ponderosa pine, lodgepole pine and mixed conifer forest openings; PP at lower, LP at middle to upper, mixed conifer at highest elevations.	No/Yes	Low
Cheilanthes feei (VP)	Washington, Oregon, California; Blue Mountains in Oregon.	Seasonally moist crevices on cliffs of limestone or basalt with limey deposits.	No/No	Low
Chiloscphus gemmiparus (B)	Oregon	On rocks, often is splash zones of cold, montane streams.	No/No	Low
Cicuta bulbifera (VP)	Eastern Cascades of Oregon and Washington; California	Shoreline marshes.	No/No	Low
Collomia mazama (VP)	Southern to central Cascades, Oregon	Mid- to high elevations,; meadows, stream banks and bars, lakeshores and vernal pool margins, forest edges and openings.	No/No	Low
Conostomum tetragonum (B)	Washington, Oregon, California	Likely above timberline on soil in rock crevices in boulder fields, moraines, and ledges of cliffs.	No/No	Moderate
Cyperus acuminatus (VP)	Washington, Oregon, California	Low gradient edges of lakes and perennial/seasonal pools with fluctuating water levels.	No/No	Low
Cyperus lupulinus ssp. lupulinus (VP)	Washington, Oregon	Rocky lower slopes and terraces along low elevation (= or < 1200 ft.) streams in eastern Oregon.	No/No	Low
Dermatocarpon meiophyllizum (L)	Washington, Oregon	On rocks in perennial or nearly perennial streams.	No/Yes	Low
Elatine brachysperma (VP)	Washington, Oregon, California; Blue Mountains and Northern Basin and Range in Oregon.	Muddy shores, shallow pools	No/No	Low

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Eucephalus gormanii (VP)	Oregon; Western Cascades	Rocky ridges, outcrops, or rocky slopes in alpine or subalpine mixed conifer forest.	No/No	Moderate
Gastroboletus vividus (F)	Oregon, California; Western Cascades and Klamath Mountains in Oregon.	Higher elevation coniferous forest with subalpine fir, Shasta red fir and mountain hemlock. This is a mycorrhizal species.	No/No	Moderate
Gentiana newberryi (VP)	Oregon and California; Eastern and Western Cascades of Oregon	Alpine to subalpine mixed conifer openings, wet to dry montane meadows, sometimes adjacent to springs, streams, or lakes.	No/Yes	Low
Heliotropium curassavicum (VP)	Washington, Oregon, California; Blue Mountains, Northern Basin and Range, Columbia Basin, Eastern Cascades, Willamette Valley in Oregon	Alkaline, saline playas, receding ponds and clay soils.	No/No	Low
Helodium blandowii (B)	Washington, Oregon, California; Blue Mountains, Eastern and Western Cascades in Oregon	Montane fens.	No/Yes	Low
Helvella crassitunicata (F)	Washington, Oregon; Western Cascades in Oregon	Montane habitats.	No/Yes	Low
Hygrophorus caeruleus (F)	Eastern and Western Cascades in Oregon	Coniferous forests near melting snowbanks. This is a mycorrhizal species.	No/Yes	Moderate
Leptogium cyanescens (L)	Washington, Oregon, California; Coast Range in Oregon	Generally riparian, but recently documented on vine maple, bigleaf maple and Oregon white oak.	No/No	Low

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Leucogaster citrinum (F)	Washington, Oregon, California; Coast Range, Klamath Mountains, West Cascades, Willamette Valley	Occurring with *Abies concolor, A. lasiocarpa, Pinus contorta, P. monticola, Pseudotsuga menziesii* and *Tsuga heterophylla* at elevations of 900-6500 feet. This is a mycorrhizal species.	No/Yes	Low
Lipocarpha aristula (VP)	Washington, Oregon, California; Blue Mountains, Columbia Basin, Eastern Cascades, Snake River Plains in Oregon	Low elevation (< 2500 feet) streamsides and gravel bars.	No/No	Low
Lobelia dortmanna (VP)	Washington and Oregon; Eastern Cascades of Oregon	In water of lake, pond, slow river or stream, or wet meadow.	No/Yes	Low
Lycopodiella inundata (VP)	Washington, Oregon, California; Coast Range, Eastern and Western Cascades	Deflation areas in coastal back-dunes; montane bogs, less often, wet meadows.	No/Yes	Low
Lycopodium complanatum (VP)	Washington, Oregon; Blue Mountains, Western Cascades in Oregon	Middle elevations; edge of wet meadow; dry, forested midslope.	No/No	Low
Mulenbergia minutissima (VP)	Washington, Oregon; Northern Basin and Range in Oregon	Thin lava soils; associated with cattails, sedges.	No/No	Low
Ophioglossum pusillum (VP)	Washington, Oregon, California; Coast Range and Western Cascades in Oregon	Low to mid-elevations in dune deflation planes, marsh edges, vernal ponds and stream terraces in moist meadows.	No/No	Low
Penstemon peckii (VP)	Central Oregon	Ponderosa pine or mixed conifer with ponderosa pine, in openings or in relatively open stands; on recovering fluvial terraces and shallow intermittent drainages.	No/Yes	Low

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Pilularia americana (VP)	Oregon, California; Blue Mountains, Northern Basin and Range, Eastern Cascades and Klamath Mountains in Oregon	Alkali and other shallow vernal pools; not recently used stock ponds; reservoir shores.	No/No	Low
Pinus albicaulis (VP)	Mountain ranges in western states.	Harsh, cold sites characterized by rocky, poorly developed soils and snowy, wind-swept exposures, also high-elevation sites near treeline..	Yes/Yes	High
Polytrichum sphaerothecium (B)	Washington, Oregon, California; Western Cascades in Oregon	On igneous rocks in subalpine parkland to alpine krummholz.	No/No	Moderate
Potamogeton diversifolius (VP)	Washington, Oregon, California; Northern Basin and Range in Oregon	Ponds, lakes, streams, rivers.	No/No	Low
Pseudocalliergon trifarium (B)	Eastern and Western Cascades in Oregon	Montane fens.	No/No	Low
Ramaria amyloidea (F)	Washington, Oregon, California; Western Cascades in Oregon	Montane coniferous forests with documented elevations of 1800-5600 feet; associated species include white fir, Shasta red fir, lodgepole pine and western white pine. This is a mycorrhizal species.	No/Yes	Moderate
Rhizomnium nudum (B)	Washington, Oregon; Western and Eastern Cascades in Oregon	Coniferous forests on moist soil in seepages, vernally wet depressions or intermittently wet, low-gradient channels.	No/Yes	Low
Rorippa columbiae (VP)	Oregon, Washington, California; Blue Mountains, Northern Basin and Range, Eastern and Western Cascades and Willamette Valley in Oregon	Low to mid-elevations; wet to vernally moist sites; meadows, fields, playas, lakeshores, intermittent stream beds, banks of perennial streams, along irrigation ditches, river bars and deltas.	No/No	Low

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Rotala ramosior (VP)	Washington, Oregon, California; Northern Basin and Range, Western Cascades and Willamette Valley in Oregon	Low elevation, low gradient shores, pond edges, river bars.	No/No	Low
Scheuchzeria palustris ssp. americana (VP)	Washington, Oregon, California; Eastern and Western Cascades in Oregon	Mid-elevations; open-canopied bogs, fens, and other wetlands where often in shallow water.	No/Yes	Low
Schistostega pennata (B)	Washington, Oregon; Coast Range, Western Cascades in Oregon	Usually on mineral soil in crevices on lower and more sheltered parts of root wads of fallen trees. Often near streams or other wet areas. High local humidity essential.	No/Yes	Low
Schoenoplectus subterminalis (VP)	Washington, Oregon, California; Coast Range, Klamath Mountains, Western Cascades in Oregon	Generally submerged to emergent in quiet water 2-8 decimeters deep, in peatlands, sedge fens, creeks, ditches, ponds and lakes.	No/Yes	Low
Splachnum ampullaceum (B)	Washington, Oregon; Eastern Cascades in Oregon	Peatlands and other wetlands.	No/No	Low
Texosporium santi-jacobi (L)	Washington, Oregon, California; Blue Mountains and Columbia Basin in Oregon	Late seral, dry shrub/grassland.	No/No	Low
Tomentypnum nitens (B)	Washington, Oregon; Eastern and Western Cascades, Blue Mountains in Oregon	Montane fens.	No/Yes	Low
Trematodon boasii (B)	Western Cascades in Oregon	Bare soil along subalpine streams, trail and pond edges.	No/No	Low
Tritomaria exsectiformis (B)	Washington, Oregon; Western and Eastern Cascades in Oregon	In coniferous forest along low-volume, low-gradient perennial springs and seeps.	No/Yes	Low

Table B-1 (cont'd). R6 Sensitive plant species documented or suspected on Deschutes National Forest, assessed for the Mt. Bachelor Project Area.

Species	Range within western PNW; Physiographic Province in Oregon	Habitat	Known to Occur in Mt. Bachelor SUP/ On Forest	Probability of Occurrence in Project Area
Utricularia minor (VP)	Washington, Oregon, California; Coast Range, Western and Eastern Cascades, Klamath Mountains, Blue Mountains in Oregon	Lowland and montane fens, sedge meadows, low-nutrient lakes and peatbog pools.	No/Yes	Low

Table B-2. Results of pre-field review of Survey and Manage species.

Mt. Bachelor Development Survey and Manage Prefield Review Form (04/28/2011)

Note 1: Asterisk following taxon name indicates dual status as R6 sensitive and S&M taxon.
Note 2: In Habitat field, elevations in parentheses = mean elevation for data set.
Note 3: X in first column indicates survey is required.

Category A S&M taxa included in 2001 ROD and documented (D) or suspected (S) on DES NF

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
	*Schistostega pennata**	D	bryo	moss	On damp, mineral soil, primarily on root masses of fallen trees in humid, heavily shaded microsites, commonly within *Abies amabilis* series but also in *Tsuga heterophylla* and *T. mertensiana* series.		
	*Leptogium cyanescens**	S	lichen	foliose	Known in Oregon from two coastal sites and in WA, one low elevation site in west Cascades. Substrates include *Pyrus fusca, Acer circinatum* and *Picea sitchensis*.		

Category B S&M taxa included in 2001 ROD and documented (D) or suspected (S) on DES NF

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
	*Rhizomnium nudum**	D	bryo	moss	Often associated with *Pinus contorta, Picea engelmannii, Tsuga mertensiana, Pinus monticola* on moist soil in seepages, vernally wet depressions or intermittently wet, low-gradient channels.		
	*Tritomaria exsectiformis**	D	bryo	liverwort	On wet or damp, very rotten wood or peaty/organic soil at sites with persistent, low-volume groundwater discharge.		
X	*Albatrellus caeruleoporus*	D	fungus	polypore	Associated with *Tsuga*.	September-November	Mycorr
X	*Albatrellus ellisii*	S	fungus	polypore	Associated with spp. of *Abies, Picea, Pinus, Pseudotsuga, Tsuga* or *Castanopsis. On mineral soil, litter and humus. O*ccurs principally in White Fir series (52%).	October - January	Mycorr

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
X	*Alpova alexsmithii**	D	fungus	sequestrate	Occurs principally on soil in Pacific Silver Fir (44%) and Mountain Hemlock (44%) series at elevations of 2740-5760 feet. A mycorrhizal associate of Tsuga. Associated species include *Abies amabilis, Pinus contorta, Picea engelmannii* and *Tsuga mertensiana*.	August-December	Mycorr
	Arcangeliella lactarioides	D	fungus	sequestrate	Associated with various Pinaceae spp., particularly *Abies magnifica* and *Pinus ponderosa*.	July-November	Mycorr
	Boletus pulcherrimus	S	fungus	bolete	In humus, associated with the roots of mixed conifers (e.g., *Abies grandis, Pseudotsuga menziesii*). Occurs principally on mineral soil and humus in White Fir series (36%) at elevations of 62-5735 (4231) feet.	July-December	Mycorr
X	*Choiromyces alveolatus*	D	fungus	sequestrate	Associated with various Pinaceae spp., particularly *Abies procera, Abies spp., Pinus contorta, P. ponderosa, Pseudotsuga menziesii, Tsuga heterophylla and T. mertensiana* above 4200 ft. elevation.	May-November	Mycorr
X	*Chroogomphus loculatus*	S	fungus	sequestrate	Associated with various Pinaceae spp., especially *Tsuga mertensiana* at 4600 feet elevation.	October	Mycorr
X	*Clavariadelphus ligula*	D	fungus	club	Under coniferous or mixed coniferous forests associated with *Abies, Calocedrus, Pinus, Pseudotsuga, Thuja, Tsuga, Umbellularia,* and *Castanopsis*.	September-December; July-October	Mycorr
	Clavariadelphus occidentalis (Clavariadelphus pistillaris)	S	Fungus	Club	On litter, humus, mineral soil, principally in Western Hemlock series (47%) at elevations of 332-4497 (2073) ft. Associated species include Pacific silver fir, white fir, grand fir, incense cedar, sugar pine, western white pine, ponderosa pine, Douglas fir.	Winter, into May	Mycorr

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
	Clavariadelphus sachalinensis	S	fungus	club	Principally in Douglas fir (42%) and Western Hemlock (30%) series, at elevations of 152-5352 (2706) feet. Associated species include white fir, subalpine fir, incense cedar, Engelmann spruce, sugar pine, ponderosa pine, Douglas fir.	June-October	Mycorr
X	*Clavariadelphus truncatus*		fungus	club	On soil or duff under mixed deciduous-coniferous forests or deciduous forests with *Abies, Calocedrus, Picea, Pinus, Pseudotsuga, Thuja, Tsuga.*	September-March (May)	Mycorr
	Cortinarius magnivelatus	S	fungus	mushroom	Associated with roots of *Abies concolor, A. magnifica, Picea engelmannii, Pinus lambertiana, P. ponderosa.*	May-August	Mycorr
X	*Cortinarius olympianus*	S	fungus	mushroom	Associated with roots of Pinaceae.	September-November	Mycorr
X	*Cortinarius verrucisporus*	S	fungus	sequestrate	Associated with roots of *Abies* spp.	June-September	Mycorr
	Cortinarius wiebeae		fungus	sequestrate	Associated with roots of *Pseudotsuga menziesii* and *Pinus ponderosa*. Oregon endemic (2 sites).	June	Mycorr
X	*Cudonia monticola*	S	fungus	Earth tongue	On litter and rotten wood, principally Western Hemlock series (58%) at elevations of 523-5994 (2556) feet. Associated species include Pacific silver fir, white fir, grand fir, subalpine fir, red fir, noble fir, Engelmann spruce, Douglas fir, mountain hemlock.	Late Summer and Autumn	Litter saprobe
	Elaphomyces anthracinus	D	fungus	sequestrate	Associated with roots of assorted Fagaceae in Europe and *Pinus ponderosa* in Oregon (DES NF is only known site in NWFP area).	May-August	Mycorr
X	*Elaphomyces subviscidus*	D	fungus	sequestrate	Associated with roots of *Pinus contorta* and *Tsuga mertensiana* at high elevation (7150 feet).	Summer	Mycorr
X	*Fayodia bishpaerigera (Fayodia*	S	fungus	mushroom	In litter debris under hardwoods and conifers.	Summer-Autumn	Mycorr

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
	gracilipes)						
X	*Fevansia aurantiaca* (= *Alpova aurantiaca*)	D	fungus	sequestrate	Associated with various Pinaceae spp., particularly *Abies lasiocarpa* and *Pseudotsuga menziesii*.	August	Mycorr
X	*Gastroboletus ruber*	D	fungus	sequestrate	Associated with roots of assorted Pinaceae above 4350 feet elevation, particularly *Abies amabilis, A. procera, A. magnifica* var. *shastensis, Pinus monticola* or *Tsuga mertensiana*.	August-September	Mycorr
X	*Gastroboletus subalpinus*	D	fungus	sequestrate	Associated with roots of various Pinaceae above 5000 feet elevation, particularly *Abies magnifica, Pinus albicaulis, P. contorta* and *Tsuga mertensiana*.	September-October	Mycorr
X	*Gastroboletus turbinatus*	D	fungus	sequestrate	In lowland forests of *Picea sitchensis-Tsuga heterophylla* to montane and subalpine *Abies, Picea* and *Pinus* spp.	July-November	Mycorr
X	*Gastroboletus vividus**	S	fungus	sequestrate	With roots of various Pinaceae, particularly Abies lasiocarpa, A. x shastensis and Tsuga mertensiana.	July-September	Mycorr
	Gautieria magnicellaris	D	fungus	sequestrate	Associated with roots of Pinus spp. in Mexico and *Abies concolor* in western United States above 5300 feet elevation.	July-October	Mycorr
	Gymnomyces abietis	D	fungus	sequestrate	Associated with roots of *Abies* spp. and possibly other Pinaceae above 3200 feet elevation.	July-October	Mycorr
X	*Gymnomyces nondistincta*	S	Fungus	Sequestrate	Endemic to Oregon. Associated with roots of Pacific silver fir and mountain hemlock in Mountain Hemlock (50%) and Parkland (50%) series at elevations of 5962-7126 (6544) feet.	September	Mycorr

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
X	*Gyromitra californica*	S	fungus	cup fungi	On or adjacent to well-rotted stumps or logs of coniferous trees, on litter or soil rich in brown rotted wood. In Pacific Silver Fir (19%), Western Hemlock (17%) or White Fir (17%) series at elevations of 158-6026 (4047) feet. Primarily in *Abies amabilis, A. concolor, A. magnifica, Pinus contorta, P. lambertiana, P. ponderosa, Pseudotsuga menziesii, Picea engelmannii, Tsuga mertensiana*, and *Populus tremuloides.*	June	wood/ litter saprobe
	*Helvella crassitunicata**	D	fungus	elfin saddle	On soil, especially along trails, in montane regions with Abies spp.	August-October	Mycorr
	Hydnotrya inordinata	D	fungus	sequestrate	Associated with roots of *Abies amabilis, Pinus contorta, Pseudotsuga menziesii*, and *Tsuga heterophylla* from 3500 - 6500 feet elevation.	March, April; July	Mycorr
X	*Hygrophorus caeruleus**	D	fungus	mushroom	Associated with roots of Pinaceae spp., near melting snowbanks.	April-July	Mycorr
	*Leucogaster citrinus**	D	fungus	sequestrate	Associated with roots of *Abies concolor, A. lasiocarpa, Pinus contorta, P. monticola, Pseudotsuga menziesii* and *Tsuga heterophylla* from 900 - 6500 feet elevation.	August-November	Mycorr
	Polyozellus multiplex	D	fungus	chantrelle	Associated with roots of *Abies* spp. in mid-elevation conifer forests.	June-November	Mycorr
	*Ramaria amyloidea**	D	fungus	coral	On humus or soil in association with *Abies* spp., *Pseudotsuga menziesii* and *Tsuga heterophylla*. Occurs primarily in Pacific Silver Fir (46%), White Fir (27%) and Western Hemlock (15%) series at elevations of 1800-5500 feet. Other associated species include *Abies amabilis, A. concolor, A. magnifica, A.* x *shastensis, A. procera, Pinus contorta, P. monticola, Thuja plicata* and *Tsuga mertensiana*.	September-October	Mycorr

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
X	*Ramaria aurantiisiccescens*	S	fungus	coral	Occurs in humus, litter and soil, associated with *Abies* spp., *Pseudotsuga menziesii* and *Tsuga heterophylla*. Occurs primarily in Western Hemlock (47%) and Pacific Silver Fir (27%) series at elevations of 5600-6934 feet. Other associated species include *Abies concolor, A. lasiocarpa, A. procera, Chamaecyparis lawsoniana, Pinus contorta, P. ponderosa, Picea engelmannii, Thuja plicata, Tsuga mertensiana* and *Acer macrophyllum*.	October	Mycorr
	Ramaria botryis var. aurantiiramosa	S	fungus	coral	On humus or soil in association with *Pseudotsuga menziesii* and *Tsuga heterophylla*.	October	Mycorr
X	*Ramaria coulterae*		fungus	coral	On coniferous debris, rare but scattered through coniferous forests.	Spring; early summer	Mycorr
	Ramaria largentii	S	fungus		Occurs on soil, litter and humus in association with Pinaceae. In Oregon and Washington, occurs primarily in Western Hemlock (48%), White Fir (19%), Douglas Fir (14%) and Pacific Silver Fir (14%) series at elevation of 1330-5100 feet. Associated species include *Tsuga heterophylla, Pseudotsuga menziesii, Abies amabilis, A. concolor, A. grandis, Pinus lambertiana, P. monticola, Calocedrus decurrens, Taxus brevifolia and Thuja plicata*.	October	Mycorr
	Ramaria maculatipes	D	fungus	coral	On humus or soil in association with *Abies* spp., *Pseudotsuga menziesii* and *Tsuga heterophylla*.	November	Mycorr
X	*Ramaria rubrievanescens*	D	fungus	coral	On humus or soil with Pinaceae spp. Occurs primarily in Mountain Hemlock (25%), White Fir (22%), Western Hemlock (17%) and Pacific Silver Fir (15%) series at elevation of 720-7120 feet. Associated species include *Abies amabilis, A. concolor, A. grandis, A. lasiocarpa, A. magnifica, A. x shastensis, A. procera, Calocedrus decurrens, Pinus contorta, P. lambertiana, P. monticola, P. ponderosa, Picea engelmannii, Pseudotsuga menziesii,*	June; September-October	Mycorr

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

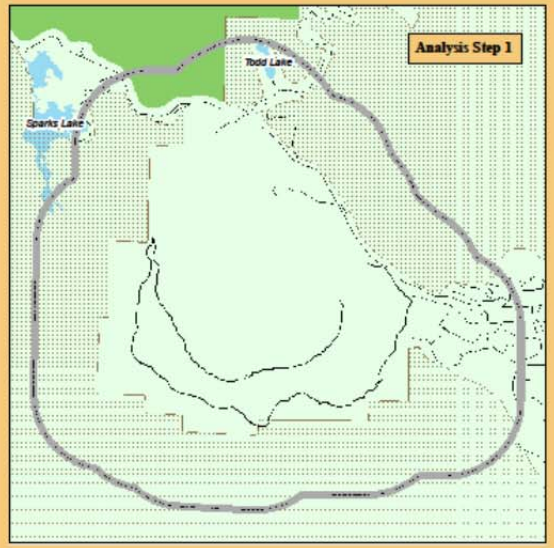
Survey Required	Taxon	D or S	Group	Subgroup	Habitat	Season	Eco-Function
					Tsuga mertensiana, T. heterophylla, Thuja plicata and Acer macrophyllum.		
X	*Ramaria thiersii*	S	fungus	coral	On humus or soil in association with Pinaceae spp.	June	Mycorr
X	*Rhizopogon abietis*	S	fungus	sequestrate	Associated with *Abies, Tsuga, Picea* and *Pinus* spp.	July-December	Mycorr
X	*Rhizopogon atroviolaceus*	D	fungus	sequestrate	Associated with species of *Abies, Picea, Pinus, Pseudotsuga* and *Tsuga*.	May-December	Mycorr
X	*Rhizopogon evadens* var. *subalpinus*	D	fungus	sequestrate	Usually in association with roots of *Tsuga mertensiana* or *Abies* spp. from 4000 to 7600 feet elevation.	August-October	Mycorr
	Rhizopogon exiguus	S	fungus	sequestrate	Associated with roots of Pseudotsuga menziesii and Tsuga heterophylla in Western Hemlock (80%) and Douglas Fir (20%) series at elevations of 80-3980 feet.	Spring and Autumn	Mycorr
X	*Rhizopogon flavofibrillosus*	D	fungus	sequestrate	Associated with roots of various Pinaceae, including *Abies concolor, A. lasiocarpa, Picea engelmannii, Pinus attentuata, P. contorta, P. lambertiana, P. muricata* or *Pseudotsuga menziesii* from 3000 - 7600 feet elevation.	July-November	Mycorr
	Sarcodon fuscoindicus	S	fungus	tooth fungus	Occurs on soil, litter and humus. Occurs primarily in Western Hemlock (43%) and Pacific Silver Fir (20%) series at elevation of 35-6500 feet. Associated species include *Abies amabilis, Pinus lambertiana, Pseudotsuga menziesii, Tsuga heterophylla* and *Thuja plicata*.	Autumn and Winter	Mycorr
	Spathularia flavida	S	fungus	club	On litter, woody debris and soil in conifer and hardwood forests. Occurs primarily in Western Hemlock (40%), Douglas Fir (12%), Pacific Silver Fir (12%) and White Fir (10%) series at elevations of 30-5480 feet. Associated species include *Abies concolor, A. grandis, Pinus contorta, P. monticola, P. ponderosa, Pseudotsuga menziesii, Thuja plicata* and *Tsuga heterophylla.*	Summer and Autumn	litter saprobe

Table B-2 (cont'd). Results of pre-field review of Survey and Manage species.

Category C S&M taxa included in 2001 ROD and documented (D) or suspected (S) on DES NF							
Survey Required	**Taxon**	**D or S**	**Group**	**Subgroup**	**Habitat**	**Season**	**Eco-Function**
	Cypripedium montanum	D	Vasc	orchid	In *Pinus ponderosa*, *P. contorta* and *Pseudotsuga* forests but also with *Calocedrus decurrens*, *Abies grandis*, *Pinus lambertiana* and *Taxus brevifolia*. Not yet detected south of the Metolius Basin on Deschutes NF.		
	Cladonia norvegica	D	lichen	squamulose	On rotten wood, tree bases and tree trunks in mature to old conifer forests at low to middle elevations.		

APPENDIX C:

POTENTIAL WILDERNESS AREA INVENTORY



Potential Wilderness Area Inventory
for Bachelor Ski Area Improvements Planning Area
Bend-Ft.Rock Ranger District
Deschutes National Forest

Analysis Step 1 - Remove non-federal Lands

This map displays the Potential Wilderness Area Inventory Analysis Area on Sisters Ranger District within the Popper Project Planning Area, non-federal lands with Inventoried Roadless Areas and Wilderness Areas

Analysis Step 2 - Remove Stump Producing Activities

Depicts past harvest and Inventoried Roadless Areas. Past harvest areas where logging and roads are evident will be removed from further examination per (FSH 1909.12.71.11(9)).

Analysis Step 3 - Remove Areas Adjacent to Roads with Evidence of Stumps

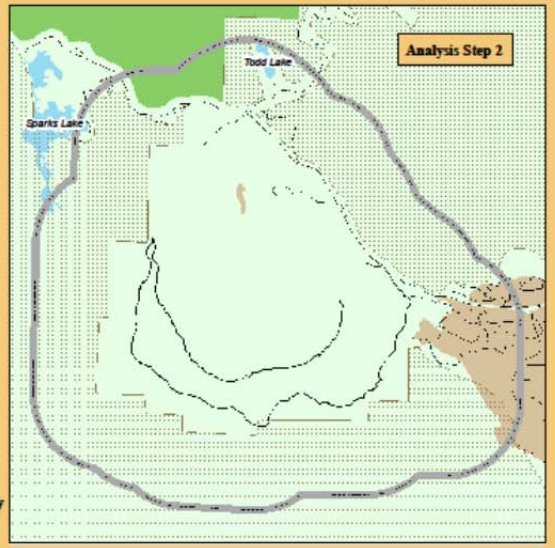
Depicts forest roads. Impacts from past firewood cutting and danger tree removal along roads were estimated to occur to varying degrees dependent on slope, tree height, firewood availability and other factors. Based on local knowledge and professional judgement, a boundary of 300 feet each side of roads was used to depict the area along roads where past activities had occurred. (FSH 1909.12, Chapter 71 (71.1 and 71.11))

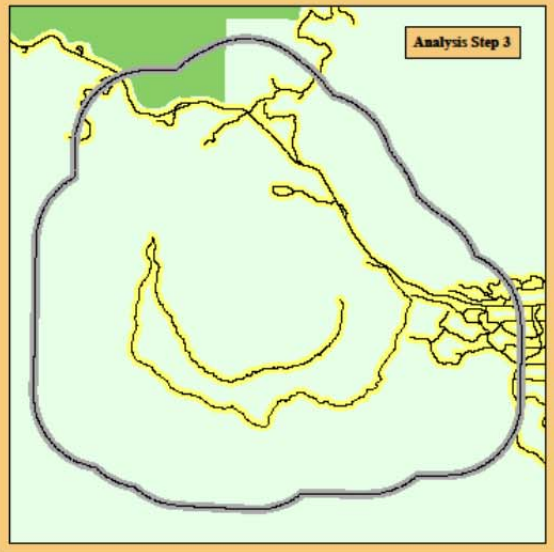
Analysis Step 4 - Potential Wilderness Area Inventory - Stage 1

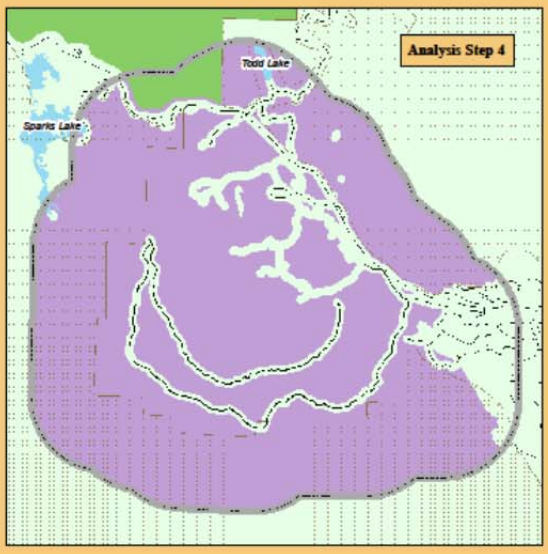
Depicts acres not containing past timber harvest or forest roads. These acres will be examined using inventory criteria at (FSH 1909. 12 ch.71 and 71.11(9)).

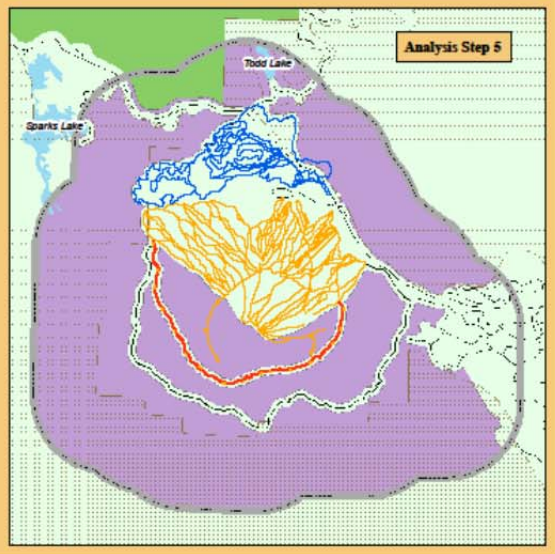
Analysis Step 5 - Preform Manual Edits to Identify Final Potential Wilderness Area Inventory

Map displays the final Potential Wilderness Area Inventory.









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Analysis Step 4 - Potential Wilderness Area Inventory - Stage 1

Depicts acres not containing past timber harvest or forest roads. These acres will be examined using inventory criteria at (FSH 1909. 12 ch.71 and 71.11(9)).

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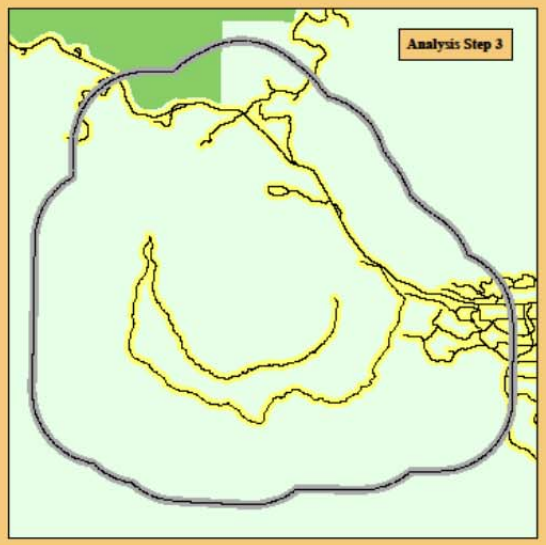

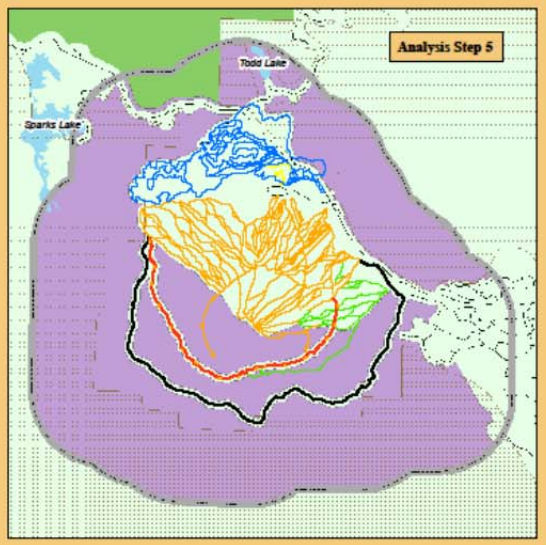

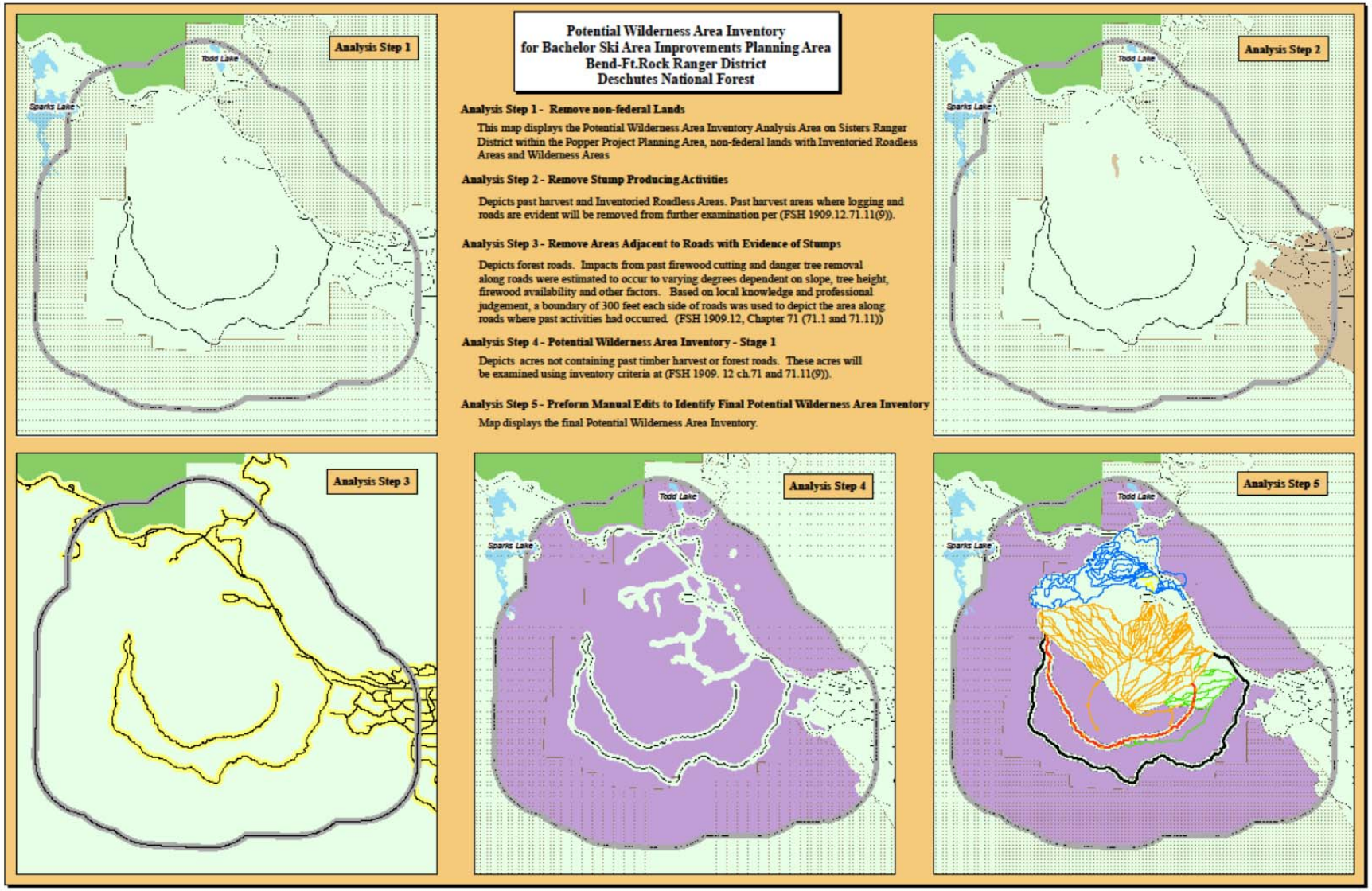

Potential Wilderness Area Inventory
for Bachelor Ski Area Improvements Planning Area
Bend-Ft.Rock Ranger District
Deschutes National Forest

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Depicts forest roads. Impacts from past firewood cutting and danger tree removal along roads were estimated to occur to varying degrees dependent on slope, tree height, firewood availability and other factors. Based on local knowledge and professional judgement, a boundary of 300 feet each side of roads was used to depict the area along roads where past activities had occurred. (FSH 1909.12, Chapter 71 (71.1 and 71.11))

Analysis Step 4 - Potential Wilderness Area Inventory - Stage 1

Depicts acres not containing past timber harvest or forest roads. These acres will be examined using inventory criteria at (FSH 1909. 12 ch.71 and 71.11(9)).

Analysis Step 5 - Preform Manual Edits to Identify Final Potential Wilderness Area Inventory

Map displays the final Potential Wilderness Area Inventory.

APPENDIX D:

EPA AND DOI COMMENT LETTERS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

July 16, 2012

Shane Jeffries, District Ranger
Bend/Fort Rock Ranger District
63095 Deschutes Market Road
Bend, Oregon 97701

Re: EPA Region 10 Comments on the Forest Service Draft Environmental Impact Statement for Mt Bachelor Ski Resort Improvements in the Deschutes National Forest (EPA Project Ref: 11-016-AFS).

Dear Mr. Jeffries:

This review was conducted in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Under our Section 309 authority, our review of the DEIS considers the expected environmental impacts, and the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

The DEIS analyzes two alternative development scenarios that would implement improvements to the Mount Bachelor Ski Resort pursuant to a recently revised master development plan (MDP). Proposed enhancements include actions to enhance facilities at the ski resort including development of the Eastside "pod" for additional ski opportunities, modifying and installing additional chair lifts, construction of new lodges/expansion of existing lodges, and new facilities to promote summer recreation. Alternative A differs from the Proposed Action in that it does not include a new lower catchline. We focused our review on the Proposed Action.

In our April 29, 2011 scoping comments, the EPA emphasized the need to protect water quality and watershed health. We believe the DEIS adequately analyzes and addresses these issues. We also referenced Executive Order (E.O.) 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) and suggested that the proposed construction presents an opportunity to utilize sustainable building and water management practices.

In responding to these suggestions, DEIS states on page A-4 that the MDP commits to having all facilities and activities, both summer and winter, located, constructed and undertaken in an environmentally responsible manner (MDP p. IV-1). We appreciate the response and support this direction. As the Final EIS is developed, we continue to encourage the Deschutes National Forest to incorporate additional detail as it relates the sustainable building practices. In particular, we would like to see the FEIS contain detail related to waste reduction efforts and management of construction and demolition debris. We would also like to see additional information about efforts to reduce the consumption of energy, water, and materials. We recognize that compliance with E.O 13423 is not mandatory for facilities developed by private entities using National Forest System lands under permit,

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but we believe that providing this information would help the public and reviewers to understand how the direction in the MDP will translate into on the actions on the ground. We also believe that including this information could help to maximize the sustainability of the proposal and the resort's energy conservation.

Because our review did not identify any environmental impacts that should be avoided in order to fully protect the environment, we have rated this EIS as Lack of Objections (LO). An explanation of this rating is enclosed. We appreciate the opportunity to participate early in the planning process for this project. If you have questions about our comments, please contact me at (206) 553-1601or by electronic mail at reichgott.christine@epa.gov, or you may contact Teresa Kubo of my staff at (503) 326-2859 or by electronic mail at kubo.teresa@epa.gov.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure

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U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

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United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
620 SW Main Street, Suite 201
Portland, Oregon 97205-3026

9043.1
IN REPLY REFER TO
ER12/399

Electronically Filed

July 16, 2012

Amy Tinderholt
63095 Deschutes Market Road
Bend, Oregon 97701

Dear Ms. Tinderholt:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Mt. Bachelor Ski Improvements Project in the Bend/Ft. Rock Ranger District of the Deschutes National Forest. The Department does not have any comments to offer.

We appreciate the opportunity to comment.

Sincerely,

Allison O'Brien
Regional Environmental Officer