United States Department of the Interior

FISH AND WILDLIFE SERVICE

Western Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

JUL - 2 2008

In Reply Refer To:
13410-2008-I-0226

RECEIVED
JUL - 7 2008
BY:

Y. Robert Iwamoto
Forest Supervisor
Mt. Baker-Snoqualmie National Forest
2930 Wetmore Avenue, Suite 3A
Everett, Washington 98201-4404

Subject: Summit at Snoqualmie Master Development Plan

Dear Mr. Iwamoto:

This letter responds to your May 20, 2008, request for initiation of consultation under section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act) for the proposed Summit at Snoqualmie Master Development Plan. Your request for informal consultation was received on July May 21, 2008. In your cover letter, you requested U.S. Fish and Wildlife Service's (Service) concurrence with the determination that the proposed action "may affect, but is not likely to adversely affect" the northern spotted owl (*Strix occidentalis caurina*) (spotted owl), the marbled murrelet (*Brachyramphus marmoratus*) (murrelet), bull trout (*Salvelinus* confluentus), Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), and the gray wolf (*Canis lupus*). A complete record of this consultation is on file at the Service's Western Washington Fish and Wildlife Office in Lacey, Washington.

You also determined the proposed action would have "no effect" on designated spotted owl critical habitat and murrelet critical habitat. There is no regulatory requirement for Service concurrence on "no effect" determinations. The responsibility of a determination that a project will have no effect on federally listed species rests solely with the action agency.

TAKE PRIDE IN AMERICA

Consultation History

- March 23, 2008: The Service received the March 2008 Biological Assessment (BA), but did not receive a cover letter requesting initiation of consultation from the Mt. Baker-Snoqualmie National Forest (Forest).
- April 21, 2008: The Service sent the Forest a list of several questions on the BA, the answers of which were needed to start consultation. The Service also told the Forest that the Service's Central Washington Field Office was reviewing the BA and additional comments were forthcoming.
- May 8, 2008: During a Level 1 team conference call, it was agreed that the BA needed changes to the bull trout impacts analysis. Later that same day, the Forest sent the Service an updated electronic copy of the BA to the Service that contained changes discussed thus far.
- May 16, 2008: The Service sent the Forest and their consultant (SE Group) additional BA questions and comments that were required to complete consultation.
- May 20, 2008: SE Group sent the Service an updated electronic version of the BA (dated June 2008) with the Service's suggested changes. Later that day, Jesse Plumage, MBS Wildlife Program Manager, sent the Service an electronic copy of the cover letter to the BA.
- May 21, 2008: the Service received a hard copy of the cover letter to the BA.
- May 22, 2008: the Service responded to the Forest's BA with a suggested correction to the cover letter, specifically the effects determination on marbled murrelet, a change that already appeared in the BA. Later that day, the Forest acknowledged the oversight, but no follow up cover letter was sent. For this consultation, the Service will use the May 20, 2008, cover letter hard copy with the Forest's email corrections and the electronic version of the BA with corrections dated June 2008.

Summary of the Proposed Action

The proposed action is an update of the Summit-at-Snoqualmie ski resort's (resort) master development plan (MDP). This MDP is a long-range (10 to 15 years) management and development plan with the goal of upgrading and expanding the recreational infrastructure and associated facilities, including an adjustment to the Special Use Permit (SUP) boundary. The proposed action will include, but is not limited to, building structures, relocating existing lifts, installing new lifts, and enlarging and creating new ski trails by removing trees and grading. The resort expects to increase customer use of the facility by about 32 percent. The proposed action would result in an estimated total of 146.7 acres of ground disturbance. The MDP includes several conservation measures (see the biological assessment for a complete list of conservation measures: SE Group 2008).

Action Area

The resort is situated in the Cascade Mountain Range of Western Washington, approximately 46 mi east of Seattle. The resort lies on both sides of I-5 at the Snoqualmie Pass summit. The resort consists of four different areas: Summit West, Summit Central, and Summit East which lies to the south of the I-5 summit, and Alpental which lies to the north. The action area includes all four areas, with a 0.5-mi wide buffer zone, and totals about 15,000 acres. Some of the land is owned by the resort; most is National Forest System land and administered under a SUP. Base elevation at the Summits is 2,840 ft with a peak elevation of 3,865 ft. Alpental's base is at 3,599 ft with the peak at 5,450 ft. The forest habitat at the ski resort is late successional western hemlock and pacific silver fir. Due to the existing ski trails, the forest stands are highly fragmented.

The resort has created, and will continue to create, disturbance effects to resident wildlife. The resort currently serves about 725,000 customers per year. In addition, ski patrol use snow machines for crowd control and first aid during the day while large tracked snow grooming vehicles groom ski trails at night. In the summer, crews perform maintenance duties. These actions all create noise disturbance to wildlife throughout the action area and throughout the year. There are other disturbance sources outside, and adjacent to, the action area. These include the I-90 highway, considered the busiest mountain pass in the nation, traffic on State Route 207, and disturbance associated with private development.

Effects of the Action

When analyzing the effects of an action, the Service evaluates the degree of effect to federally listed species resulting from the proposed action by considering the proximity, distribution, timing, type, duration, frequency, intensity, and severity of the action (USDI and USDC 1998).

Northern Spotted Owl

Surveys for spotted owls were conducted to protocol in 1994, 1995, 2001, 2002, 2007 and an additional survey will be conducted in 2008. The only detection occurred in 1994 near Mt. Catherine near the boundary of the action area. This presumed owl center occurs about 1.8 mi from planned activity at the base of the ski lift on the back side of Summit East which overlaps the action area boundary. In 2003, an independent study by Raedeke Associates detected a pair of nesting spotted owls about 1 mile outside the SUP boundary, but no young were fledged. It is assumed that this is the same home range.

Spotted owls have large home ranges encompassing thousands of acres of forest. Northern spotted owls prefer to use mature and old forest habitats, presumably because they are most effective at capturing their preferred prey in these habitats. Spotted owls move across their home ranges over the course of the year searching for prey (Forsman et al. 1984). Loss of suitable habitat reduces the amount of foraging area available and likely reduces the overall population and availability of prey, and thus reduces the capability of the landscape to support spotted owls.

Spotted owls in Washington use large annual home range areas that vary from less than 3,000 acres to more than 30,000 acres (Hansen et al. 1993). Because the actual configuration of a home range is rarely known, a circle centered on a spotted owl activity center is used to identify the area approximating the provincial median annual home range. Because spotted owl territories are variable, the median home range circle may or may not identify all essential habitats within an owls' territory. Without radio telemetry data for individual spotted owls, it is difficult to know which stands are used by spotted owls. Therefore, the Service uses the median home range circle to assess the potential impacts of activities that removes forest stands.

In the Washington Cascades, the spotted owl median annual home range (home range) is estimated at 6,657 acres. For the purposes of habitat analyses, the Service typically uses a 1.8-mi-radius circle to approximate the spotted owl home range. We determined where on the landscape the 1.8-mi-radius boundary occurs, and the percent of suitable habitat within the home range circle. The Service uses 40 percent as a minimum threshold for suitable habitat within a spotted owl median home range circle as an indicator for a viable spotted owl home range (U.S. Fish and Wildlife Service 1995).

We used a Geographic Information System to analyze the habitat within the home range of the Mt. Catherine spotted owl pair. This home range circle contains 2,038 acres (31 percent) of suitable habitat, which is below the 40 percent threshold of 2,605 acres. However, this does not rule out the potential viability of the home range due to insufficient habitat. There are many examples of spotted owl pairs that have persisted within home range circles below 40 percent suitable habitat, that home ranges are not circular, and that the 40 percent threshold is not an absolute indicator of viability. However, we continue to use the 40 percent threshold for our section 7 consultation analyses because it is supported by numerous studies that indicate that spotted owls commonly have between 30 to 50 percent suitable habitat within a home range (e.g., Thomas et al. 1990; Hanson et al. 1993; Bart 1995; Dugger et al. 2005). Further, much of Mt. Catherine home range circle contains large tracks of unbroken forests, which may increase the quality of the available habitat.

Much of the home range circle occurs within the action area buffer zone. However, the only activity near the home range circle is the proposed clearing for the expansion of the ski trails and installation of lifts on the back side of Summit East. This proposed clearing will occur just within the owl activity center boundary. The habitat to be removed from this home range is not mapped as nesting, roosting, and foraging (NRF) or dispersal habitat. It is described as high elevation silver fir with little canopy cover and high human-caused disturbance levels, with only limited dispersal function for spotted owls (Sonny Paz, wildlife biologist, pers. comm. 2008). Therefore, the proposed action would not affect suitable habitat within the Mt. Catherine spotted owl home range.

A lack of spotted owl detections in the action area doesn't necessarily mean the absence of spotted owls. The action area contains over 2,000 acres of NRF habitat and about 2,000 acres of dispersal habitat. Suitable spotted owl habitat is generally described as mature or old-growth forest that has a moderate to high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees, a high incidence of large trees with various deformities (e.g. cavities, broken tops, dwarf-mistletoe infections); numerous large snags, accumulations of fallen

logs, and sufficient open space below the canopy for owls to fly through (Thomas et al. 1990:1). Suitable habitat meets all of the spotted owl's requirements for nesting, roosting, foraging, and dispersal. The age of the forest is not as important a factor in determining habitat suitability as are vegetation and structural components (Thomas et al. 1990:2).

Spotted owls use a wide array of forest types for foraging and dispersal, including more open and fragmented habitats (Thomas et al. 1990:149-151). Spotted owl dispersal habitat is not considered suitable habitat, but at a minimum consists of stands with adequate tree size and canopy closure to provide protection from predators and minimal foraging opportunities (Thomas et al. 1990:310). Dispersal habitat plays a key role in providing connectivity across the landscape and between patches of suitable habitat (Thomas et al. 1990:309)

The proposed action will remove 3.7 acres of NRF and 20.3 acres of dispersal habitat. These amounts may be significant if they were in large continuous patches in unfragmented stands. However, the patches of trees requiring removal for the proposed action will be small. As an example, one of the larger patches requiring tree clearing for a new ski trail will be about 1.3 acres on Summit West. However, the majority of this patch is not suitable habitat - it contains no NRF habitat and only a small percentage of dispersal habitat. The overall removal of the estimated 3.7 acres of NRF and 20.3 acres of dispersal habitat will amount to small "slices" of suitable habitat. Therefore, the effects of removing 3.7 acres of NRF and 20.3 acres of dispersal habitat would have an insignificant effect to spotted owl habitat considering the size of the patches that will be removed, and the amount or remaining available habitat. The functional ability of these stands to provide for spotted owls would not significantly change.

Further, the suitable habitat of the action area has been highly fragmented since its original construction in the 1930s. The additional fragmentation of the forest stands within the action area as a result of removing trees for widening existing ski trails and creating new ski trails and infrastructure would be an insignificant change from existing conditions.

Although information specific to behavioral responses of spotted owls to disturbance is limited, research indicates that they may be sensitive to human disturbance. The action area has been, and will continue to be, active with human disturbance from many sources which may be deterrents to spotted owl use of the action area. This level of disturbance will increase as a result of the proposed action, both during construction, and after construction if the resort attracts more customers (a target of a 32 percent increase). However, disturbance effects to spotted owls may currently be at a saturation level and any additional disturbance may be insignificant. Nonetheless, the MDP includes some conservation measures that will help minimize any potential disturbance to the spotted owl in the event that spotted owls are detected at survey stations. These include restricting helicopter operation during the breeding season (March 1 to September 15) (CM4), and minimizing the removal of snags and down woody material to the extent practicable (CM16). Considering the current level of disturbance and the inclusion of these two conservation measures, the disturbance effects of the proposed action to spotted owls would be discountable.

In summary, the proposed action would likely have discountable effects to spotted owls. The probability of spotted owls using the action area is low. This low probability is due to the

combined considerations of negative survey results, and the low probability of spotted owls using the action area due to the low suitability habitat attributable to small stand size and high human-caused disturbance, especially in light of the proximity of more suitable habitat occurring nearby.

Also, the proposed action would likely have an insignificant effect to spotted owls due to the combined considerations of the incremental amount of habitat to be removed compared to the total amount present within, and adjacent to, the action area, the highly fragmented nature of the stands in the action area, and the incremental increase in human-caused disturbance in light of the existing high level of human-caused disturbance.

Marbled Murrelets

There have been no documented occurrences of murrelets within the Action Area. Surveys to protocol were conducted in 1994, 1995, 2001, 2002, and 2007 with no detections (an additional survey to protocol will occur in 2008). However, the absence of detections during surveys does not necessarily mean the absence of murrelets. Murrelets have been detected nearby, one within 2 mi of the action area east of the Cascade Crest, and another within 5 mi of the action area.

The action area occurs between 40 and 50 mi from saltwater. Less than 5 percent of marbled murrelet detections occur greater than 40 mi inland (FWS 1997). However, surveys in that study were not evenly distributed; more surveys were conducted closer to saltwater which may have skewed the results. Nonetheless, the likelihood of occupancy of murrelets in the action area is likely low, especially in conjunction with arguments below.

One of the primary risks to murrelet survival and recovery is nest predation. The risk of predation on murrelet nests by avian predators appears to be highest in close proximity to human activity (Raphael et al. 2002). In many studies, significantly more predators (especially corvids [Corvidae Family]) occurred in campgrounds, along suburban edges, and in other areas close to human development (McShane et al. 2004). Because corvid predation rates appear to be influenced by proximity to human activity centers, it is likely that predation pressure on murrelet nests in the action area, if undetected nests occur within the action area, would be very high.

Large contiguous stands of suitable habitat are considered important to marbled murrelet recovery (61 FR 26256-26320). The average nest stand size in Washington is 515 acres (Hamer and Nelson 1995). However, stands of this size do not exist within the action area which lessens the probability of murrelets occurring within the action area.

Large stands experience less nest failure. Avian predators use forest edges to penetrate the stand in search of murrelet eggs and nestlings. Raphael et al. (2002) report that nest failure and predation were highest when located within 50 meters from a forest stand edge. The habitat within the action area has been heavily fragmented since its original construction in the 1930s. Ski trails and access roads created many forest edges from which nest predators may penetrate forest stands. The proposed action will add new ski trails and widen existing ski trails. This will create new forest edges, and move existing ones deeper into stands. However, due to the existing high level of fragmentation and resulting small stand sizes, the stands in the action area

are likely saturated with nest predators. An increase of forest edges will not result in a significant increase in exposure of murrelets to nest predation.

There is approximately 2,137 acres of suitable murrelets habitat within the action area. The proposed action would remove approximately 3.8 acres of suitable murrelet habitat through the removal of trees for ski lifts, ski trails, and facility construction, a small fraction of the total available. Also, the 3.8 acres is the total accumulation of suitable habitat removed in numerous small scattered patches, or "slices," across the action area, none of which would significantly reduce any existing stand. Further, the best murrelet nesting habitat within the action area is a very small stand near a busy work station, a very unlikely area for nesting murrelets due to its potential for human-caused disturbance and nest predation. The effect of removing a small amount of suitable murrelet habitat compared with the amount available elsewhere within, and adjacent to, the action area would be insignificant.

There is little data concerning the murrelet's vulnerability to human caused disturbance effects, except anecdotal researcher observations that indicate murrelets typically exhibit a limited, temporary behavioral response to noise disturbance at nest sites and are able to adapt to auditory stimuli (Singer et al. 1995 *in* McShane et al. 2005; Long and Ralph 1998; Golightly et al. 2002). In general, responses to auditory stimuli at nests sites have been modifications of posture and on-nest behaviors (Long and Ralph 1998). While the unique breeding biology of the murrelet is not conducive to comparison of the reproductive success of other species, studies on other alcids (Alcidae family) and seabird species have revealed detrimental effects of disturbance to breeding success and the maintenance of viable populations (Cairns 1980; Pierce and Simons 1986; Piatt et al. 1990; Beale and Monaghan 2004).

The resort has created, and will continue to create, disturbance effects to resident wildlife. This level of disturbance will increase as a result of the proposed action, both during construction, and after construction if the resort attracts more customers (a target of a 32 percent increase). However, disturbance effects to murrelets may currently be at a saturation level and any additional disturbance may be insignificant. Conservation measures will mitigate some potential for disturbance to murrelets during construction, such as helicopter timing restrictions (CM5), but only if surveys detect murrelets at survey stations.

In summary, the proposed action would likely have discountable effects to murrelets. The probability of murrelets using the action area is low. This low probability is due to the combined considerations of the distance the action area is from saltwater, negative survey results, and the low suitability of the action area for murrelets due to small stand size, high predation pressure potential from high forest edge, and high human-caused disturbance.

Also, the proposed action would likely have an insignificant effect to murrelets due to the combined considerations of the incremental increase in the forest edge and resulting corvid predation pressure, the amount of suitable murrelet habitat to be removed compared to the total amount present within, and adjacent to, the action area, and the incremental increase in human-caused disturbance.

Bull Trout

The applicant expects land clearing and grading activities will increase soil erosion which may impact water bodies downstream of the action area such as Keechelus Lake, Coal Creek and Mill Creek. It was estimated that an additional 2.7 tons of sediment per year would enter Coal Creek and 5.8 tons per year would enter Mill Creek. However, this addition amounts to an estimated change of less than one percent, an insignificant amount.

Keechelus Lake: Adfluvial bull trout are known to occupy Keechelus Lake. Because water levels in Keechelus Lake vary widely, the distance between the action area and the lake can range between 1.0 and 2.5 mi away. Also, bull trout would typically occupy the deeper, cooler water of the lake during the warm summer months which is further from the action area, and thus the potential influence of additional sediment during the summer months. Therefore, the effects of the proposed action to bull trout in Keechelus Lake would be discountable.

Coal Creek: No bull trout have been reported from any stream in the Coal Creek sub-watershed. Also, no bull trout were detected in Coal Creek during 2002 day and night snorkel surveys of the lower portions of Coal Creek by the Forest's consultant. Although there are no barrier to fish passage between Lake Keechelus and Coal Creek, it is unlikely that bull trout use Coal Creek because it is relatively exposed and experiences high temperatures (Jeff Thomas, Bureau of Reclamation, June 27, 2008). Therefore, the effects of the proposed action to bull trout in Coal Creek would be discountable.

Mill Creek: No snorkel surveys have been completed in Mill Creek. However, it is unlikely that the creek supports bull trout. The creek is intermittent near its mouth at Keechelus Lake and natural and human-made passage barriers exist in Mill Creek at mile 0.7. Also, there are no reports of bull trout in Mill Creek. Further, bank surveys were conducted by a consultant (Jones and Stokes) in 2004 with no detections. The presence of bull trout in Mill Creek would be unlikely. Therefore, the effects of the proposed action to bull trout in Mill Creek would be discountable.

In summary, it is unlikely that bull trout would be exposed to the effects of additional sediment within receiving streams as a result of the proposed action. Therefore, the effects of the proposed action to bull trout would be discountable.

Canada Lynx

The habitat within the action area does not contain suitable denning or foraging habitat due to the lack of subalpine fir and early successional stands. Also, the action area does not contain suitable lynx dispersal habitat; lynx prefer to travel through forest cover and use riparian areas, saddles and ridges as travel habitat. Further, there have been no sightings or evidence of lynx use in the action area. Therefore, the probability that lynx would use the action area is so unlikely that its exposure to the proposed action would be discountable.

Grizzly Bear

The southern boundary of the North Cascades Grizzly Bear Recovery Zone (NCGBRZ) follows I-90. Alpental lies within the NCGBRZ while the rest of the action area lies outside. Although the grizzly bear is considered present in the 9,565 mi^2 NCGBRZ, the population is likely less than 50 and may be as low as 10 to 20 (Almack et al. 1993). No grizzly bears are currently known to reside in the action area. Sightings and other evidence indicate the presence of a limited number of grizzly bears north of I-90 in the North Cascades ecosystem (Gaines et al. 2000). Recent Class 1 reports of a grizzly bear (confirmed by a biologist and/or photograph, carcass, track, hair, dig, or food cache) occurred in the Cooper River subwatershed (1988 and 1991), and in the Middle Fork Teanaway subwatershed in 1989 (Almack et al. 1993), roughly 15 mi and 25 mi respectively from the action area.

The proposed action will not significantly change the suitability of the area. Use of the area by any wide-ranging carnivores will still be constrained by the high level of human disturbance associated with year-round motorized use of roads. Given this and the extremely low density of grizzly bears within the adjacent NCGBRZ, the potential for grizzly bears to be displaced by proposed action disturbance or to experience a reduction in predatory foraging opportunities would be discountable.

Gray Wolf

The gray wolf is rare in Washington and is believed to be resident only in the North Cascades and in the Selkirk Mountains of northeastern Washington (Almack and Fitkin 1998). Although confirmed Class 1 reports are uncommon, the available information suggests wolves may be present in the southern Washington Cascades (Almack and Fitkin 1998). Given the wide-ranging nature of wolves, it is possible that transient individuals could occur in the action area.

Analysis of gray wolf suitability is done at the scale of a Bear Management Unit to determine the relative quality of "security habitat" for gray wolves (Gaines et al. 2000). Thurber et al. (1994) found gray wolves avoided roads open to public use, gated access roads, and secondary access roads in Alaska; several authors have suggested gray wolf packs do not persist where road densities exceed 1 mi/mi^2 (Thiel 1985; Jensen et al. 1986; Mech 1989).

Adverse effects to gray wolves resulting from the proposed action are extremely unlikely. The extreme low density of gray wolves in this portion of the Cascades makes it unlikely that the area would be used by wolves. Also, the use of the area by any wide-ranging carnivores will still be constrained by the high level of human disturbance associated with year-round motorized use of roads. Therefore, the potential for gray wolves to be displaced by proposed action disturbance is discountable.

Adverse effects to gray wolf habitat from the proposed action would be extremely small. The action area would not function as security habitat for gray wolves due to the existing road density that exceeds 1 mi/mi^2, and high human activity. Further, the capacity of the landscape to support deer and elk (and gray wolf) would not significantly change as result of the proposed action; it

would not likely significantly change the amount of herbaceous vegetation and carrion, or denning opportunities. Therefore, the effects of the proposed action on potential gray wolf habitat would also be insignificant.

Conclusion

The Service concurs with the BA determinations that the proposed action "will affect, not likely to adversely affect" the spotted owl, murrelet, bull trout, grizzly bear, Canada lynx, or the gray wolf due to the arguments stated above.

This concludes informal consultation in accordance with the Act (50 CFR 402.13). This action should be re-analyzed if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed species or designated critical habitat that was not considered in this consultation; and/or, if a new species or critical habitat is designated that may be affected by this project.

The Service appreciates your efforts to protect listed species and the habitats on which they depend while meeting your land management needs. If you have any questions regarding this letter or your responsibilities under the Act, please contact Mark Hodgkins at (360) 753-9532 or Marc Whisler at (360) 753-4410, of my staff.

Sincerely,

Amy Whisler

for Ken S. Berg, Manager
Western Washington Fish and Wildlife Office

cc:
CWFO, Wenatchee, WA (J. Krupka)

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PERSONAL COMMUNICATIONS

Paz, Sonny. 2008. Telephone conversation to discuss the habitat type at the base of the Hayak chair lift on the back side of Summit East; on June 30, 2008. Wildlife Biologist, U.S. Forest Service, Mt. Baker-Snoqualmie National Forest, Snoqualmie Ranger District, North Bend, Washington.

BIOLOGICAL ASSESSMENT FOR THE SUMMIT AT SNOQUALMIE MASTER DEVELOPMENT PLAN PROPOSAL

May 2008

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1.0 INTRODUCTION

This Biological Assessment (BA) was prepared pursuant to the Endangered Species Act of 1973, as amended, to describe and evaluate the potential affects of the Summit at Snoqualmie Master Development Plan (MDP) Proposal on the Northern Spotted Owl (*Strix occidentalis caurina*), Canada Lynx (*Lynx canadensis*), Grizzly Bear (*Ursus arctos horribilis*), Gray Wolf (*Canis lupus*), Marbled Murrelet (*Brachyrampus marmoratus*), Bull Trout (*Salvelinus confluentus*) and Designated Critical Habitat for the Northern Spotted Owl and Marbled Murrelet. This BA contains a list of proposed, threatened, and endangered species or their habitats with the potential to occur in the vicinity of Summit at Snoqualmie and describes the study methods used to determine the probability of each species occurrence, their life history, and habitat requirements.

This BA has been prepared as part of the inventory of natural resources associated with construction of the proposed Summit at Snoqualmie Master Development Plan including; new chairlifts, associated trails, infrastructure and proposed Special Use Permit (SUP) boundary modification. The Summit-at-Snoqualmie is situated in the Cascade Mountain Range of western Washington, approximately 46 miles east of Seattle (see Figure 1 – Vicinity Map) and is accessed via Interstate 90 (I-90). The Summit-at-Snoqualmie is located on private land within both King and Kittitas Counties and National Forest System (NFS) lands within the Snoqualmie Ranger District (SNOQRD) (formerly North Bend Ranger District) of the Mount Baker-Snoqualmie National Forest (MBSNF) and the Cle Elum Ranger District of the Okanogan and Wenatchee National Forest (OWNF). Ski Lifts, Inc. operates the ski area under a Special Use Permit (SUP) that is administered by the MBSNF. The FS Manual directs the Forest Service to conserve listed threatened and endangered species, species proposed for listing as threatened or endangered, and the ecosystems upon which they depend. Therefore, the Forest Service is to initiate consultation (or conferencing) on projects that would likely affect species proposed for federal listing, and proposed critical habitats, as if these species or habitats were listed. Table 1-1, below, presents the list of species considered in this BA.

Table 1-1
Threatened, Endangered, and Candidate Species

Common Name	Scientific Name	Status
1. Northern Spotted Owl	*Strix occidentalis caurina*	Threatened
2. Marbled Murrelet	*Brachyrampus marmoratus*	Threatened
3. Grizzly Bear	*Ursus arctos horribilis*	Threatened
4. Gray Wolf	*Canis lupus*	Endangered
5. Canada Lynx	*Lynx canadensis*	Threatened
6. Bull Trout	*Salvelinus confluentus*	Threatened

2.0 PROJECT OVERVIEW

The Summit-at-Snoqualmie is owned and operated by Ski Lifts, Inc. and consists of four ski areas: Summit West (formerly Snoqualmie Summit); Summit Central (formerly Ski Acres); Summit East (formerly Hyak); and Alpental.

The surrounding mountain environment and proximity to the Puget Sound Region support year-round visitation to The Summit-at-Snoqualmie. Year-round dispersed recreation activities and opportunities surrounding The Summit-at-Snoqualmie include photography, sightseeing, hiking, backcountry camping, and wildlife viewing. Hiking, horseback riding, mountain/road biking, rock climbing, and fishing are the primary summer activities throughout the Snoqualmie Pass region. The Summit-at-Snoqualmie's facilities are available for business meetings, small conferences, wedding receptions, and other special occasions throughout the summer.

The Proposed Action would update The Summit-at-Snoqualmie's MDP for long-range (10-15 years) management and development of The Summit-at-Snoqualmie (see Figures 2 and 3). Additionally, a primary objective of the MDP is to upgrade and expand the recreational infrastructure and associated facilities, including a small adjustment of the SUP boundary for The Summit-at-Snoqualmie. The purpose of these upgrades and improvements is to increase skier connectivity between Summit East and Summit Central, maintain long-term economic viability of the facilities at Summit East; take advantage of opportunities to restore conditions in the Upper South Fork Snoqualmie River and Coal Creek watersheds (may include removing culverts, revegetation efforts, stabilizing mass wasting slopes, wetland and stream restoration, etc.); and be consistent with the Forest Plans of the MBSNF and the OWNF, as amended and the Snoqualmie Pass Adaptive Management Area Plan (USDA 1997).

3.0 ACTION AREA AND PROPOSED ACTION

3.1 Action Area

Project elements described in the Proposed Action (see Section 3.3) would occur in The Summit-at-Snoqualmie SUP area located in the Cascade Mountain Range of western Washington, approximately 46 miles east of Seattle. The Summit-at-Snoqualmie is located within both King and Kittitas Counties and National Forest System (NFS) lands within the Snoqualmie Ranger District (SNOQRD) of the MBSNF and the Cle Elum Ranger District of the OWNF. The Action Area is defined as the geographic area within which the Proposed Action would be located (approximately 3,000 acres).

The action area includes all areas that could be affected by the proposed project and is not limited to the actual project site. These areas are based on the type of construction activities proposed for this project and the limits of potential project effects as discussed in Section 4.

3.1.1 Aquatic Action Area

Due to potential water quality and water quantity effects associated with the proposed action, the action area for aquatic species is considered to include Coal Creek and Keechelus Lake within the Upper Yakima River watershed. No listed species occur within the South Fork Snoqualmie watershed due to the natural barrier at Snoqualmie Falls, approximately 31 river miles downstream of the project area. Therefore, no action area for aquatic species has been established for the South Fork Snoqualmie River.

3.1.2 Terrestrial Action Area

The action area used to analyze potential effects to terrestrial wildlife species from the proposed project includes The Summit-at-Snoqualmie SUP area and the following areas outside of the SUP area boundary (see Figure 4):

- Areas within 1 mile of the SUP boundary of Alpental which would be potentially subject to noise disturbance from construction activities (grading, blasting) and helicopter operations.
- Areas within 1 mile of the SUP boundary of Summit East, Summit Central, and Summit West which would be potentially subject to noise disturbance from construction activities (grading) and helicopter operations.

3.2 Project Purpose and Need

The purpose for the Proposed Action is to ensure the long-term economic viability of The Summit-at-Snoqualmie (particularly Summit East), to maintain and/or enhance environmental resources, and provide for the public quality recreational opportunities in a natural outdoor

setting on NFS lands, consistent with the Forest Plans for the MBSNF and OWNF, other federal laws and regulations, other agency direction, and The Summit-at-Snoqualmie SUP.

The Proposed Action, under consideration in this Biological Assessment, is based on components of FEIS Alternative 1, Alternative 3 and Modified Alternative 5 (see Figures 2 and 3). As shown in Figures 2 and 3, the Proposed Action would improve alpine winter recreational opportunities at The Summit-at-Snoqualmie Ski Area by:

- Improving circulation and dispersal of skiers and other site visitors in and out of the base area, and throughout the ski area through improvements to parking, facilities, and circulation and dispersal of skiers on the slopes;
- Maintaining the viability of Summit East by integrating Summit East with Summit Central by installing strategically designed and placed lifts and connector trails;
- Balancing the capacities of skier service facilities and lift/trail capacities by consolidating base area operations and providing on-mountain facilities to accommodate the increasing number of skiers; and
- Correcting the SUP boundaries and allocations within the existing SUP boundary for more efficient administration.

Under Proposed Action, The Summit's comfortable carrying capacity (CCC) would increase from 7,920 to 9,990 skiers and Alpental's CCC would increase from 1,880 to 2,920 skiers for an increase of approximately 32 percent, or 3,110 skiers for The Summit-at-Snoqualmie.

3.3 Proposed Action

The purpose and need elements listed in Section 3.2 provided the guidance for the development of specific project elements under the proposed action. The proposed action was developed to provide a framework for the development and operation of The Summit-at-Snoqualmie over an approximately 10-15 year period, beginning after the issuance of the Record of Decision (ROD). For the purposes of this BA, elements of the proposed action include:

- New chairlifts and replacement of old lifts
- Ski trail expansion and terrain improvements
- Night skiing expansion
- New facilities and existing facilities upgrades
- Parking lots upgrade and expansion
- Utilities upgrades
- Restoration projects

In total, approximately 146.70 acres of disturbance would occur under the proposed action from the above listed actions. Disturbance associated with the proposed action has been classified as

full clearing with grading, full clearing with no grading, and blasting. Table 3-1 presents the distribution of disturbance by type.

Table 3-1
Summary of Proposed Action Disturbance

Proposed Action	Full Clearing with Grading (acres)	Full Clearing with no Grading (acres)	Blasting (acres)
Chairlift Construction and Replacement	15.50	30.55	0
Trail Expansion and Construction	19.88	19.71	1.11
Facility Construction and Expansion	5.06	0	0
Parking Lot Construction and Expansion	34.02	0	0
Road Construction and Expansion	2.02	0	0
Utility Upgrades	18.85	0	0
Sub-total Impacts	**95.33**	**50.26**	**1.11**
Grand Total			**146.70**

Figures 2 and 3 provide an overview of the proposed action as discussed in the following sections. The project elements of the proposed action are described below.

3.3.1 Lift Configuration

Under the Proposed Action, The Summit will operate 21 lifts (17 chairlifts, 2 surface lifts and 2 magic carpets); while Alpental will operate six lifts (5 chairlifts and 1 magic carpet). At full build-out, five of The Summit-at-Snoqualmie's existing chairlifts will remain in their current state: Armstrong Express, Central Express, Easy Street, Pacific Crest, and Mt. Hyak1. Thirteen chairlifts will be realigned or upgraded under the Proposed Action and 9 new lifts will be constructed; these are discussed in detail below. The following descriptions of the proposed lift modifications are organized by ski area; Summit West, Summit Central, Summit East, and Alpental. Please refer to Figures 2 and 3 for the locations of proposed new lifts and modified lift alignments. Table 3-2 provides a summary of the lift network under the Proposed Action.

[1] Replacement of the existing *Mt. Hyak* chairlift at Summit East was approved in 2000 (Decision Notice and finding of No Significant Impact – Summit West Ski Area Ski Rental and Welcome Center, October 25, 2000). Replacement of the chairlift includes removal of the existing *Keechelus* and *Dinosaur* chairlifts. For purposes of this Decision, the absence of the *Keechelus* and *Dinosaur* lifts, and realignment of *Mt. Hyak* is considered an existing condition, although the *Mt. Hyak* chairlift has not yet been constructed.

Table 3-2
The Summit-at-Snoqualmie Lift Specifications Under the Proposed Action

Name	Site Area	Lift Type	Vertical Length	Slope Length	Status
Armstrong Express	Alpental	Det quad	1,232	4,066	existing
Edelweiss	Alpental	TBD	1,071	2,854	modified
Internationale	Alpental	Det quad	1,345	3,808	proposed
St. Bernard	Alpental	Fixed double	179	1,010	modified
Sessel	Alpental	Fixed quad	834	2,512	modified
Magic Carpet	Alpental	Surface	32	247	proposed
Baby Double	Summit West	Fixed double	194	1,060	existing
Central Express	Summit Central	Det quad	936	3,909	modified
Dodge Ridge	Summit West	Det quad	569	2,424	modified
Easy Gold	Summit East	Fixed double	195	1,018	proposed
Easy Street	Summit Central	Fixed double	317	1,801	existing
Holiday	Summit Central	Fixed quad	249	1,324	existing
Julie's Chair	Summit West	Fixed quad	367	1,786	proposed
Little Thunder	Summit West	Fixed quad	109	1,254	modified
Magic Carpet I	Summit Central	Surface	19	206	modified
Magic Carpet II	Summit West	Surface	25	182	existing
Mill Creek	Summit East	Fixed triple	529	1,834	proposed
Mt. Hyak	Summit East	Det quad	1,080	3,228	proposed
Northside	Summit West	Fixed double	450	1,487	modified
Pacific Crest	Summit West	Fixed quad	694	2,831	modified
Rampart	Summit East	Fixed quad	737	2,944	proposed
Silver Fir	Summit Central	Det quad	1,020	4,003	proposed
Ski School	Summit Central	Fixed quad	214	1,272	proposed
Surface Lift I	Summit West	Surface lift	32	571	existing
Surface Lift II	Summit West	Surface lift	47	570	proposed
Triple 60	Summit Central	Det quad	698	2,346	proposed
Wildside	Summit West	Det quad	709	2,187	modified

3.3.1.1 Summit West

Surface Lift II

The proposed Surface Lift II tow would be constructed adjacent to Summit West Lot 1. The proposed lower terminal would be constructed just north of the existing Slide-In Lodge. The proposed upper terminal would be constructed to provide access to the proposed Baby Double chairlift.

Baby Double

Under the Proposed Action, the proposed Baby Double chairlift would be constructed at the northernmost extent of Summit West. The proposed lower terminal would be located approximately 50 feet north of the proposed upper terminal of Surface Lift II and the proposed upper terminal would be located approximately 1,050 feet up the hill from the lower terminal.

The proposed Surface Lift II tow would be constructed adjacent to Summit West Lot 1. The proposed lower terminal would be constructed just north of the existing Slide-In Lodge. The proposed upper terminal would be constructed to provide access to the proposed Baby Double chairlift.

Magic Carpet

Under the Proposed Action, a Magic Carpet would be installed adjacent to the proposed Surface Lift II tow.

Northside

The proposed Northside chairlift would provide round-trip access to expert terrain, north of the existing Pacific Crest chairlift. The proposed lower terminal would be accessed via the proposed Baby Double or Julie's Chair chairlifts or by skiing down from the existing Pacific Crest chairlift. The upper terminal would be located approximately 500 feet north of the existing upper terminal of the Pacific Crest chairlift.

Little Thunder

The existing Little Thunder chairlift would be realigned and shortened to better utilize beginner slope gradients lower on the hill. The proposed lower terminal would be located approximately 250 feet north of the existing lower terminal, closer to base area facilities. The upper terminal would be located approximately 750 feet downslope from its existing location. The proposed realignment of the Little Thunder chairlift would be in conjunction with the replacement and realignment of the Dodge Ridge chairlift.

Julie's Chair

The existing Julie's Chair chairlift would be realigned approximately 200 feet south of its existing alignment. The upper terminal would be located approximately 250 upslope and south of the current location.

Dodge Ridge

Under the Proposed Action, the existing Dodge Ridge chairlift would be replaced and realigned along the natural fall line of the hill. The proposed upper terminal would be located approximately 50 feet northwest of the existing location. The proposed lower terminal would be located approximately 1,400 feet south of its existing location. The proposed realignment of the Dodge Ridge chairlift would be in conjunction with the proposed realignment of the Little Thunder chairlift.

Surface Lift I

Surface Lift I would be constructed alongside the proposed Little Thunder chairlift.

Wildside

Under the Proposed Action, the Wildside chairlift would be replaced and realigned with the lower terminal located approximately 300 feet north of the existing terminal. The upper terminal would be relocated approximately 50 feet south of its existing location.

3.3.1.2 Summit Central

Holiday

Under the Proposed Action, the existing Holiday chairlift would be replaced and realigned. The proposed lower terminal would be located closer to the proposed base area facilities.

Triple 60

The proposed Triple 60 chairlift would be constructed along the same alignment as the existing lift with the lower terminal located further downslope, adjacent to the proposed Summit Central base lodge.

Ski School

The proposed Ski School chairlift would be constructed to provide out-of-base access to appropriate beginner terrain at Summit Central. The lower terminal would be constructed within 250 feet of the proposed base lodge. The upper terminal would be constructed approximately 1,250 feet upslope from the proposed lower terminal and would provide access to much of the beginner terrain proximate to the base area.

Magic Carpet

Under the Proposed Action, a Magic Carpet would be installed in between the proposed lower terminals of the Triple 60 and Ski School chairlifts, along the current alignment of the existing tow.

Silver Fir

Under the Proposed Action, the existing Silver Fir chairlift, a fixed-grip triple chairlift, would be replaced in the same alignment with a detachable quad.

3.3.1.3 Summit East

Easy Gold

The existing upper terminal of the Easy Gold chairlift would be relocated approximately 300 feet downslope from its existing location.

Rampart

The proposed *Rampart* chairlift would be constructed to take advantage of existing terrain at Summit East. The lower terminal location would be as shown in Figure 2. The upper terminal would be constructed approximately 750 feet northwest of the existing upper terminal for the Mt. Hyak chairlift.

The proposed *Rampart* chairlift would be constructed within Section 16 at Summit East.

3.3.1.4 Alpental

Edelweiss

Under the Proposed Action, the existing Edelweiss chairlift would be upgraded to provide increased capacity within the existing alignment. In conjunction with the capacity upgrade, the lift top terminal area would be modified to improve circulation and skier egress. Ground disturbance associated with these improvements would be limited to existing disturbed areas associated with the current lift configuration. This analysis assumes that no new disturbance would be required for the Edelweiss upgrade.

Internationale

Under the Proposed Action, the proposed Internationale chairlift would access expert terrain in the northwest portion of the SUP area. The lower terminal of Internationale would be located approximately 1,000 feet southeast of the existing upper terminal of Sessel. The upper terminal would be sited approximately 1,500 feet north of the existing upper terminal of the Edelweiss chairlift at 4,960 feet elevation.

St. Bernard

The existing St. Bernard chairlift would be relocated approximately 250 feet east and downhill from its existing location.

Sessel

Under the Proposed Action, the Sessel chairlift would be realigned and lengthened to take advantage of the majority of intermediate terrain at Alpental. The upper terminal would be located approximately 450 feet up-mountain from the existing location, within an existing opening. The proposed lower terminal would be located approximately 250 feet north of the existing location.

Magic Carpet

Under the Proposed Action, a Magic Carpet would be installed adjacent to the proposed St. Bernard chairlift, along the current alignment of the existing Drei tow (to be removed).

All equipment and materials would access the site via existing roads and ski trails where possible, or by helicopter where no roads or ski trails are accessible. Towers would be constructed off-site and airlifted in. Table 2-1 provides lift specification data for the proposed chairlifts. No new road construction would be required.

3.3.2 Ski Trail Expansion

Under the Proposed Action, the trail network at The Summit would increase by approximately 48 acres, from the existing 70 named trails on approximately 545 acres, to 78 trails on approximately 586 acres. The trail network at Alpental would increase by approximately 11 acres, from the existing 25 named trails on approximately 206 acres to 27 trails on approximately 217 acres. The following descriptions of the proposed trail modifications are organized by ski area; Summit West, Summit Central, Summit East, and Alpental. Additionally, trails are grouped by the lift that serves the terrain into what is termed a “pod”. Refer to Figures 2 and 3 for the proposed trail network under the proposed action.

3.3.2.1 Summit West

Wildside Pod

Under the Proposed Action, the proposed realignment of the Wildside chairlift would include approximately 0.5 acre of full clearing with grading and approximately 0.4 acre of full clearing with no grading to accommodate the proposed lift alignment and lower lift terminal. Additional clearing is proposed to provide access to the lower terminal of the Wildside chairlift from Trails 1 and 2.

Dodge Ridge Pod

Approximately 1.0 acre of full clearing with grading would be required to realign the Dodge Ridge chairlift. Additional terrain modification proposed in conjunction with the realignment of the Dodge Ridge chairlift includes reforestation of approximately 4.1 acres adjacent to Trails 9 and 9A within the proposed Dodge Ridge pod.

Little Thunder Pod

Approximately 7.9 acres of full clearing with grading is proposed around the realignment of the Little Thunder chairlift to provide more level terrain for beginner skiers. In addition, approximately 1.3 acres of reforestation or revegetation would occur alongside the Little Thunder chairlift in order to provide a buffer between beginner and intermediate terrain.

Surface Lift I Pod

Under the Proposed Action, approximately 0.03 acre of full clearing with grading is proposed for construction of the proposed Surface Lift I surface lift. No terrain modification is proposed for trails within the proposed Surface Lift I pod.

Pacific Crest Pod

No terrain modification or trail clearing is proposed within the existing Pacific Crest pod. Approximately 2.2 acres of reforestation is proposed adjacent to Trail 10 within the Pacific Crest pod.

Julie's Chair Pod

Under the Proposed Action, approximately 1.0 acres of full clearing with grading is proposed for construction of the proposed Julie's Chair chairlift. No terrain modification is proposed for trails associated with the proposed/realigned Julie's Chair pod. Additional terrain modification includes approximately 1.2 acres of reforestation adjacent to Trail 13 within the Julie's Chair pod.

Surface Lift II Pod

Under the Proposed Action, approximately 0.03 acre of full clearing with grading is proposed for construction of the proposed Surface Lift II surface lift. No terrain modification is proposed for trails within the proposed Surface Lift II pod.

Northside Pod

Under the Proposed Action, approximately 1.3 acres of full clearing with grading and 1.2 acres of full clearing with no grading is proposed for construction of the proposed Northside chairlift. No additional terrain modification is proposed for trails within the proposed Northside pod.

Baby Double Pod

Under the Proposed Action, approximately 1.1 acres of full clearing with grading and 3.8 acres of full clearing with no grading is proposed for construction of the proposed Baby Double chairlift and associated terrain. Additional terrain modification includes approximately 0.2 acre of reforestation adjacent to Trail 13B within the Baby Double pod.

3.3.2.2 Summit Central

Holiday Pod

Approximately 1.0 acres of full clearing with grading is proposed for construction of the proposed Holiday chairlift under The Proposed Action. Additional terrain modification includes approximately 1.8 acres of reforestation adjacent to Trails 43, 44, and 45 within the Holiday pod.

Triple 60 Pod

Under the Proposed Action, the proposed realignment of the Triple 60 chairlift would provide access to Trail 41. No additional terrain modification is proposed for trails within the proposed/realigned Triple 60 pod. Approximately 1.6 acres of reforestation is proposed adjacent to Trails 33 and 40 within the Triple 60 pod.

Ski School Pod

Approximately 1.0 acres of full clearing with grading is proposed for construction of the Ski School chairlift that is proposed under the Proposed Action. No terrain modification or trail clearing is proposed for trails within the proposed/realigned Ski School pod. Approximately 1.2 acres of reforestation is proposed adjacent to Trails 34 and 46 within the Ski School pod.

Central Express Pod

Under the Proposed Action, approximately 6.7 acres of full clearing with grading is proposed along Trail 26 within the existing Central Express pod. In addition, approximately 6.4 acres of reforestation is proposed adjacent to Trails 30 and 31.

Silver Fir Pod

As under the existing condition the proposed upper terminal of the Silver Fir chairlift would provide access to the existing Trail 49 (Central-to-East Crossover). A trestle will be constructed on existing Trail 49 (Central to East Crossover) to cross an existing stream and will reduce the effect of the gully on skiers and snowboarders who must negotiate an uphill slope in the area on the way to Summit East from Summit Central.

Under the Proposed Action, approximately 0.7 acre of full clearing with no grading is proposed where Trails 23, 24, and 25 merge. In addition, approximately 0.7 acre of full clearing with grading is proposed below the merge area, adjacent to Trail 18A in order to reduce undulations in the existing terrain.

Approximately 1.1 acres of full clearing with no grading is proposed between the Silver Fir and Central Express pods in order to create an opening that would connect the two pods. Under the Proposed Action, Trail 19 would begin at the upper terminal of the Silver Fir chairlift, descend into the Central Express pod, and wind back around (utilizing the proposed opening) into the Silver Fir pod.

3.3.2.3 Summit East

Mill Creek Pod

Approximately 1.0 acres of full clearing with grading is proposed for construction of the Mill Creek chairlift under the Proposed Action. Four new trails would be cleared within the Mill Creek pod. Trails 52A, 52B, 52C, and 52D would include approximately 2.8 acres of full clearing with grading and 8.9 acres of full clearing with no grading. Proposed trails would be constructed to an average width of approximately 130 feet.

East to Central Crossover Trail (Trail 71)

Proposed Trail 71 (East to Central Crossover) would originate at the beginning of existing Trail 63. Two wood/steel bridges would be constructed to allow proposed Trail 71 to cross Stream A and Hyak Creek. The proposed bridge over Stream A would be approximately 15 feet wide by approximately 115 feet long. The bridge over Hyak Creek would be approximately 25 feet wide by 75 feet long. Ski Lifts, Inc. proposes to construct a snow bridge each year in order to allow Trail 71 to cross an additional stream south of the proposed Hyak Creek crossing.

Rampart Pod

Proposed trails within the *Rampart* pod would utilize existing openings where possible. Approximately 1.4 acres of full clearing with no grading and 0.4 acre of full clearing with grading would be necessary to construct the upper terminal of the chairlift and provide appropriate egress area to the 5 trails accessed via the proposed *Rampart* chairlift. In addition, proposed Trails 60 and 61 would have reduced trail widths (90-120 feet) and would require approximately 2.9 acres of full clearing with grading and 7.6 acres of full clearing with no grading to extend existing Trails 60 and 61 to the proposed lower terminal of the *Rampart* chairlift. Under the Proposed Action, approximately 1.7 acres of reforestation would occur within the *Rampart* pod.

Mt. Hyak

Proposed reforestation would modify the trail layout of trails accessed from the existing Mt. Hyak chairlift. (2.0 acres)

3.3.2.4 Alpental

Armstrong Express Pod

Under the Proposed Action, approximately 2.8 acres of grading and 0.4 acre of blasting is proposed along Trails 3 and 7 (existing ski trails) within the Armstrong Express pod to smooth undulations in the existing terrain.

Edelweiss Pod

No terrain modification or trail clearing in the Edelweiss pod is proposed under the Proposed Action.

Internationale Pod

Under the Proposed Action, a portion of Trail 20 would be widened. At approximate elevation 4,200 feet, an existing 15 foot wide opening through rock and vegetation would be blasted to approximately 30 feet wide.

Sessel Pod

Under the Proposed Action, a 45 foot wide opening would be cleared between Trails 21 and 16. The new trail would be labeled Trail 21A. Approximately 0.3 acre of full clearing with no grading would be required to create this clearing (proposed Trail 21A).

St. Bernard Pod

Under the Proposed Action, the realignment and extension of the St. Bernard chair lift would include no proposed terrain modifications or trail changes except for lift towers and terminals.

3.3.3 Night Skiing Expansion

The night skiing terrain at The Summit under the Proposed Action would include lighting 22 new trails on approximately 140 acres of additional terrain. Under Proposed Action at The Summit, night skiing would be expanded to include all the runs in the Mill Creek, Silver Fir, and Easy Street pods. The *Rampart* pod would include existing night lighting (at Summit East) and expanded night terrain near the bottom of the *Rampart* lift. All new night lighting installation would include low-glare, directional lights (see Section 6 – Conservation Measures).

At Alpental, night skiing would be expanded to include the runs along the northern edge of the Internationale pod, lighting 3 new trails on approximately 17 acres.

3.3.4 New Facilities and Existing Facility Upgrades

3.3.4.1 Guest Service Facilities

Under the Proposed Action, The Summit would increase the size of guest service facilities from the existing 97,566 square feet to 174,720 square feet and this would correspond with the proposed increase in mountain capacity, with restaurant seating increasing from 1,386 to 4,234.

At Alpental, the size of guest services would increase from the existing 20,688 square feet to 34,688, and the restaurant seating would remain at 528.

Proposed development would include construction of a guest services building at Alpental, expansion of existing base area facilities at Summit West, construction of a new base lodge at Summit Central, expansion of the existing facilities at Silver Fir, creation of a mountain-top restaurant at Summit East, and renovation to several out-buildings, primarily ski school buildings. The new guest support facilities would be designed and sited to relieve base area congestion and to spread guests throughout the resort.

3.3.4.2 Alpental

Approximately 14,000 square feet of guest service facilities would be constructed at Alpental under the Proposed Action. The proposed 14,000-square foot visitor service building would be constructed in Alpental's base area in a previously undeveloped area. The building would be constructed adjacent to the existing bottom terminal of the Armstrong Express chairlift and would house arrival services such as ticketing, ski school sales, retail, lockers, and public lockers.

3.3.4.3 Summit West

The Proposed Action includes expansion of the existing Slide-In Lodge, including its consolidation with the existing Alpenhaus Lodge. Consolidation of the two lodges would include construction of approximately 42,390 square feet of guest service space (food and beverage) between the two existing lodges. The existing Slide-In Lodge would be expanded to the east by approximately 1,500 square feet. In all, expansion of existing base area facilities at Summit West (including the Alpenhaus and Slide-In Lodges) would create approximately 15,740 square feet of additional guest service space.

Also under the Proposed Action, the existing Thunderbird Lodge would be renovated to include approximately 70 restaurant seats. The proposed renovation would be completed on the existing foundation and footprint.

3.3.4.4 Summit Central

Under the Proposed Action, the existing Central Base Lodge and rental shop/learning center would be removed and a new 60,000-square foot facility would be constructed. The proposed Summit Central Base Lodge would be constructed downslope from the existing day lodge and would include approximately 1,700 restaurant seats.

Under the Proposed Action, the guest services previously provided at the Central Base Lodge and rental shop/learning center would be consolidated in this proposed facility. In addition, the existing Mohan, Skico, and Skibacs ski schools as well as the existing base lodge would be

removed. The Summit-at-Snoqualmie does not propose any relocation of these facilities or creation of new facilities in their absence.

Silver Fir

Under the Proposed Action, the Silver Fir Base Lodge would be expanded from 4,618 square feet to approximately 19,818 square feet.

3.3.4.5 Summit East

The proposed mountain-top restaurant at Summit East would be constructed adjacent to the upper terminal of the Mt. Hyak chairlift. The 5,000-square foot facility would provide 250 restaurant seats.

Table 3-3 provides a summary of the proposed building sizes and footprints, as well as restaurant seating and capacities under the Proposed Action. Guest services would be consolidated with Summit Central.

Table 3-3
The Summit-at-Snoqualmie Guest Services Under The Proposed Action

Facility Name	Location	Building Size (square feet)	Building Footprint (square feet)	Restaurant Seats	Status
Alpenhaus/Slide in Lodge	Summit	42,390	15,740	0	Renovated
Thunderbird Lodge	Summit	34,300	3,400	70	Renovated
Summit Central Base Lodge	Summit	60,000	30,000	1,700	Proposed
Silver Fir Base Lodge	Summit	19,818	10,000	440	Renovated
Mountain Top Restaurant	Summit	5,000	3,800	250	Proposed
Visitor Service Building	Alpental	14,000	3,500	0	Renovated
Total		175,508	**66,440**		

Source: The Summit-at-Snoqualmie management, SE Group

3.3.4.6 Maintenance Facilities

Under the Proposed Action, the existing maintenance facility at Alpental would be replaced by a 2,400-square foot facility to provide for approximately 1,000 additional square feet. The proposed facility would be constructed alongside the existing maintenance road across from the proposed fuel storage tanks, approximately 800 feet north of Alpental Road.

Under the Proposed Action, a 12,000-square foot facility would be constructed adjacent to the existing maintenance facility at Summit West. The existing maintenance facility at Summit

Central would remain but the existing maintenance office at Summit Central (adjacent to the existing bottom terminal of the Gallery chairlift) would be removed.

Table 3-4 provides a summary of maintenance facilities under the Proposed Action.

Table 3-4
The Summit-at-Snoqualmie Maintenance Facilities Under the Proposed Action

Maintenance Building	Square Feet
Alpental	
Electrical Facility	319
Lift Maintenance Facility	600
Maintenance Facility	2,400
Storage Shed	363
Subtotal	**3,682**
The Summit	
Summit West Maintenance Facility	6,000
Summit West Maintenance Facility	12,000
Summit West Storage Sheds (combined)	1,690
Summit Central Storage Sheds (combined)	1,437
Subtotal	**21,127**
Total	**24,809**

3.3.4.7 Ski Patrol and First Aid

Under the Proposed Action, ski patrol would operate out of 13 duty stations/first aid facilities, totaling 7,449 square feet. At Alpental, the existing Edelweiss Duty Station would remain and and a new 500 square foot station would be constructed at the top terminal of the proposed Internationale lift. The existing ski patrol bump station at the upper terminal of the Armstrong Express chairlift would be renovated to a 375-square foot facility as well. These new stations would increase ski patrol/first aid space at Alpental from 1,516 square feet to 1,935 square feet. The Summit would increase ski patrol/first aid space from approximately 4,527 square feet to approximately 5,514 square feet. The increase in ski patrol/first aid space would be accomplished through the renovation and/or removal of existing facilities as well as construction of new facilities. In total, The Summit-at-Snoqualmie would renovate two existing duty stations, expand two existing stations, remove three existing stations, and construct three proposed duty stations.

Table 3-5 provides a summary of The Summit-at-Snoqualmie's proposed ski patrol duty stations under the Proposed Action.

Table 3-5
The Summit-at-Snoqualmie Ski Patrol Duty Stations Under the Proposed Action

Duty Station	Size (square feet)	Location	Status
Alpental			
Armstrong Express Bump Shack	375	Adjacent to Armstrong Express	Proposed
Edelweiss Duty Station	630	Upper Terminal of Edelweiss Lift	Existing
Internationale Duty Station	500	Upper Terminal of Internationale Lift	Proposed
Alpental First Aid Station	430	Denny Mountain Lodge	Renovated
Subtotal	**1,935**		
The Summit			
Pacific Crest Duty Station	500	Upper Terminal of Pacific Crest Lift	Expanded
Summit West Duty Station	500	Adjacent to upper terminal of Wildside chairlift	Existing
Summit West First Aid Facility	1,406	Base Area of Summit West	Existing
Central Express Duty Station	56	Upper Terminal of Central Express Lift	Existing
Summit Nordic Center First Aid Facility	600	Silver Fir Base Area	Expanded
Summit Central First Aid Facility	1,402	First Floor Ski Patrol Building in Summit Central	Renovated
Summit East Duty Station	500	Upper Terminal of Mt. Hyak Lift	Proposed
Summit East First Aid Facility	550	Base Area of Summit East	Existing
Subtotal	**5,514**		
Total	**7,449**		

Source: SE Group

3.3.5 Utilities

As proposed, all utilities at The Summit-at-Snoqualmie would be installed subsurface, with the exception of communication lines along chairlifts and those previously discussed. Domestic Water and Wastewater Treatment Facilities, utility lines (i.e., water, sewer, power, communication) would be grouped in the same trench, where possible, or in parallel trenches where required (e.g., vertical/horizontal spacing is required for sewer/water lines).

3.3.5.1 Power

Alpental

The proposed Internationale, St. Bernard, and Sessel chairlifts would be equipped with bottom drive terminals. These lift installations would include underground power line extensions from the existing network of power lines.

Power and communication lines would be extended to the proposed bump shack at the upper terminal of the Armstrong Express chairlift. The proposed visitor services building would require power line extensions from the existing network of power lines. Utility lines would be installed subsurface and would be grouped in the same trench, where possible, or in parallel trenches where required (e.g., vertical/horizontal spacing is required for sewer/water lines).

Summit West

The proposed Surface Lift I and II, Baby Double, Northside, Julie's Chair, Little Thunder, Dodge Ridge, and Wildside chairlifts would be equipped with bottom drive terminals. These lift installations would include underground power line extensions from the existing network of power lines.

Power would be supplied to the proposed maintenance facility as discussed for water and sewer utility lines. Utility lines would be installed subsurface along the existing road from the maintenance lot parking area and would be grouped in the same trench, where possible, or in parallel trenches where required (e.g., vertical/horizontal spacing is required for sewer/water lines.

Summit Central

The proposed Holiday, Triple 60, Ski School, and Silver Fir chairlifts would be equipped with bottom drive terminals. These lift installations would include underground power line extensions from the existing network of power lines.

Power would be supplied to the Silver Fir base area from the existing network of power lines. Utility lines would be installed subsurface, as previously discussed for Alpental under Domestic Water Supply and Storage.

Summit East

The proposed Mill Creek chairlift would be equipped with a bottom drive terminal. The lift installations would include underground power line extensions from the existing network of power lines.

The proposed *Rampart* chairlift would be equipped with bottom drive terminals. These lift installations would include underground power line extensions from the existing network of power lines. Utilities would be installed within the proposed road leading to the bottom terminal of *Rampart* chairlift.

Power would be supplied to the proposed mountain-top restaurant as discussed for water and sewer utility lines. Utility lines would be installed subsurface and would be grouped in the same trench, where possible, or in parallel trenches where required (e.g., vertical/horizontal spacing is required for sewer/water lines).

3.3.5.2 Propane

Under the Proposed Action five additional 10-gallon propane tanks would be utilized, located at the upper terminals of the proposed Internationale, Northside, and *Rampart* chairlifts, as well as the proposed ski patrol bump shack at the upper terminal of the Armstrong Express chairlift.

3.3.5.3 Communications

Under the Proposed Action, communications would continue to be provided via telephone service connecting all base area and on-mountain facilities. The addition of communications lines along proposed or upgraded chairlifts would include aerial installation. All other proposed communication lines would be buried in a common trench.

3.3.5.4 Petroleum Fuel

Under the Proposed Action, Alpental's existing aboveground fuel storage tank, comprised of two tanks (500-gallon gasoline and 1,500-gallon diesel), would be relocated alongside the existing maintenance road, across from the proposed maintenance facility.

3.3.6 Roads

The following changes to the existing road network would occur under the Proposed Action:

- Construction of approximately 500 feet of permanent road (native surface) leading from the existing upper terminal of the *Pacific Crest* chairlift to the proposed upper terminal of the *Northside* chairlift.
- Construction of approximately 600 feet of permanent road (native surface) would provide access from an existing road to the proposed upper terminal of the *Rampart* chairlift. Another 405 feet of permanent road (native surface) would be constructed to provide access from existing road to the bottom terminal of the proposed *Rampart* chairlift.
- Existing Road M-5 (approximately 1,560 feet - native surface) would be abandoned and revegetated.
- Alpental Road from the Alpental base area at Parking Lot 3 to Parking Lot 6 would be paved.

See Table 3-6 below for a summary of The Summit-at-Snoqualmie's road network under the Proposed Action.

Table 3-6
The Summit-at-Snoqualmie Road Network Under the Proposed Action

Category	Proposed Action
Proposed Roads (miles)	0.23
Existing Roads to be Removed/Restored (miles)	0.56
Road Length by Surface Type (miles)	
Paved	1.9
Native	16.2
Total Road Network (miles)	**18.1**

Source: SE Group and Jones & Stokes

3.3.7 Parking

Under the Proposed Action, The Summit-at-Snoqualmie would provide approximately 57.2 acres of parking at 23 parking lots and along State Route 906 at Summit West, Parking lots on NFSL, which include Alpental lots 3, 4, 5, 6, and 7, Summit West lots 1, 2, and the maintenance shop lot area, and approximately half of Silver Fir lot 1 (the portion located on NFSL) would be paved under The Proposed Action.

Stormwater management for the paved parking lots would include oil/water separators, the use of a magnesium chloride deicer instead of sand, and sediment detention areas.

- Parking Lot 1 at Summit West would be regraded and paved to provide an additional 2.8 acres of parking space. Stormwater retention would be installed subsurface.
- Parking Lot 2 at Summit West would be paved and would include stormwater management.
- Parking Lot 1 at Silver Fir would be paved and would include stormwater management.
- Parking Lot 2 at Silver Fir would be expanded from 1.4 acres to approximately 3.6 acres.
- Parking Lot 3 at Silver Fir would be expanded from 0.6 acre to approximately 1.3 acres.
- Parking Lot 4 at Silver Fir would be constructed approximately 200 feet north of the existing Parking Lot 3 and would provide approximately 4.7 acres of additional parking, particularly for tubing.
- Parking Lots 3, 4, 5, 6, and 7 at Alpental would be paved and would include stormwater management.

Parking for the Proposed Action is summarized below in Table 3-7.

Table 3-7
The Summit-at-Snoqualmie Parking Lots Under the Proposed Action

Parking Lot	Status	Area (acres)	Cars per Acre	Total Car Capacity	Total Capacity (people)
Alpental					
Lot 1	Existing	0.8	104	83	183
Lot 2	Existing	1.9	155	295	649
Lot 3[a]	Proposed	0.9	72	65	143
Lot 4[a]	Proposed	0.6	133	80	176
Lot 5[a]	Proposed	0.9	90	81	178
Lot 6[a]	Proposed	2.5	121	303	667
Lot 7[a]	Proposed	0.2	125	25	55
Subtotal		**7.8**		**932**	**2051**
The Summit					
Summit West Lot 1[b]	Proposed	8.0	118	944	2,077
Summit West Lot 2[a]	Proposed	4.3	99	426	937
First Western	Existing	1.8	105	190	418
SR 906	Existing	2.3	130	300	660
Summit Central Lot 1	Existing	10.9	147	1,606	3,533
Summit Central Lot 2	Existing	4.2	96	405	891
Silver Fir Lot 1[a]	Proposed	2.7	109	295	649
Silver Fir Lot 2[c]	Proposed	3.6	118	425	935
Silver Fir Lot 3[c]	Proposed	1.3	132	172	378
Silver Fir Lot 4[d]	Proposed	4.8	118	566	1,245
Summit East Lot 1	Existing	1.8	83	150	330
Summit East Lot 2	Existing	2.6	75	195	429
Summit East Lot 3	Existing	1.1	105	115	253
Subtotal		**49.4**		**5789**	**12735**
Total		**57.2**		**6,721**	**14,786**

Source: The Summit-at-Snoqualmie management, SE Group GIS DATA 5/27/04
a – Proposed paving of the existing parking lot and installation of stormwater facilities.
b – Proposed expansion of existing parking lot, paving and installation of stormwater facilities.
c – Proposed expansion of existing parking.
d – Proposed new parking lot.

In total, The Summit-at-Snoqualmie would provide parking capacity for approximately 14,786 people at one time.

3.3.8 Restoration

Under the Proposed Action, The Summit-at-Snoqualmie would implement portions of the Watershed Condition Assessment Report (Jones & Stokes Associates, 2001) in order to restore disturbed areas and maintain or improve the health of the aquatic and riparian ecosystems within the Upper South Fork Snoqualmie and Coal Creek watersheds. Specific watershed restoration projects would include the following:

- H-2 – Slope stabilization adjacent to Road M-5 at Summit East (work would be performed in conjunction with the deactivation of Road M-5).
- H-10 – Slope stabilization adjacent to Roads TR-17, TR-17-1, TR-17-3 and TR-17-4 at Summit East.
- K-6 – Slope stabilization along roads nears the bottom terminal of the *Silver Fir* chairlift at Summit Central.
- S-46 – Slope stabilization adjacent to Road C near Beaver Lake at Summit West.
- K-46 – Slope stabilization at Summit Central near the upper terminal of the *Central Express* chairlift.

In addition to the projects identified above, The Summit-at-Snoqualmie would also implement the following restoration actions under the Proposed Action:

- Deactivate and restore two road segments (Road M-5 at Summit East and Road C at Summit West).
- Develop tree islands with Pacific Silver Fir saplings on previously cleared slopes at Summit East, Summit Central, and Summit West.
- Remove existing lift terminals, lift towers and lift structures, according to the MDP. Revegetate previously disturbed areas.
- Restore stream channel and associated riparian area near the existing tubing center.
- Remove culverted segment and restore associated riparian area along Beaver Lake Creek at Summit West.
- Restore Wetlands 207 (Summit West) and 142 (Summit Central). Restoration would be performed in conjunction with planting of tree islands.
- Implement the Stormwater Management Plan to address water quality and quantity issues resulting from operations of native surface parking lots and sanding for traction.

- In conjunction with proposed *Trail 71*, the existing East-to-Central Crossover trail would be abandoned and revegetated (see Figure 2). Approximately 2.3 acres of the existing East-to-Central Crossover trail would be reforested. A 12-inch tread width would remain for mountain bike use during the summer months.
- Reforest an additional 0.98 acre within Section 16 at Summit East as a result of the trail modification (East to Central Crossover)

These restoration projects would be closely linked to proposed development projects. Detailed discussion of these restoration projects proposed under the Proposed Action can be found in Section 5.1 of The Summit-at-Snoqualmie MDP – Implementation, Operation, Restoration and Monitoring Plan (FEIS Appendix F) and the Draft Conceptual Stormwater Management Plan (FEIS Appendix G).

The Summit-at-Snoqualmie MDP – Implementation, Operation, Restoration and Monitoring Plan identifies and elaborates on potential restoration opportunities and provides monitoring guidelines to ensure that restoration projects would be implemented under USFS review, throughout the life of the approved MDP. The plan would provide guidance for the construction and operations of roads, utilities, ski area facilities, and stream crossing culverts. It would also be used to determine the success of restoration projects, BMPs, and other mitigation that would be implemented during the construction of various MDP components. In conjunction with the Draft Conceptual Stormwater Management Plan, The Summit-at-Snoqualmie MDP – Implementation, Operation, Restoration and Monitoring Plan would aid in assessing the cumulative effects of the MDP as well as other human-induced and natural disturbances within the Upper South Fork Snoqualmie and Coal Creek watersheds. Accordingly, USFS approval to begin project development of MDP projects would consider the success of previous restoration and mitigation projects, as determined through the monitoring program.

3.4 Project Phasing Schedule

Under the proposed action The Summit-at-Snoqualmie would propose projects a phased approach, based upon the schedule shown in Table 3-8. Each phase represents 3 to 4 years of construction projects. The actual approval of projects on an annual basis would hinge upon review by the USFS or appropriate specialists and approval by the authorized officer, commensurate with the success of mitigation measures as determined by monitoring (see Section 6.0–Conservation Measures).

Table 3-8
MDP Phasing

Master Plan Component	Phase of Implementation
Lift and Trails	
Sessel (C-4)	2
St. Bernard (C-2)	2
Internationale (C-4)	2
Edelweiss (C-2)	2
Triple 60 (DC-4)	3
Holiday (C-4)	3
Wildside (C-4)	2
Dodge Ridge (C-4)	2
Julie's (C-4)	2
Surf. Lift I – Summit West (S)	1
Surf. Lift II – Summit West (S)	2
Lil' Thunder (C-4)	2
Silver Fir (DC-4)	1
Mill Creek (C-2)	1
Ski School (C-4)	2
Rampart (C-4)	1
Northside – (C-2)	3
Support Facilities	
East Mt. Top Restaurant	2
Silver Fir Lodge	2
Central Lodge	3
T-Bird Lodge	3
Maintenance Shop West	3
Alpenhaus / Slide In Exp.	3
Alpental Maintenance Shop	2
Guest Services Alpental	3

Table 3-8
MDP Phasing

Master Plan Component	Phase of Implementation
Parking (build, pave, stormwater)	
New West Lot Expansion & Paving	1
Central Lot Expansion	1
Alpental Lot Paving	2
Existing West Lot Paving	3
Existing Central Lot Paving	3
Silver Fir Lot Paving	1
Revegetation	
East Crossover Revegetation	1

3.5 Land Donation

Under the Proposed Action, Ski Lifts, Inc. would donate 390 acres of private land to the Federal Government for inclusion in the OWNF, allocated to Adaptive Management Area (as the donated acres are surrounded by SPAMA). The land donation would include lands within Section 21, T. 22 N., R.11 E. and would be managed for Late-Successional Habitat (LSH).2 No development in Section 16 would occur until the land has been transferred to Federal Government ownership.

3.6 Forest Plan Amendment

The Proposed Action includes a non-significant Forest Plan amendment, which would add a total of 17.01 acres to the SUP area, including Hyak Creek and the cross-country hut at Grand Junction (approximately 500 feet west of Hyak Lake, occupying roughly 0.01 acre). The adjustment would incorporate Hyak Creek into the SUP area and provide for use of existing Trail 49, as well as construction and use of the proposed Trail 71 between Summit East and Summit Central. The proposed Forest Plan amendment also includes reallocating a total of 397.01 acres of OWNF lands from AMA (ST-1 - Scenic Travel) to AMA (RE-1 - Developed Recreation) to be more consistent with the existing/proposed use of the land. These lands include 380 acres in the existing SUP area, 17 acres in the SUP area adjustment, and 0.01 acre at the existing cross-country warming hut.

[2] This land donation would be acceptable to the US Government despite the fact that the mineral rights would not be transferred to the US. In a March 10, 2005 letter to Kimberly Bown, Director of Lands in Forest Service Region 6, Gregory Smith, Acting Director of Lands for the Forest Service Washington Office, indicated that outstanding interests (i.e., not owning the mineral rights) would not interfere with the purpose for which the land would be contributed to the Department of Agriculture (i.e., preservation of connectivity for old growth dependent species).

The amendment would be considered a non-significant Forest Plan amendment under NFMA on the basis of Criteria outlined in FSM 1922.51 – Changes to the Forest Plan That are Not Significant. Changes to the forest plan that are not significant can result from:

- Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management;
- Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management; and
- Minor changes in standards and guidelines.
- Opportunities for additional management practices that will contribute to achievement of the management prescription.

Within the existing SUP area, 380 acres of WNF lands are allocated to AMA (ST-1), which is not consistent with their inclusion in the ski area SUP boundary and the presence/operation of ski area facilities within them. Presently, the Silver Fir chairlift and trails, Summit East-Summit Central crossover trails, and roads are located on this portion of the SUP area. Therefore, designation of this area as RE-1 would be the most consistent with its use and its presence within the SUP area. The Plan amendment would place the land in the appropriate management prescription for ski areas and would not significantly alter the multiple-use goals and objectives for long-term land and resource management (FSM 1922.51-1). The Plan amendment would not result in a change in standards and guidelines.

4.0 CONSTRUCTION TECHNIQUES

The majority of effects to wildlife would be related to clearing and/or grading for the development of ski trails, lifts, roads, and support facilities. Assumptions on the amount of clearing that would occur for specific activities proposed in the Action Alternatives are shown in Table 4-1 (for analysis purposes, clearing and/or grading extents should be considered worst-case; actual clearing would not exceed the stated limit and may be less).

Table 4-1
The Summit-at-Snoqualmie MDP - Clearing Assumptions

MDP Component	Clearing Requirement[a]
Lifts	
Alignment Clearing	60-foot corridor
Terminal Ground Disturbance	0.5 acre
Tower Ground Disturbance	100 square feet
Roads	
Tread Width	16 feet
Ground Disturbance Width[b]	34 feet
Utility Lines[c]	
Water Lines	15-foot corridor
Wastewater Lines	50-foot corridor
Powerlines	15-foot corridor
Communications Lines	15-foot corridor
Propane Lines	15-foot corridor
Other Facilities[d]	
Buildings	50-foot corridor
Parking Lots	30-foot corridor

a - Limits of disturbance established for proposed development components, and analyzed in Chapter 4 using GIS.
b - Worst case estimate of clearing, grading, machinery operation, storage of spoils, etc.
c - Underground utilities would be grouped and/or placed in existing roads and ski trails to the maximum extent practicable.
d - The clearing requirements represent an assumed disturbance area surrounding the facility footprint.

4.1 Trail Construction

A detailed breakdown of the location and extent of clearing and/or grading is provided in the Section 3.3 – Proposed Action. Trail construction techniques include:

Full Clearing with Grading - All trees, shrubs, and herbaceous vegetation would be removed within the construction limits, stumps would be removed, and the surface would be graded and

revegetated, where appropriate (see Illustration A). Grading would occur at all locations where structures are proposed (e.g., lift towers, buildings) and along key trails where a smooth surface is necessary. Grading may include the use of explosives for the removal of bedrock or large boulders, or the use of heavy equipment (e.g., excavators, bulldozers, etc.) for earthmoving. The method of tree removal/disposal would be determined on a case-by-case basis and would include removal by lop and scatter, skidders (yarding over snow, where possible), and/or helicopter.

Full Clearing with No Grading - All trees and shrub/herbaceous vegetation would be removed within the construction limits (see Illustration B). Trees would be cut flush to the ground and stumps would not be removed. The surface would not be graded. The method of tree removal would be determined on a case-by-case basis and would include removal by lop and scatter, skidders (yarding over snow), and/or helicopter. Any soil disturbed would be restored by either excavator or hand.

Glading - Glading would involve the selective removal of trees within the ski trail boundary to connect natural openings. In areas where existing tree canopy closure is greater than 70 percent, clearing would not reduce the resulting canopy cover to less than 70 percent. Where existing canopy cover is less than 70 percent (prior to clearing), no canopy clearing would occur. Trees would be cut flush to the ground and stumps would not be removed. The ground surface would not be graded and the natural ground cover would be maintained. Tree removal in sparsely vegetated area (e.g., subalpine parkland) would be left in place and lopped and scattered. In densely vegetated stands, skidders or helicopters would be used for tree removal. Disturbance to the topsoil would be restored either with an excavator or by hand.

Blasting – Blasting would involve the use of explosives to remove or fragment bedrock, rock outcrops and/or large boulders from ski slopes. All vegetation and soil would be removed. Resulting debris would be scattered onsite or hauled to an approved location. Blasting would only occur under the direct supervision and permission of USFS personnel.

Illustration A
Typical Full Clearing Treatment With Grading

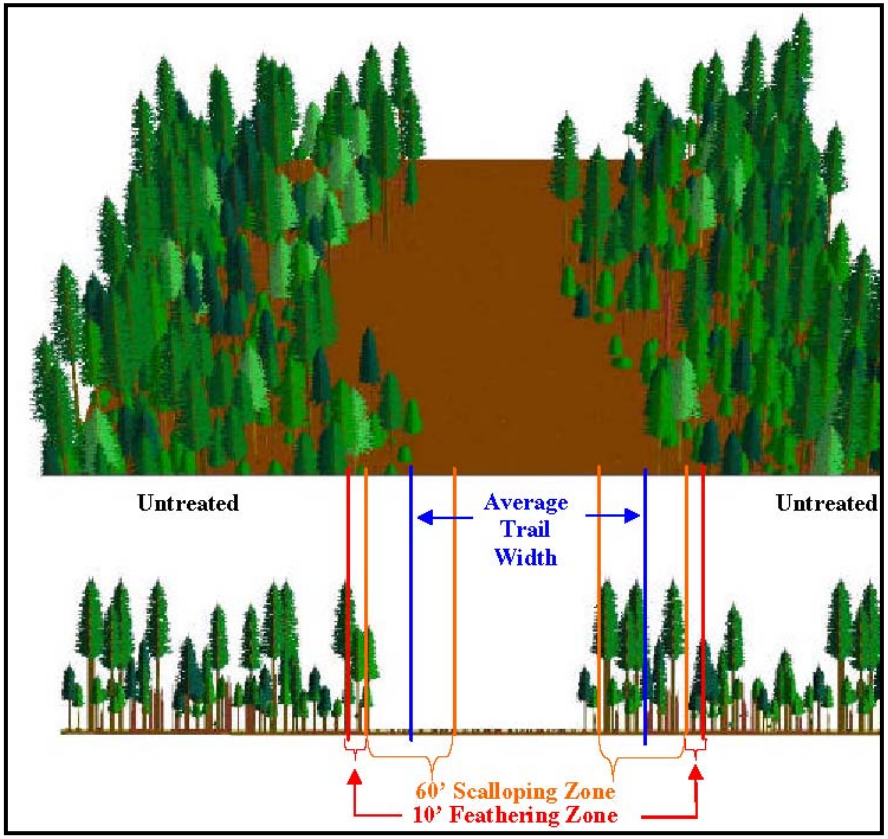
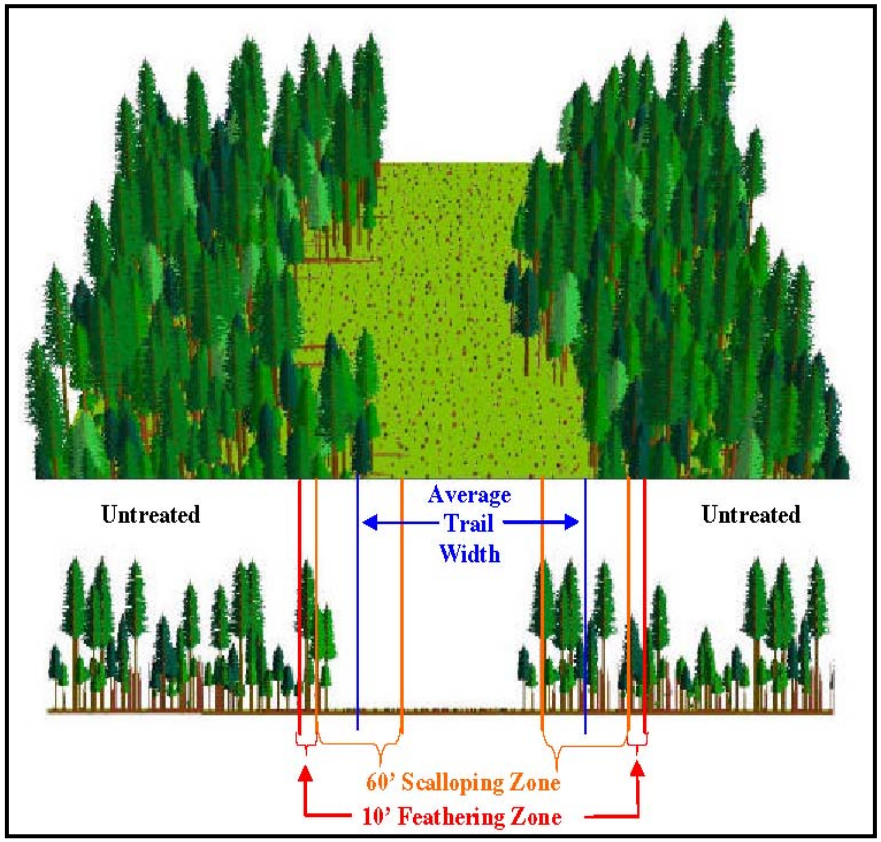


Illustration B
Typical Full Clearing Treatment – No Grading



In addition to the clearing prescriptions outlined above, ski trail clearing would include edge treatments that are intended to reduce the visual effects of trail clearing and to enhance the skiing opportunities along the trail edge. These prescriptions include:

- **Forest Edge Scalloping:** Flagging a separate, limit of clearing boundary outside of the flagged new trail edge so the boundary is non-linear to reduce visual impacts associated with straight trail edges. The limit of clearing boundary would resemble an irregular sine wave that is outside of, but adjacent to the flagged trail edge. The flagged limit of clearing boundary would not exceed a maximum distance of 30 feet from the original flagged trail edge.
- **Forest Edge Feathering:** Selectively removing trees along the flagged limit of clearing boundary where appropriate, so that a hard line in the new trail-to-forest transition is not evident. The area to be thinned for forest edge feathering would be approximately 10 feet wide. Trees would be selectively removed starting at the flagged limit of clearing boundary, so that the tree density gets progressively lower as you move towards the new trail within the 10 foot feathering area.

4.2 Lift Construction

Standard construction techniques would be used for erecting lift terminal structures, with existing maintenance roads providing vehicular access to the drive terminal, unless indicated otherwise. Construction for each terminal would involve 0.5 acre area of full clearing with grading, which includes the actual terminal site and the clearing assumption described in Table 4-1. Spoils from terminal excavation would be hauled off-site by hand or helicopter if not needed for contouring. Clearing of trees and vegetation would be completed using trackhoe and dozer equipment. Lift tower footings would be excavated by hand or by excavators, where accessible, without additional road construction (unless otherwise noted in the following sections). Concrete for footings and lift towers would be flown in by helicopter in situations where it could not be transported on the ground. Standard and site-specific BMPs and mitigation measures would be implemented to provide erosion control. Table 4-2 describes construction techniques for each lift.

Table 4-2
Lift Construction Techniques

Ski Lifts	Lift Terminals	Lift Alignment and Trails
Alpental -Sessel, St. Bernard	• Constructed on-site. • Grading for lift terminals would be limited by maximum disturbance limits (see Table 4-1). • Excavation for lift terminals would be done by machine. Equipment would access the site via existing roads and ski trails where possible.	• Towers would be constructed off-site and airlifted in. • Merchantable trees would be felled by hand and removed by mechanical methods where possible. Skidding over snow would occur where mechanical removal (processor/forwarder) is not practical. Non-merchantable trees would be lopped and scattered. Excess slash would be chipped, scattered, or burned in accordance with USFS guidance. • If lift tower placement in wetlands cannot be avoided, placement would include hand excavation and placement of spoils outside wetlands. Other lift tower footings would excavated by a trackhoe or spider backhoe.
Internationale	• Constructed on-site. • Grading for lift terminals would be limited by maximum disturbance limits (see Table 4-1). • Excavation for lift terminals would be done by machine. Equipment would access the site via existing roads and ski trails where possible, or by helicopter where no roads or ski trails are accessible.	• Towers constructed off-site and airlifted in. • Clearing for the lift line would be required. Merchantable trees would be felled by hand and removed by mechanical methods where possible. Skidding over snow would occur where mechanical removal (processor/forwarder) is not practical. Non-merchantable trees would be lopped and scattered. Excess slash would be chipped, scattered, or burned in accordance with USFS guidance. • Blasting of rocks would occur at approximately 4,200 feet elevation to widen a proposed ski trail. • Lift tower footings would excavated by a trackhoe or spider backhoe.

Table 4-2
Lift Construction Techniques

Ski Lifts	Lift Terminals	Lift Alignment and Trails
Summit West - all lifts	• Constructed on-site. • Grading for lift terminals would be limited by maximum disturbance limits (see Table 4-1). • Excavation for lift terminals would be done by machine. Equipment would access the site via existing roads and ski trails where possible.	• Towers constructed off-site and airlifted in. • Merchantable trees would be felled by hand and removed by mechanical methods where possible. Skidding over snow would occur where mechanical removal (processor/forwarder) is not practical. Non-merchantable trees would be lopped and scattered. Excess slash would be chipped, scattered, or burned in accordance with USFS guidance. • Lift tower footings would excavated by a trackhoe or spider backhoe.
Summit Central - all lifts	• Constructed on-site. • Grading for lift terminals would be limited by maximum disturbance limits (see Table 4-1). • Excavation for lift terminals would be done by machine. Equipment would access the site via existing roads and ski trails where possible.	• Towers constructed off-site and airlifted in. • Trees would be removed by mechanical methods where possible. Skidding over snow would occur where mechanical removal (processor/forwarder) is not practical. Felled trees would be would be lopped and scattered. Excess slash would be chipped or scattered, or burned in accordance with USFS regulations. • Lift tower footings would excavated by a trackhoe or spider backhoe.
Summit East - Easy Gold - Mill Creek	• Constructed on-site. • Grading for lift terminals would be limited by maximum disturbance limits (see Table 4-1). • Excavation for lift terminals would be done by machine. Equipment would access the site via existing roads and ski trails where possible.	• Towers constructed off-site and airlifted in. • Merchantable trees would be felled by hand and removed by mechanical methods (i.e., processor forwarder operating on a slash bed). Non-merchantable trees would be lopped and scattered. Excess slash would be chipped, scattered, or burned in accordance with USFS guidance. • Lift tower footings would excavated by a trackhoe or spider backhoe.

Table 4-2
Lift Construction Techniques

Ski Lifts	Lift Terminals	Lift Alignment and Trails
- Rampart	• Constructed on-site. • Grading for lift terminals would be limited by maximum disturbance limits (see Table 4-1). • Excavation for lift terminals would be done by machine. Equipment would access the bottom terminal areas via existing roads. An excavator would access the construction site by ski trail (after leaving the road surface). No trucks or other vehicles would access the bottom terminal sites (i.e., no roads would be built). At the lower terminal, the nearby wetland area would be fenced off to prevent equipment access into the wetland. The top terminals would be accessed via existing roads (in the vicinity of the top terminal sites) and ski trails (access directly to the top terminal sites).	• Towers constructed off-site and airlifted in. • In cleared ski trails, merchantable trees would be felled by hand and removed by mechanical methods (i.e., processor forwarder operating on a slash bed). Skidding over snow would occur where mechanical removal is not practical. Non-merchantable trees would be lopped and scattered. Excess slash would be chipped, scattered, or burned in accordance with USFS guidance. • Lift tower footings would excavated by a trackhoe or spider backhoe.

4.3 Facility Construction

Standard construction techniques will be used for construction of buildings, parking lots and stormwater facilities. Parking lots will be graded using dozer equipment and paved where approved. Excavations for stormwater facilities and building foundations will be done with trackhoes. All spoils will be hauled offsite if not used for establishing final grades. Construction equipment will access constructions sites via I-90, SR 907, and existing ski area work roads.

Construction of the mountain-top lodges at Alpental and Summit East would be performed using standard construction techniques. Equipment will be brought to the site via existing work roads or flown in via helicopter. Excavation for the foundation will be completed by trackhoe. Spoils will be hauled offsite or by helicopter if not used for establishing final grades. Materials for the lodges will be delivered to the site via existing roads or via helicopter and assembled onsite.

Table 4-3
Summit-At-Snoqualmie Facility Construction

Facility	Construction Techniques
Visitor Service Building (Alpental)	Access to the construction area of the Visitor Service Building at Alpental would occur via existing roads that access the Alpental base area.
Summit East mountain-top restaurant	Construction access to the Summit East mountain-top restaurant would occur via existing roads at Summit East.
Summit Central Base Lodge	The Summit Central Base Lodge would utilize construction access via the existing roads at the base area of Summit Central.
Thunderbird Lodge renovation	Access for the Thunderbird Lodge renovation would occur via existing roads at Summit West.

4.4 Utility Crossings

For all proposed utility line corridors, ground surface conditions would be restored and revegetated. In vegetated areas (i.e., ski trails), utility line corridors would be revegetated as per Forest Plan best management practices/standards and guidelines. Utility corridors in roads and parking lots would not be revegetated.

Utility lines (power, water, communication) would be installed in a common trench within existing or proposed trails and roads to minimize overall disturbance. A trackhoe would be used to excavate the trench and spoils would be staged onsite to backfill the trench following utility installation.

5.0 SPECIES INFORMATION

5.1 Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl was listed as a threatened species by the USDI Fish and Wildlife Service (USFWS) in 1990 (55 FR 26194) and critical habitat was designated in 1991 (57 FR 1796). Declines in spotted owl populations are a result of extensive habitat loss associated with timber harvesting (Csuti et al., 2001; Gutierrez et. al., 1995).

5.1.1 Habitat Requirements and Ecology

There are two components of spotted owl habitat: habitat containing all the requirements for spotted owl nesting, roosting, and foraging activities (NRF habitat) and dispersal habitat. Dispersal habitat includes both habitat required for juveniles to disperse following fledging, and connective habitat between spotted owl subpopulations (57 FR 1798).

The majority of known spotted owl nesting, foraging and roosting sites are in mature and large-tree old-growth forest. Nests typically occur in dense, multi-layered stands with large diameter branches and high canopy closure but are occasionally found in sites lacking some of these characteristics. Roosting habitat typically consists of stands containing large-diameter trees with high canopy closure and multiple canopy layers. Important components of foraging habitat include complex structure (multiple canopy layers, LWM, etc.) and high canopy closure (57 FR 1798). Nesting, Roosting, and Foraging NRF habitat in the Central Washington Cascade Range is generally below 5,000 feet elevation (Hamer and Cummins, 1991; Personal Communication, Forbes, 2004). It is hypothesized that the owls do not nest above this elevation due to the persistence of snow during the nesting season that may make prey less available. Spotted owl dispersal habitat is more variable, and at a minimum must provide trees of adequate size and canopy closure to provide protection from predators and offer some foraging opportunity (57 FR 1798). The preferred prey species of spotted owls in the northwestern United States are flying squirrels, deer mice, and juvenile snowshoe hares.

In the Washington Cascades, the spotted owl nesting season is generally considered to begin on or around March 1 and end on or around August 31, with a critical nesting season during which the species is believed to be more sensitive to disturbance around the nest site occurring between March 1 and July 15. Spotted owl pairs do not nest every year, an average of 62% (range 16 - 89%) nest each year (Forsman et al., 1984 in Forsman, 2003).

In September 2004 a report was published by Sustainable Ecosystems Institute of Portland Oregon titled: Scientific Evaluation of the Status of the Northern Spotted Owl (Courtney et al., 2004). The report is a review and synthesis of information on the status of the northern spotted owl. The report was prepared to aid the US Fish and Wildlife Service in their 5-year status review process, as set out in the Endangered Species Act. The report did not make

recommendations on listing status, or on management, but focused on identifying the best available science, and the most appropriate interpretations of that science. The focus is on new information developed since the time of listing in 1990. The report relied on demography studies summarized in a report titled: Status and Trends in Demography of Northern Spotted Owls, 1985–2003 (Anthony et al., 2004). The following excerpt is from the executive summary of the SEI report:

Central to understanding the status of the subspecies is an evaluation of its taxonomic status. The panel is unanimous in finding that the Northern Spotted Owl is a distinct subspecies, well differentiated from other subspecies of Spotted Owls.

The panel did not identify any genetic issues that were currently significant threats to Northern Spotted Owls, with the possible exception that the small Canadian population may be at such low levels that inbreeding, hybridization, and other effects could occur.

The use of habitat and of prey varies through the range of the subspecies. These two factors interact with each other and also with other factors such as weather, harvest history, habitat heterogeneity etc, to affect local habitat associations. While the general conclusion still holds that Northern Spotted Owls typically need some late-successional habitat, other habitat components are also important (at least in some parts of the range).

The available data on habitat distribution and trends are somewhat limited. Development of new habitat is predicted under some models. However our ability to evaluate habitat trends is hampered by the lack of an adequate baseline. Given these caveats, the best available data suggest that timber harvest has decreased greatly since the time of listing, and that a major cause of habitat loss on federal lands is fire. In the future, Sudden Oak Death may become a threat to habitat in parts of the subspecies' range.

Barred Owls are an invasive species that may have competitive effects on Northern Spotted Owls (as was recognized at the time of listing). Opinion on the panel was divided on the effects of Barred Owls. While all panelists thought this was a major threat, some panelists felt that the scientific case for the effects of Barred Owls remained inconclusive; other panelists were more certain on this issue.

The demography of the Northern Spotted Owl has been recently summarized in a meta-analysis (Anthony et al., 2004), which is the most appropriate source for information on trends. Although the overall population and some individual populations show signs of decline, we cannot determine whether these rates are lower than predicted under the Northwest Forest Plan (since there is no baseline prediction under that plan). However the decline of all four Washington state study populations was not predicted, and may indicate that conditions in that state are less suitable for Northern Spotted Owls. Several reasons for this pattern are plausible (including harvest history, Barred Owls, weather).

There is currently little information on predation on Spotted Owls, and no empirical support for the hypothesis, advanced at the time of listing, that fragmentation of forest after harvest increases predation risk.

West Nile Virus is a potential threat, but of uncertain magnitude and effect.

In general, conservation strategies for the Northern Spotted Owl are based on sound scientific principles and findings, which have not substantially altered since the time of listing (1990), the Final Draft Recovery Plan (1992) and adoption of the Northwest Forest Plan (1994). Nevertheless we identify several aspects of conservation and forest management that may increase both short and medium term risks to the species. These are typically due to failures of implementation.

A full evaluation of the uncertainties of the data, the conclusions that can be drawn from them, and of the perceived threats to the subspecies, are shown in the summary of individual panelist responses to a questionnaire.

Major threats to Northern Spotted Owls at this time include: the effects of past and current harvest; loss of habitat to fire; Barred Owls. Other threats are also present. Of threats identified at the time of listing, only one (predation linked to fragmentation) does not now appear well supported.

5.1.2 Occurrence within the Action Area

Spotted owl surveys were conducted in potential spotted owl habitat within and adjacent to the Study Area in 1994 and 1995, 2001, 2002, and in 2007 (see Table 5-1). These surveys were conducted according to the *Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls* (USFWS 1992). In order to comply with survey protocol, three visits are scheduled for 2008 to ensure surveys are valid for the following five years.

Table 5-1
Surveys Completed for Northern Spotted Owl at Snoqualmie Pass

Year	Month Completed	Result
1994	June-August	Single call near Mt. Catherine
1995	June-August	Not Detected
2001	May-August	Not Detected
2002	June-August	Not Detected
2007	June-August	Not Detected

This area is also monitored by the OWNF and by Raedeke Associates as part of a long-term demographic study. Habitat for spotted owl within the Action Area was classified into nesting,

roosting, foraging (NRF), dispersal, and non-habitat according to available vegetation datasets. Data for the Action Area was classified according to the following scheme:

- Nesting/Roosting/Foraging- Mature (tree diameters medium and large) forested stands with greater than 70 percent canopy closure below 5,000' elevation.
- Dispersal- Mature and Immature (tree diameters greater than sapling/pole) with canopy closure between 30 and 70 percent at all elevations.
- Non-habitat- Non-forested (shrub/herbaceous/water) areas, young forest (tree diameters in the sapling/pole category) with less than 30 percent canopy closure at all elevations.

The Action Area contains approximately 2,137.45 acres of NRF habitat, 2,433.61 acres of dispersal habitat, and 10,261.64 acres of non-habitat. Figure 7 show the location of stands of potentially suitable spotted owl habitat within the Action Area.

Spotted owls are known to occur on both the east and west sides of the Cascades in the vicinity of the Snoqualmie Pass area. According to the SPAMA Plan EIS, there are 33 known spotted owl activity centers within the SPAMA and 128, 490 acres of suitable spotted owl habitat available (USFS, USFWS 1997).

As of 1994, there were 20 known spotted owl activity centers in the Yakima River watershed (USFS 1997), 13 of which are also in the AMA and included in the above count. There is 80,760 acres of suitable habitat within the watershed. There are three known spotted owl activity centers in the South Fork Snoqualmie River watershed and 10,143 acres of potential habitat (USFS 1995).

In the Washington Cascades Physiographic province, spotted owl home range territories are considered to encompass 1.8 miles of land around an activity center (USFWS 1990). Of the activity centers mentioned above, the 1.8 mile radius circle of only one includes lands within the Action Area. This territory is centered near Mt Catherine and includes a portion of the SW corner of section 16 near Summit East.

Spotted owl surveys were conducted in potential spotted owl habitat within and adjacent to the Action Area in 1994 and 1995, 2001, 2002, and 2007. One call response was obtained in the Mt Catherine area in 1994, while no spotted owls were found during 2001, 2002, or 2007. Surveys conducted by Raedeke Associates in 2003 resulted in a pair of nesting spotted owls being found, however no young were fledged (Sovern 2004 pers com). The site center for this pair is approximately 1 mile away from the SUP boundary. Potentially suitable spotted owl habitat within the Action Area is defined as late successional habitat within the western hemlock or Pacific silver fir vegetation zones.

Northern spotted owl nesting, roosting, and forging habitat in west-side forests has historically been defined as LSH in the western hemlock and Pacific silver fir zones (USFS 1995) however recent research suggests that the Pacific silver fir zone may not be regularly utilized as nesting habitat, with the majority of nesting occurring in LSH in the western hemlock zone (Herter and Hicks 2000). Based on this and the lack of spotted owl responses during surveys in the Action Area, northern spotted owls are not expected to nest in the study area but may use the habitat within the Action Area for foraging and dispersal habitat.

The Snoqualmie Pass area was identified in the SPAMA Plan EIS as an important area for habitat connectivity for spotted owls. Of particular concern is the area of mature forest located in Section 16 between Summit East and Summit Central. This area of relatively contiguous habitat is considered an important link in the north-south movement of a variety of species including spotted owl.

5.1.3 Critical Habitat

The Snoqualmie Pass Action Area occurs within designated critical habitat for the northern spotted owl, CHU-WA-33 (see Figure 4). Approximately 1,393.52 acres of CHU-WA-33 occurs within the Action Area. There are two other mapped CHUs in the proximity of the Action Area, CHU-WA-32 (approximately 1 mile north of the Action Area) and CHU-WA-13 (approximately 3 miles east of the Action Area).

5.2 Marbled Murrelet (*Brachyrampus marmoratus*)

The marbled murrelet is listed as threatened by both the USFWS and the WDFW.

5.2.1 Habitat Requirements and Ecology

The North American subspecies of marbled murrelet occurs from the Aleutian Islands south along the coasts of Alaska, Washington, Oregon, and California. Its distribution is closely correlated with the presence of late successional coastal forests (Carter and Erickson 1988, Nelson 1989, Paton and Ralph 1988, Sealy and Carter 1984). Marbled murrelets are mostly found within 1 mile of shore (Strachan et al. 1995, Strong et al. 1996) when in salt water. In Washington, the marbled murrelet is found in all near-shore marine environments, with the greatest concentrations found in the northern Puget Sound area (WDFW 1993b).

Murrelets live primarily in a marine environment but fly inland during the nesting season to nest in older forests. Murrelets typically nest in low-elevation old-growth and mature coniferous forests (Hamer 1995; Hamer and Cummins 1991). Once at sea, murrelets can be found as dispersed pairs or in flocks or aggregates (Strachan et al. 1995, Strong et al. 1996). Strong et al. (1996) found that most murrelets occurred within 1 mile of the shoreline, regardless of their age. However, hatch-year fledglings were closer to shore than the general population.

Marbled murrelets construct their nests high in older conifers with wide horizontal limbs. In Washington State, murrelets have been detected up to 50 miles inland from the coast, most typically adjacent to major drainages (Hamer and Cummins 1991). However, over 90 percent of all observations have been within 37 miles of the coast in the northern Washington Cascades (61 FR 26256-26320). According to the Recovery Plan for the Threatened Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California, the Puget Sound Zone has been defined as extending 50 miles (80 km) from the eastern shore of Puget Sound (USFWS 1997).

Although marbled murrelets have been known to nest in stands as small as 7.5 acres, the average nest stand size in Washington is 515 acres (Hamer and Nelson 1995) and large contiguous stands of suitable habitat are considered important to marbled murrelet recovery (61 FR 26256-26320). Marbled murrelet nests in Washington are usually found at elevations below 3,500 feet, within 40 miles of the nearest body of salt water (Hamer 1995), and in stands with old-growth characteristics (Raphael et al. 1995).

Potential habitat for the marbled murrelet is defined in the survey protocol as mature, old-growth, or younger coniferous forests that have deformations or other structures suitable for nesting (Ralph et al. 1991). Although this definition is general, it encompasses some of the new information on murrelet nesting, including documented activity in younger forests (40 to 80 years) in the Oregon Coast Range (Grenier and Nelson 1995). Nonetheless, nearly all marbled murrelet nest trees have been located in old-growth and mature stands or stands with old-growth characteristics (Hamer and Nelson 1995). The percentage of old-growth tree crown cover appears to be an important factor associated with occupied sites (Miller and Ralph 1995, Hamer and Nelson 1995).

Because so few marbled murrelet nests have been found, an understanding of the microhabitat requirements of the bird is limited. The few nests that have been measured suggest that the number of potential nest sites on trees may be the best predictor of stand occupancy by this species (Hamer and Nelson 1995). Murrelets require a broad flat surface (referred to as a platform) on a large lateral limb or other lateral structure. Large lateral limbs are usually found on trees with larger diameters and/or on older-aged trees. Potential nest platforms include mistletoe brooms, deformed limbs, and areas where a tree has been damaged (Hamer and Nelson 1995). The essential element of a murrelet nest site, therefore, is the presence of a horizontal limb that is sufficiently large, wide, and flat enough to support a nest.

5.2.2 Occurrence within the Action Area

According to the Snoqualmie Pass AMA EIS, there are approximately 89,266 acres of suitable marbled murrelet habitat within the AMA analysis area. There has been a single marbled murrelet detection within the AMA, approximately 2 miles east of the Cascade Crest, and the

next nearest detection occurred approximately 5 miles to the north in the Middle Fork Snoqualmie watershed (USFS and USFWS 1997). There have been no detections within the Action Area (see Table 5-2).

Table 5-2
Surveys Completed for Marbled Murrelet at Snoqualmie Pass

Year	Months	Result
1994	June-July	Not Detected
1995	June-July	Not Detected
2001	June-July	Not Detected
2002	June-July	Not Detected
2007	June-July	Not Detected

The majority of the Action Area is within the Pacific silver fir vegetation zone, however the largest trees in the late successional stands in the Action Area are generally either western or mountain hemlock, depending on elevation. Late successional forest containing large (>32 inch d.b.h.) western hemlocks are considered suitable nesting habitat for marbled murrelets (Federal Register 1996, 60 FR 26256-26320). Potentially suitable habitat for marbled murrelets within the Action Area occurs primarily in the area near the existing maintenance shop at Summit West and in Section 16 between Summit Central and Summit East. The Action Area contains approximately 2,137.45 acres of suitable marbled murrelet habitat.

Potential marbled murrelet nesting habitat within the Snoqualmie Pass area is between 40 and 50 miles inland from salt water. On the MBS, the majority (52%) of marbled murrelet detections to date have occurred within 20 to 29 miles inland; 42% within 30 to 39 miles inland; 4% within 40 to 49; and less than 1% between 50 and 60 miles inland. While this suggests a preference for habitat closer to salt water, surveys were not evenly distributed, with more surveys conducted within the 40 miles or less zone (USDA and USDI 1997).

Hamer (1995) found that murrelet detections decreased with both increased distance from salt water and increased elevation, with a sharp decline in detections occurring above 3500 feet elevation. While the Snoqualmie Pass area is greater than 40 miles from salt water, potentially suitable habitat in the area occurs at elevations less than 3500 feet.

Marbled murrelets are believed to be absent from the Summit at Snoqualmie Action Area based on the following information:

- Surveys conducted to protocol during 1994 and 1995, 2001, 2002, and 2007 did not detect marbled murrelets in the SUP Area.
- The distance of the summit area from salt water (>40 miles) reduces the probability of murrelets occurring in the area (Hamer 1995).

5.2.3 Critical Habitat

The Snoqualmie Pass Action Area partially overlaps designated critical habitat for marbled murrelets, CHU WA-10-c (approximately 150.26 acres).

5.3 Grizzly Bear (*Ursus arctos horribilis*)

The grizzly bear (Ursus arctos horribilis) is listed as threatened by the USFWS and as endangered by the WDFW.

5.3.1 Habitat Requirements and Ecology

Historically, the grizzly bear occurred from the mid-plains west to the coast of California and south into Texas and Mexico. Currently, grizzly bears remain in only six areas, known as ecosystems, in the lower 48 states of the United States: the Greater Yellowstone, the Northern Continental Divide, the Cabinet-Yaak, the Selkirk, the Bitterroot, and the North Cascades. Additionally, the San Juan Mountains in Colorado may also support grizzly bears (USFWS 1993). Human-caused mortality and habitat loss and degradation are currently the greatest threats to grizzly bear populations in the lower 48 states (USFWS 1993). Grizzly bear recovery plans focus on maintaining grizzly bear populations in these ecosystems. In western Washington, the North Cascades Ecosystem (NCES) has been established in the Cascade Mountains from the Canadian border south to Interstate 90. The recovery plan recognizes that grizzly bears will occur outside of the recovery zone, however only habitat within the recovery zones will be managed for grizzly bears (USFWS 1993).

The grizzly bear is a large, wide-ranging animal that requires vast amounts of remote, undisturbed habitat. It has a wide range of habitat tolerances and can exploit a wide variety of food resources. Grizzly bears use a wide variety of habitats from mature coniferous forest of varying story-layer and canopy closure to open meadows and riparian areas. They occupy home ranges that can be more than 1,000 square miles. Grizzly bears, males in particular, prefer low to mid-elevation riparian areas in the spring and late fall, but move up to higher elevation alpine and subalpine habitats during the summer season. Females with cubs generally stay at mid-to-upper elevations throughout the year, presumably to avoid contact with the males. Rocky Mountain Region den sites are often at elevations above 6,500 feet, but in the Cascade Range denning may occur above 5,800 feet (Almack, 1986). Physiographic conditions similar to high elevation denning sites could occur down to the 2,000-foot elevation in the Cascades. Food varies seasonally, and includes anything from forbs, grasses, and berries to rodents, large ungulates, and carrion. Grizzlies prefer secluded areas, generally indicated by open road densities of less than one mile per square mile.

Cover is another important component of grizzly bear habitat. Although grizzly bears occur most often in a mosaic of forested habitat interspersed with open parks for foraging, the majority of

locations of radio-collared bears are from dense forest habitat. In addition, the vast majority of grizzly bear bedding sites are in forest habitats less than 2 yards from a tree (USFWS 1993).

Denning habitat is an essential component of grizzly bear habitat because grizzly bears do not enter true hibernation (body temperature remains constant in grizzly bears during hibernation). Bears have been documented to abandon denning sites in response to disturbance. Dens are excavated from September to November, typically on steep slopes where wind and topography cause large accumulations of deep snow. Den sites usually occur at higher elevations well away from development and human activity (USFWS 1993).

Grizzly bears utilize a wide variety of habitats, depending on the season. During spring, following den emergence, grizzly bears are most likely to be present at lower elevations and follow green vegetation into higher elevations as the seasons progress. For analysis purposes, the North Cascades Grizzly Bear Management Subcommittee has established the following seasons and associated habitat uses:

- Spring (den emergence to May 31) habitats include herbaceous, open canopy forest, shrub, and sparse vegetation in the western hemlock and Pacific silver fir zones;
- Summer (June 1 – July 15) habitats include the same types as spring, with the addition of the mountain hemlock zone;
- Fall (July 16 – denning) focuses on shrub habitat and open forest types with no elevation restrictions.

Within the Action Area, the vegetation types most likely to be suitable for use by grizzly bears are late-seral stands with an open canopy; and managed herbaceous (ski trails). Several studies have been conducted comparing grizzly bear habitat use with human activity. These studies have found that grizzly bears avoid areas of human development (Gibeau 2000, Mattson et al 1986); avoid roads (McLellan and Mace 1985, Aune and Stivers 1985, Mattson et al 1986, Kasworm and Manley 1990, McLelland and Shackleton 1988, Mace and Waller 1996, and Gaines 2002, pers comm.); avoid trails (Mace and Waller 1996, Gunter 1990, Kasworm and Manley 1990); and avoid hikers (Leonard et al 1990). Based on grizzly bear sensitivity to roads, Ruediger and Mealey (1978) suggested that road densities not exceed 0.6 km/km2 (1 mile/mile2) in areas being managed for grizzly bear habitat. This recommendation is included in the grizzly bear recovery plan (USFWS 1993).

5.3.2 Occurrence within the Action Area

Within the conterminous United States, there are 5 grizzly bear recovery areas, one of which is the North Cascades Recovery Zone. This zone extends from the Canadian border along the Cascades to I-90, encompassing approximately 9,565 square miles (USFWS 1993). Alpental lies within the North Cascades Recovery Zone. Within the recovery zone, Bear Management Units

(BMU's) have been identified but management requirements have not yet been assigned in the area (USFS 1995). The Alpental SUP has a land allocation of Administratively Withdrawn under the NWFP and is designated as having a winter sports recreation emphasis. Part of the SUP is located within a BMU and contains core habitat. However, the area would not be managed for grizzly bear due to the high level of human activity and development. Summit West, Summit Central, and Summit East occur outside of the recovery zone.

Grizzly bears may also occur outside of the recovery zone. Since grizzly bears are large, wide ranging animals, they may utilize the Action Area as a portion of a larger home range although use of the Action Area would be limited by the amount of human activity since grizzly bears are known to avoid areas with high levels of human activity.

Within the AMA, there are an estimated 21,087 acres of key habitat types for grizzly bears. Use of much of this habitat is likely limited by road densities exceeding the 1 mile of road per square mile of land recommended as a maximum for grizzly bear habitat (USDA and USFWS 1997). Between 1974 and 1991, there were 9 grizzly bears sightings within the AMA, three of which were rated "confirmed" by the WDFW and six of which were rated "highly reliable". Grizzly bears have also been confirmed to the east of the AMA (USDA and USFWS 1997). In addition there have been two grizzly bear sightings in the Alpine Lakes wilderness, northeast of the Action Area, for which the reliability was not reported (WDFW 2000).

According to the South Fork Snoqualmie Watershed Analysis (USFS 1995), there have been no class 1 (confirmed) grizzly bear sightings on the Snoqualmie Ranger District. The watershed does contain an estimated 1,251 acres of spring foraging habitat and 8,467 acres of fall foraging habitat, however. Use of the watershed by grizzly bears is likely to be limited by high human use, however, since the watershed has a human accessibility index of 3.35. This is a measure of the road, trail and other human development density and the optimal maximum index value for grizzly bear management is 1.00 (USFS 1995). Within the Yakima watershed there is an estimated 13,109 acres of grizzly bear habitat and an open road density of 2.58 miles per square mile of land (USFS 1997).

Grizzly bears are not expected to regularly occur in the Action Area due to the high level of development, high road density, and the associated high level of human activity. Grizzly bears may rarely occur in the Action Area, however, potentially utilizing it as part of a larger home range territory or as travel habitat between patches of more remote habitat.

5.4 Gray Wolf (*Canis lupus*)

The gray wolf (*Canis lupus*) is listed as endangered by the USFWS and by WDFW in Washington.

5.4.1 Habitat Requirements and Ecology

Wolves potentially occurring in the Washington Cascades are part of the western distinct population segment. Critical habitat has not been designated for this distinct population segment and no recovery plan for it has been published.

Important elements of gray wolf habitat include large isolated areas with low exposure to humans, a sufficient year round food source and ample denning, rendezvous and dispersal habitat. Wolf territories are associated with areas of low human use, including developed areas (Wydeven et al., 2002; Mladenoff et al., 1995) and areas of low recreational activity (Peterson, 1977). Wolf territories are also associated with areas having low open road densities (Mladenoff et al., 1995; Mladenoff et al., 1999; Mech, 1989). Wolves are particularly sensitive to human activity around den sites (Chapman, 1979) with wolf dens generally being located at least 1 mile from recreational trails and 1 to 2 miles from established backcountry sites (Carbyn, 1974; Peterson, 1977; Chapman, 1979).

Wolf pack territories vary greatly in size, with wolf abundance within a landscape being dependent upon the amount of area available that is relatively free from human disturbance and associated mortality (Fritts and Carbyn, 1995) and upon prey density within the landscape (Fuller, 1989). Areas with a high density of ungulates are able to support a greater number of wolves in a smaller area (Fuller, 1989; Fuller, 1992; Lariviere et al., 2000; Wydeven et al., 1995; Haber, 1977). In areas of low ungulate density, wolf density also decreases and territories become larger (Mech, 1977; Messier, 1987) and wolves may switch to alternate prey such as beaver or snowshoe hare (Voigt, 1976). Reported sizes of wolf pack territories vary from 150 to 180 km2 (37,000 to 45,000 acres) in the Lake Superior region (Fuller, 1992; Wydeven et al., 1995) to 1,550 -2,590 km2 (384,000 to 640,000 acres) in Alaska (Haber, 1977).

Gray wolves typically dig their own dens, often weeks in advance of birth of pups. Wolf dens are commonly located on southerly aspects of steep slopes (or rock caves/ abandoned beaver lodges), often within 400 yards of surface water and at an elevation overlooking the surrounding landscape. In addition, these sites tend to be at least 1 mile from recreational trails and 1 to 2 miles from backcountry trails (USFWS, 1987).

Rendezvous sites are specific resting and gathering sites used by wolf packs during the summer and fall after natal dens have been abandoned. The sites are composed of meadows adjoining timber stands located near water. Wolves are particularly sensitive to disturbance at the first few rendezvous sites used after abandonment of the natal dens. Rendezvous sites are often located in bogs or abandoned and revegetated beaver ponds. The sizes of rendezvous sites varies from 0.5 acres to sites along drainages 0.6 miles long, but are typically about 1 acre.

The most critical factors defining gray wolf habitats are the availability of large ungulate prey and isolation from human disturbance. Roaded access within gray wolf home ranges is a major

factor in reducing security from human disturbance. The preferred road density is no roads but the target for gray wolf management is one mile or less per square mile of habitat (Theil, 1985; Jensen et al., 1986).

5.4.2 Occurrence within the Action Area

Gray wolves, once thought to be extirpated from Washington, are becoming reestablished in the State. Three family units have confirmed in Washington, one in Okanogan, one in North Cascades National Park, and one in the Glacier Peak Wilderness (USFS 1999).

There have been no confirmed wolf sightings within the AMA, however several unconfirmed sightings are reported each year. Wolves are sensitive to human activity and wolf use of otherwise suitable habitat is limited by road densities above 1 mile of road per square mile of land (Theil 1985, Mech 1988). Road densities within the AMA are considerably higher than this level, with densities of 2.44 miles/square mile in the portion of the AMA east of the Cascade crest, and 2.79 miles/square mile in areas west of the Cascade crest (USDA and USDI 1997).

There have been no confirmed wolf sightings within the Yakima River watershed, however unconfirmed sightings are common. There is an estimated 5,204 acres of potentially suitable wolf denning and rendezvous habitat within the watershed, but road densities are 2.58 miles per square mile and so may limit wolf use of the area. Since roads are not uniformly distributed on the landscape, there are areas where road densities are below 1 mile per square mile. Areas within the Yakima River watershed with road densities below 1 mile per square mile are the Silver Creek, Gold Creek, and Box Canyon subwatersheds (USFS 1997).

Within the South Fork Snoqualmie watershed, there is an estimated 1,631 acres of suitable gray wolf denning and rendezvous habitat available. As in the above analysis units, high levels of human access are likely to limit wolf use of the area. There have been no confirmed wolf sightings within the South Fork Snoqualmie watershed, however there have been 2 sightings which, although unconfirmed, have a high reliability rating (USFS 1995).

There have been no wolf sightings within the Action Area and given the high levels of human use in the area year round and the proximity of I-90, it is unlikely that wolves would use the area for either denning or rendezvous sites. Of the ski areas, Alpental has the highest potential for use by wolves due to being the most remote, however denning and rendezvous sites are usually located in broad flat valley bottoms (Mech 1988) and Alpental contains predominantly steep slopes and cliff habitat. Howling surveys were conducted in the Snoqualmie Pass area in 1994 and 1995, however no responses were heard.

Gray wolves are not expected to regularly occur in the Action Area due to the high level of development within the Action Area and the associated high level of human activity. Gray

wolves may rarely occur in the Action Area, however, potentially utilizing it as part of a larger home range territory or as travel habitat between patches of more remote habitat.

5.5 Canada Lynx (*Felis lynx canadensis*)

The Canada lynx (*Felis lynx canadensis*) is listed as threatened under the ESA by the USFWS and by the Washington Department of Fish and Wildlife (WDFW).

5.5.1 Habitat Requirements and Ecology

The total population of lynx in Washington State has been recently estimated at between 96 and 191 individuals (WDFW, 1993a), but the status of lynx throughout their historic range in the Cascades is unknown (USFS, 1998a). At least historically, lynx probably occurred in and adjacent to the MBSNF and the OWNF, although the evidence indicates that populations on the west side of the Cascades, in both Canada and Washington, were never very abundant (USFS, MBSNF, 1992a).

Lynx occupy the boreal regions of North America and Eurasia, including Alaska, Canada, and the northern edge of the contiguous United States. Although the lynx remains widespread in many of its northern haunts, it has receded from much of its former range in the U.S. In Washington, the lynx is found in the North Cascade Range, particularly in high elevation lodgepole pine habitat.

Lynx home ranges and habitat characteristics were studied in the Okanogan National Forest from 1980-83 by the Washington Department of Wildlife (WDW) and from 1985-87 by the Wildlife Research Institute (Koehler, 1990; Koehler and Brittell, 1990). Koehler (1990) determined that radio-collared lynx utilized lodgepole pine and Engelmann spruce-subalpine fir forest cover types above the 4,500 foot elevation level in greater than expected proportions. Estimated density of resident adult lynx during the two studies was one animal per 10,750-11,800 acres (Koehler, 1990).

Lynx depend on the snowshoe hare as their primary food source (Koehler, 1990). Because of this close association of lynx with snowshoe hares, habitat that is good for hares is assumed to benefit lynx (Rodrick and Milner, 1991). Snowshoe hares prefer early successional stages of forested habitats with dense stands of shrubs and saplings that provide hiding and thermal cover and winter food (Grange, 1932; Pietz and Tester, 1983; Litvaitis et al., 1985; Monthey, 1986). Hares browse primarily on stems of hardwoods or conifers during winter (Pease et al., 1979), and shift to a diet of forbs, grasses, and leaves in the summer (de Vos, 1964; Wolf, 1978). Although studies in north central Washington found the stems and bark of lodgepole pine to be the principal winter foods of snowshoe hares (Koehler, 1990), snowshoe hare populations in northern Idaho are concentrated in areas wherever hardwood shrubs protrude through snowpacks.

Lynx require a mosaic of forest conditions, including early successional habitat for hunting and mature forests for dens. Den sites are typified by forests older than 200 years with northerly aspects containing lodgepole pine, spruce, and subalpine fir and with a high density of downfall logs (Koehler, 1989). These mature stands for dens were as small as 1-5 acres in size with stringers of connected travel corridors that provide security cover for adults and kittens. Intermediate stages may be used as travel corridors that provide connectivity between foraging, denning, and cover habitats (Koehler and Aubrey, 1994; Aubrey et al., 1999).

Lynx use travel cover to move within their home ranges, for connectivity between denning and foraging areas, and for dispersal across the landscape. Travel cover generally consists of closed canopy coniferous/deciduous vegetation that is greater than 6 feet high and adjacent to foraging habitat. Forested areas with light stocking densities (170 to 260 trees per acre) and openings greater than 300 feet wide may be avoided by lynx (USFS, 1998c). Preferring continuous forest for travel, lynx often use ridges, saddles, and riparian areas (Ruediger, et. al., 2000). Home range sizes in Washington range from 14 to 27 square miles, with daily travel distances of up to 3.2 miles per day and long distance dispersal or exploratory movements up to 600 miles (McKelvey et al., 1999c).

5.5.2 Occurrence within the Action Area

Nearly all of the Action Area is located below 4,400 feet elevation; however, the area does provide a variety of early successional stage stands (plantations) suitable as snowshoe hare habitat. Given the average density of lynx (one per 11,000 acres) and the size and habitat types of the Action Area, less than one resident lynx (not including kittens) could be expected to utilize the Action Area as a portion of their territory. In addition, due to the almost continuous ski area activity within the existing ski area, due to nighttime trail grooming, and intermittent avalanche control, and daytime operations, the existing Summit-at-Snoqualmie ski area was not considered to contain suitable denning or foraging habitat for this project (USDI, 2000). According to guidelines established in the Lynx Habitat Mapping Direction memo, the Action Area does not contain suitable denning or foraging habitat for the Canada lynx due to the lack of subalpine fir parkland and early Successional stage stands (USDI, 2000). Additionally, according to the Lynx Conservation Assessment Strategy (LCAS), the Action Area is located in peripheral lynx habitat and is considered unoccupied (USFS, USFWS 2005). The USFS and USFWS re-issued the Conservation Agreement on August 31, 2006 and confirmed that the southern extent of the MBSNF and OWNF are considered unoccupied. There have been no sightings or evidence of lynx use of the Action Area.

Since lynx prefer to travel through forest cover, and use riparian areas, saddles and ridges as travel habitat, the majority of the Action Area would not be suitable for lynx travel habitat. Areas that would not be suitable include the developed portion of the base areas at Summit East,

Summit Central, Summit West and Alpental. Additionally, the large open areas maintained as ski terrain at all four areas are not considered suitable habitat. The ridge tops and subalpine bowls at Alpental contain large natural openings in the vegetation communities that may not be preferred lynx travel habitat; however, there are generally small tree islands that could provide sufficient cover. Lynx could also travel through relatively continuous cover outside of the Action Area to both the north and south. Use of the Action Area by Canada lynx is expected to be limited to rare pass-through dispersal events.

5.6 Bull Trout (*Salvelinus confluentus*)

Bull Trout (*Salvelinus confluentus*) is listed as threatened under the ESA by the USFWS and by the Washington Department of Fish and Wildlife (WDFW). Designated Critical Habitat includes Gold Creek and the Yakima River downstream from Keechelus Lake, but not Keechelus Lake or other Keechelus tributaries.

5.6.1 Habitat Requirements and Ecology

Three life forms of bull trout are recognized, each having a different life history pattern. Bull trout occur as migratory (adfluvial or fluvial) or resident fish (Rieman and McIntyre 1993). The adfluvial forms mature in lakes or reservoirs and spawn in tributaries where juveniles rear for 1 to 4 years (Meehan and Bjorn 1991). Fluvial bull trout have a similar life history to adfluvial, but move between mainstem rivers and smaller tributaries. Migratory forms may make extensive migrations, attain sexual maturity at age 5 or 6, and may live up to 10 years. They may reach a size exceeding 9.98 kilograms (22 pounds) (Fraley and Shepard 1989). Stream resident bull trout spend their entire lives in smaller, high elevation streams, apparently moving very little and seldom reaching a size of over 305 mm (12 inches) (Brown 1992).

All forms of bull trout inhabit cool clear streams with water temperatures rarely exceeding 15°C (59°F). Adults spawn in the fall in areas of streams with suitable gravel, often near seeps or springs. Egg incubation is slow, taking up to 225 days (Craig 1997). Upon emerging, juveniles rear in cool water areas with abundant cover, usually in the form of LWD. Bull trout abundance is positively correlated with complex forms of cover and pools (Rieman and McIntyre 1993).

Adfluvial adults mature in lakes where they use a variety of habitats from nearshore to deep water (Thompson and Tufts 1967). In Chester Morse Lake, bull trout are widely distributed and use profundal and littoral zones of the lake (Connor et al. 1997). In Flathead Lake (Montana), bull trout travel along the shoreline, but have been found as deep as 109.4 meters (360 feet) (Hanzel 1965). Adults are found throughout the water column in most lakes during the fall, winter and spring, moving to deeper cooler water in the summer (Shepard 1985). Adult bull trout sometimes follow their primary prey species. In Flathead Lake, adults move into the lower reaches of the river in the fall to consume pygmy whitefish (Andrusak and Northcote 1971) and

move along the lakeshore to locate spawning salmon (Shepard et al. 1984). Similar patterns of use and distribution are expected in Keechelus Lake.

5.6.2 Occurrence within the Action Area

Nine bull trout stocks occur in the Yakima River basin (WDFW, 1998). Two stocks occur downstream of the Action Area: the Yakima River stock and the Keechelus Lake stock. The Keechelus Lake stock is considered a distinct stock due to its geographic isolation and is considered adfluvial. The Yakima River stock is prevented from accessing Keechelus Lake or the Study Area by the Keechelus Dam. Only the Keechelus Lake population is considered to occur within the Action Area.

The Keechelus Lake population (stock) of Bull trout is present in Keechelus Lake, and has potential access to the lower 0.5 mile of Coal Creek, and the lower 500 feet of Mill Creek. This segment of Mill Creek is intermittent in late summer and fall. Gold Creek is another Keechelus Lake tributary that provides the only known spawning habitat for the Keechelus population.

Bull trout have not been reported from any stream in the Coal Creek sub-watershed. Jones & Stokes (2002a) fish biologists detected no bull trout during night snorkel surveys on the Lower 900 meters (2,952 feet) of Coal Creek (from Keechelus Lake to about 100 meters upstream of I-90), or during day time snorkel reconnaissance surveys of Coal Creek from Keechelus Lake to the furthest upstream I-90 culvert (Jones & Stokes 2001). Given the relatively low elevation of Coal Creek headwaters, high temperatures, and barriers to passage at the I-90 culverts, it is unlikely that bull trout are present in Coal Creek.

No snorkel surveys have been completed in Mill Creek. Bank surveys of Mill Creek have been conducted with no detections fo bull trout (Jones and Stokes 2004). However, this stream is intermittent near its mouth at Keechelus Lake, and natural and human-made passage barriers exist in Mill Creek at mile 0.7. Therefore, Mill Creek would be unsuitable for supporting an anadromous population. Habitat for isolated resident fish extends from the mouth upstream to at least 1000 feet upstream of FS Road 9070 and could provide habitat for resident bull trout. However based as bull trout have not been detected during surveys, and have never been reported to occur in Mill Creek, they are not expected to be present for purposes of this analysis.

6.0 CONSERVATION MEASURES

The conservation measures identified in the following table (see Table 6-1) would be included in the site plans and construction plans, as appropriate. All conservation measures would be approved by the USFS prior to authorization for construction.

Table 6-1
Conservation Measures for the Summit-at-Snoqualmie Master Development Plan

CM1	Riparian Reserves would be protected to the fullest extent practical by flagging the clearing limits and any trees to be removed in the field, which would be approved by the USFS prior to ground disturbance. Trees cleared would be felled towards stream channels and left on site to provide in-channel LWD and streambank stability. Ski trails crossing streams and Riparian Reserves would be narrowed to minimize future loss of LWD. Riparian understory vegetation adjacent to stream channels would be avoided where possible to maintain bank stability and channel shading.
CM2	If the presence of any special status species is determined in the area affected by the Proposed Action, the Forest Service Biologist would be immediately notified and management activities altered as appropriate.
CM3	Evaluation of the need for surveys for special status species would be conducted in all areas where suitable habitat is determined by a Forest Service approved biologist. If the presence of these species is determined to be in an area affected by the Proposed Action, the Forest Service Biologist would be immediately notified and management activities altered as appropriate.
CM4	If helicopters are planned for use, seasonal restrictions (March 1 – September 15) would be implemented during the Northern Spotted Owl and marbled Murrelet nesting seasons if protocol surveys are not current. Seasonal restrictions would not apply if surveys are current and no owls or murrelets are found. Flights paths would be established to avoid flying over CHU-WA-33 and WA-10-c at any time.
CM5	To avoid impacts to nesting spotted owls in areas adjacent to the Action Area, all helicopter access and egress routes will be planned such that they avoid passing over known and historic nest sites outside of the Action Area at an altitude of less than 250 feet above the canopy.
CM6	Animal proof containers would be used for waste disposal to prevent habituation of wildlife to human food sources.
CM7	Manage the mature forest in Section 16 beyond ski trails to maintain large woody debris, maintain 70% canopy where it exists, and maintain forest habitat conditions.
CM8	Project-specific Stormwater Pollution Prevention Plans (SWPPPs) will specify the use of appropriate Best Management Practices (BMPs) (e.g., sediment traps , waterbars, wattles, or silt fencing) to trap sediment and prevent sediment deposition in streams.
CM9	All Management Requirements/Constraints and Mitigation Measures listed in the Hydraulic Project Approval (HPA) MOA with the WDFW will be implemented for each project involving an HPA. Any in-channel construction will be completed during periods specified in the HPA from the WDFW.
CM10	When the use of culverts cannot be avoided, they will be designed to accommodate 100-year flows, with considerations for debris, fish passage (if applicable) and passage of low-mobility, riparian-dependent species (e.g., bottomless arch culverts, if applicable). Culverts will periodically be inspected for debris jams and cleaned as necessary. Hydraulic permits will be obtained for all activities in stream channels. All channel modification proposals will be included

	in a project-specific SWPPP, which will be reviewed and approved by the USFS prior to construction. Documentation of alternatives considered will be required for the USFS to consider a proposal.
CM11	Project-specific SWPPPs will specify that road crossings and utility line trenched crossings of streams will be avoided where possible. Unavoidable stream crossings will be oriented perpendicular to the stream channel. If construction equipment must cross a channel, it will be limited to a one-time crossing; crossing will occur in an area that minimizes disturbance to the stream bed and banks and a temporary platform will be created to cross the channel if necessary. The USFS and the WDFW will approve all stream crossing locations and proposed methods of crossing prior to construction.
CM12	Follow USFS and WDFW Memorandum of understanding (USFS and WDFW, 1997) for all projects in waters on National Forest lands in the State of Washington.
CM13	Follow WDFW streambank protection guidelines for stream crossing structures (WDFW, 2003).
CM14	Project activities generating noise above ambient forest levels or otherwise creating disturbances will not occur within occupied ungulate winter habitat (from December 1 to April 15) or within ungulate calving, fawning, or kidding habitat (from April 15 to June 15) as directed by the MBSNF Forest Plan or as determined at specific sites by a wildlife biologist.
CM15	To reduce potential impacts to mature forest, avoid clearing buffer areas of parking lots, roads, and buildings within mature forest habitat to the extent feasible and design utility trenching such that overstory trees do not have to be removed.
CM16	Removal of snags and down woody material will be restricted to that necessary to meet safety standards. Where possible, snags will be topped instead of removed. Large down woody material will be left where felled whenever feasible.
CM17	In areas where additional night lighting is proposed, directional lighting designed to reduce ambient reflection or night glare will be used to reduce potential impacts to nocturnal animals.
CM18	To minimize potential impacts to nesting birds, including woodpeckers and other primary cavity excavators, olive sided flycatchers, and neotropical migratory birds potentially occurring in the Study Area, habitat disturbing activities associated with construction and maintenance will occur only between the dates of August 1 and March 30 and while snow is present on the ground, unless otherwise agreed to with Forest Service personnel and based on conditions.
CM19	Where new culverts are installed or old culverts replaced, bottomless arch culverts or bridges will be used where feasible to maintain habitat connectivity for low-mobility, riparian-dependent species.
CM20	Northern spotted owl surveys are scheduled for 2008 to complete the 2-year survey protocol. Following completion of the 2008 surveys, no surveys would be needed for 5 years according to protocol. Additional surveys will be conducted when the current protocol expires (2013) or if there is a change in regulations.
CM21	For all in-water work, or work that requires a HPA from WDFW, all construction activities will occur within the work windows approved under the MOU. Generally, this is limited to: Upper Yakima River Watershed- July 15 – August 31 South Fork Snoqualmie Watershed- July 15 – October 31

7.0 EFFECTS OF THE ACTION

7.1 Northern Spotted Owl

Due to the absence of detections during surveys between 1994 and 2007 (refer to Table 5-1) it is considered unlikely that owls regularly nest within the area.. Per Conservation Measure 20, spotted owl surveys would be conducted as needed when the current surveys expire.

It is assumed that spotted owls may disperse through the area. Therefore, potential effects to northern spotted owl individuals resulting from construction and periodic maintenance would be temporary and would most likely result in avoidance of the area by this species. Juveniles typically disperse after fledging, in September and October, which would occur before winter ski area operations begin. However, some juveniles have been known to disperse again in late winter/early spring, which would coincide with late season nighttime trail grooming (Thomas et al., 1990). Grooming of ski trails, which typically occurs at night, may also disturb individuals, and lead to avoidance of the area, if they were to try to disperse within the Action Area. However, these impacts would be intermittent and short-term in nature. In addition, construction operations would increase the noise and activity levels within the Action Area and could result in short-term avoidance of the area by dispersing individuals. These operations would be temporary and therefore potential use of the area by dispersing and foraging owls would most likely resume once construction activities were complete. Construction of the ski runs and installations of the lifts, lodges and associated infrastructure would not affect an active nest tree of spotted owls as none have been detected within the Action Area. Additionally, the Proposed Action will not impact inner core habitat (0.5-mile radius activity center) of known spotted owl activity centers as proposed activities occur over 1 mile from the nearest known activity center by Mt. Catherine. There would be no disturbance to nesting spotted owls from the construction of the ski runs.

Some construction activities (lift terminal and tower assembly) would require the use of a Type I helicopter in order to transport materials to construction sites. Helicopter operation would occur within suitable NRF and dispersal habitat. Therefore a seasonal restriction during the critical breeding season of March 1-September 15 will be implemented as specified in Conservation Measure 4 (see Table 6-1), thus limiting disturbance to northern spotted owls potentially occurring within the Action Area or adjacent habitat. Outside of the critical breeding season adult owls would be more mobile and better able to move away from the disturbance; nevertheless some disturbance of individuals is possible. Large helicopters can have larger disturbance areas and can still impact spotted owls outside of the critical breeding.

Suitable habitat (NRF and dispersal) for northern spotted owl within the Action Area would be impacted through clearing activities for ski trails, lifts, and facilities as described in Section 4.0 – Construction Techniques (see Table 7-1). Clearing activities would result in permanent removal of approximately 3.77 acres of NRF habitat, as vegetation would be maintained as developed or

a managed shrub/herbaceous condition for the life of the ski area (see Figure 8 – Impacts to Spotted Owl Habitat). The greatest impact to NRF would occur in the vicinity of Section 16 with the installation of the *Rampart* lifts and trails. This would result in the complete removal of forested vegetation within NRF habitat. However, due to the presence of the existing ski area to the east and west, as well as I-90 to the north, the condition of the NRF habitat is considered to be degraded as it is surrounded by existing developments. As described previously, there would be no impact to NRF habitat within the inner core of the nearest spotted owl activity center located at Mt. Catherine.

Table 7-1
Impacts to Northern Spotted Owl Habitat from the Proposed Action

Habitat Type	Impacts (acres)
NRF	3.77
Dispersal	20.28
Non-habitat	122.65
Total	146.70

Clearing for ski trails, lift corridors, and facilities would directly impact approximately 20.28 acres of dispersal habitat within the Action Area (see Figure 8). This clearing would reduce the overall amount of mature forest available, but not interior forest as clearing activities occur within a highly developed area given the past timber clearing and ski area development within the Action Area. However, long-term impacts would occur to dispersal habitat associated with tree clearing would persist for the life of the ski area. The reduction of dispersal habitat and the creation of openings in the forest may increase the risk of predation for spotted owls in the unlikely event that they were to disperse through the area. As described previously, there would be no impact to dispersal habitat within the inner core of the nearest spotted owl activity center located at Mt. Catherine.

Northern Spotted Owls nesting sites and activity centers have been observed adjacent to the Action Area since 1994. The Proposed Action could potentially affect dispersal patterns for this species through the removal of vegetation. However, because of the proximity of known nests (approximately 1 mile away), the existing ski area operations, and the presence of I-90 in the Action Area, the vegetation removal would not likely alter dispersal patterns. As known nesting sites are approximately one mile away from the proposed activities, it has been determined that the effects on spotted owl nesting by the Proposed Action are highly unlikely.

Canopy closure and tree size would be negligibly affected by the Proposed Action in the forested communities. The full clearing prescriptions described in Section 4.1, would completely remove

the overstory and create additional openings, but would not alter canopy closure and tree size in adjacent undisturbed areas. The greatest impact associated with new openings would occur in the vicinity of Section 16 associated with the construction of the *Rampart* lift line and trails.

The expansion of night skiing operations in Section 16 would introduce new light sources into an area not previously lit. As shown in Conservation Measure 17, all new night skiing would utilize directional lighting that points down and away from forested areas. This measure would reduce the impact of new light sources on owls dispersing through adjacent forested areas.

The information presented in the SEI report includes a review of the effects of forest fragmentation in the southern part of the range on the likelihood of occupancy by northern spotted owls (Courtney et al., 2004). The report concludes that:

"Studies consistently showed that mature/old forest patch area was an important predictor of forest occupancy by Spotted Owls. While a fragmentation index was negatively associated with site occupancy in some studies, a trade-off between large patches of mature/old forest and juxtaposition of land cover types appeared to benefit Spotted Owls in other studies."

The report went on to recommend additional studies of long-term survival and reproductive data in order to determine more conclusively how significant the role of forest fragmentation is in the recovery of the species.

7.1.1.1 Northern Spotted Owl Critical Habitat

The Critical Habitat Unit WA-33 is partially located within the Action Area, approximately 1,393.52 acres. Other adjacent CHUs (CHU-WA-332 and CHU-WA-13) are located over a mile away from the Action Area. No proposed activities would occur within the CHU-WA-33. Additionally, Conservation Measure 4 would establish helicopter flight paths that would avoid overflight of CHU-WA-33. It is unlikely that the Proposed Action would directly affect northern spotted owl habitat within the CHU. The Proposed Action would not adversely affect the function of CHUs outside the Action Area utilized by Northern Spotted Owls.

7.2 Marbled Murrelet

There have been no documented occurrences of marbled murrelets within the Action Area and they are therefore considered to be absent from the Action Area based on recent surveys from 1994 to 2007 (refer to Table 5-2). The Action Area is located at the extreme end of the range of marbled murrelet inland distribution, approximately 50 miles from Puget Sound, and according to research less than 5 percent of marbled murrelet detections occur greater than 40 miles inland (USDA and USDI 1997). Within the Action Area, there is approximately 2,137.45 acres of suitable habitat. The proposed action would impact approximately 3.77 acres of suitable murrelet habitat through the removal of trees for lift, trail, and facility construction. The greatest impact to suitable habitat for murrelets would occur in the vicinity of Section 16 with the installation of the

Rampart lift and trails. Some construction activities (lift terminal and tower assembly) would require the use of a Type I helicopter in order to transport materials to construction sites. Helicopter operation would occur within suitable habitat and therefore a seasonal restriction during the critical breeding season of March 1-September 15 will be implemented as specified in Conservation Measure 4 (see Table 6-1), thus minimizing disturbance to marbled murrelet potentially occurring within the Action Area or adjacent habitat.

Canopy closure and tree size would be negligibly affected by the Proposed Action in the forested communities. The full clearing prescriptions described in Section 4.1, would completely remove the overstory and create additional openings, but would not alter canopy closure and tree size in adjacent undisturbed areas. The greatest impact associated with new openings would occur in the vicinity of Section 16 associated with the construction of the *Rampart* lift line and trails.

The expansion of night skiing operations in Section 16 would introduce new light sources into an area not previously lit. As shown in Conservation Measure 17, all new night skiing would utilize directional lighting that points down and away from forested areas. This measure would reduce the impact of new light sources on murrelets dispersing through adjacent forested areas.

7.2.1.1 Marbled Murrelet Critical Habitat

No proposed activities would occur within the WA-10-c. Additionally, Conservation Measure 4 would establish helicopter flight paths that would avoid overflight of WA-10-c. It is unlikely that the Proposed Action would directly affect marbled murrelet habitat within the CHU. The Proposed Action would not adversely affect the function of CHUs outside the Action Area utilized by marbled murrelets.

7.3 Grizzly Bear

A portion of the Action Area (Alpental) is located within the North Cascades Ecosystem, the nearest recovery zone for grizzly bear. The Proposed Action is not expected to result in significant impacts to grizzly bears. No grizzly bears have been documented or are know to occur with the Action Area. Potential short-term construction impacts to grizzly bear and their habitat could include disturbance during construction of chairlifts and associated trails and short-term changes in vegetation within areas developed for ski trails. Increases in wintertime activity would not impact grizzly bears as they would be in hibernation, most likely outside of the Action Area since suitable habitat for hibernation is lacking. Impacts to grizzly bear during the summer would be minimal to non-existent since no summertime recreation activities are proposed. Occasional lift and trail maintenance could potentially disturb bears that might pass through the area but this is expected to be rare. The addition of new chairlifts, the mountain-top restaurant, and new facilities would not be expected to alter grizzly bear travel habitat as this species is a

habitat generalist and will utilize a variety of habitats during its travels. Additionally, grizzly likely avoid the Action Area due to the high level of human use.

7.4 Gray Wolf

The Proposed Action is not expected to impact individuals as gray wolf occurrence has not been documented within the Action Area. The presence of gray wolves is expected to be rare and limited to occasional use of the Action Area as part of a larger home range territory, in part because the area is lacking in suitable denning habitat for this species.

As previously described, gray wolves use a variety of habitat types and appear to select habitat based upon prey availability and security from human disturbance. Ungulates are the primary prey of gray wolves, and elk, black-tailed, and mule deer are seasonally abundant throughout the Action Area. Ungulates are present during the late spring, summer, and early fall months, but absent in the winter when the snowpack makes the forage unavailable and travel difficult. Therefore, wolves may occasionally hunt within the Action Area during the summer. Potential impacts to the prey base from the Proposed Action could have adverse affects on potential wolf populations. Wolf abundance is related to prey density and their densities have been observed to increase as ungulate populations increased (Fuller, 1989; Lariviere et al., 2000). At low ungulate prey densities, wolves become nutritionally stressed, are more nomadic, less territorial, and more solitary (Mech, 1977; Messier, 1987).

Potential impacts to ungulates within the Action Area would include loss or conversion of cover habitat, an increase in foraging habitat, and disturbance due to construction and increased human activity. These impacts could lead to a short-term avoidance of the Action Area during the summer when construction activities occur. A reduction in the number of potential prey animals occurring in the Action Area could make it more difficult for wolves to find prey, thereby affecting their ability to forage. However, cover habitat does not appear to be limiting in the Action Area and the changes should be negligible.

Construction activities during the summer months associated with the Proposed Action would include increased noise and human activity within the Action Area that could result in short-term avoidance of the area by wolves. However, due to the proximity of I-90, SR906, the existing ski area operations, and the high level of private development, it is assumed that wolves currently avoid the area. Therefore, no impacts to wolf are expected during construction activities. Impacts to wolves due to winter ski area operations are not expected as this species is not expected to occur during the winter due to lack of suitable prey and increased human activity.

7.5 Canada Lynx

The Proposed Action is not expected to result in significant impacts to Canada lynx since it is not expected to occur in the Action Area, except during rare pass-through occasions. The Action

Area is not located within a LAU and it is considered peripheral habitat according to the Canada Lynx Recovery Outline (USWFS, 2005). The project is consistent with the Lynx Conservation Assessment and Strategy (LCAS, Ruediger et. al. 2000) and the Lynx Conservation Agreement (USFS and USFWS 2005). An amendment to the Lynx Conservation Agreement (USFS and USFWS 2006) further identified the southern portion of the OWNF and MBSNF as "unoccupied" by Canada Lynx. Potential impacts to lynx traveling through the area include disturbance due to construction and maintenance activities during both summer and winter. These activities could temporarily cause lynx to alter their route through the area. As such, Canada lynx are unlikely to use the area as a permanent home range, and any lynx using the area are likely to be in transit to more suitable habitat.

7.6 Bull Trout

Clearing and grading activities associated with the Proposed Action would result in increased soil erosion and subsequent sediment yield to Coal Creek and Keechelus Lake. Bull trout are known to occur in Keechelus Lake, which varies from about 1.0 to 2.5 miles downstream of proposed activities, depending on the pool level of the reservoir (lowest reservoir stage is usually in September). As described previously, bull trout have not been detected in Coal Creek and only are suspected to utilize the lower reaches near Keechelus Lake for rearing. Bull trout are known to utilize Gold Creek for spawning. To minimize impacts to resident bull trout, all in-water work will occur within approved work windows as described in Conservation Measure 21 (see table 6-1).

Habitat quality in Coal Creek has been greatly degraded in the past from multiple land management actions by different entities, including; tree harvest of riparian areas, floodplain constriction by I-90 freeway, delivery of sands into the channel from sanding of I-90, and the cumulative impacts from other land management actions, including the Snoqualmie Summit ski areas. Analysis of potential sediment generation was estimated using the Watershed Erosion Prediction Project model (Elliott, 1997). In interpreting the WEPP model's predictions, it is important to note that the WEPP documentation cautions that "At best, any predicted runoff or erosion value, by any model, will be within only plus or minus 50 percent of the [actual] value. Erosion rates are highly variable, and most models can predict only a single value. Replicated research has shown that observed values vary widely for identical plots, or the same plot from year-to-year. Also, spatial variability… of soil properties add[s] to the complexity of erosion prediction" (U.S. Forest Service, 2000).Under the Proposed Action, an increase of approximately 2.69 tons of sediment per year would be yielded to Coal Creek and 2.71 tons per year to Mill Creek. This increased sediment load would potentially impact rearing bull trout in the lower reaches of Coal Creek and Keechelus Lake.

This modeled estimate of sediment yield is considered a worst-case scenario as the WEPP model does not include the use of best management practices (BMPs) to reduce potential sediment yield. The implementation of Conservation Measure 8 would reduce the amount of sediment potentially reaching streams by requiring the use of BMPs in project specific plans. Research has indicated that silt fences trap 90 percent or better of sediment from hillslope erosion (Robichaud and Brown, 2002). Revegetation of exposed hillslopes has been shown to reduce erosion by greater than 70 percent using native vegetation (Grace, 2002). As such, the use of BMPs during construction would reduce potential sediment yields to streams and long-term site stabilization efforts through revegetation would further reduce potential sediment yields to Coal Creek and Keechelus Lake. Therefore, sediment yields resulting from the proposed action would be substantially less than modeled and would not likely directly affect bull trout.

7.7 Interdependent and/or Interrelated Effects

Development of the Proposed Action will necessitate maintenance activities (i.e. grooming, and mowing) that will prevent ecological succession of ski trails and other modified land cover areas from developing into fully functioning forested area. In the Action Area there would be no interdependent or interrelated effects relevant to listed species. Ongoing maintenance activities are addressed under annual Biological Assessments according to the Memorandum of Agreement between the USFs, USFWS, and NOAA Fisheries.

7.8 Cumulative Effects

7.8.1 Aquatic Species

The Final Environment Impact Statement (FEIS) for the Summit-at-Snoqualmie Master Plan identified 42 projects occurring within two 5th field watersheds, which include the Action Area described in Section 3.1 of this BA. Bull trout are only known ESA species occurring within the Action Area. Furthermore, bull trout are only know to occur within the Upper Yakima River watershed, therefore cumulative impacts will only be considered for project occurring within this watershed.

The Action Area encompasses a smaller subset of the 42 projects identified within the FEIS as it is smaller than the 5th field watershed. Within the Action Area, there are ongoing culvert replacements, I-90 maintenance and sanding operations, and the proposed I-90 East expansion that contribute to cumulative impacts with the proposed action.

Culvert replacements are an ongoing management need at The Summit-at-Snoqualmie. These replacements are typically done to correct culvert problems and prevent failures, excessive erosion or mass wasting. When culverts on perennial streams are replaced, there would be an unavoidable release of sediment downstream, increasing turbidity. However, USFS and WDFW requirements for culvert replacement include practical measures to reduce this impact. Over the

long-term, this activity would minimize serious erosion and water quality impacts that could have an adverse impact on fish.

Coal Creek and Lake Keechelus are impacted by sediment generation during Washington State Department of Transportation (WSDOT) maintenance and road sanding operations on I-90. According to a WEPP model analysis, approximately 380 tons of sand reach Coal Creek each year from I-90 sanding operations alone and contribute to cumulative sediment yields in Coal Creek and Lake Keechelus. I-90 maintenance has been the largest sediment source to Coal Creek, and has had a negative impact on Coal Creek for many years. While Coal Creek appears to have reached equilibrium, transporting sediment to Lake Keechelus during high flow events, the estimated 2.69 tons of sediment per year yield to Coal Creek and 2.71 tons per year to Mill Creek would be added to an already overburdened stream and potentially impact aquatic species. The proposed use of chemical deicers in place of traction sand would reduce sediment loading to streams and be beneficial to fish habitat as long as the chemical deicers are applied at a rate that would not increase chloride concentrations in streams above state water quality standards. WSDOT is proposing to use chemical deicers in place of traction sand on I-90 in the future. This change in highway management is expected to reduce the sediment load to Coal Creek, improving habitat conditions in Coal Creek.

The proposed I-90 East expansion would impact fish habitat through increased sediment generation from construction activities. Depending on the selected alignment, fish habitat could also be impacted from new stream crossings. As of the writing of this BA, the I-90 East expansion has not yet approved a selected alternative. A FEIS is anticipated to be released in the winter of 2008.

7.8.2 Terrestrial Species

The terrestrial Action Area for the Summit-at-Snoqualmie is comprised of a checkboard pattern of private and public land ownership. The FEIS for the Summit-at-Snoqualmie Master Plan identified 42 projects occurring within two 5th field watersheds that included the Action Area. The Action Area encompasses a smaller subset of the 42 projects identified within the FEIS as it is smaller than the 5th field watershed. Cumulative impacts to terrestrial ESA species are not expected to result in direct mortality. Indirect impacts to listed species would result from alterations in habitat. Projects within the Action Area that would contribute to cumulative impacts resulting in habitat alterations include I-90 modifications and maintenance, and private land developments. These projects would remove mature forest habitat and cause further reductions of this forest type in the Action Area. This would cumulatively reduce the amount of mature forest for species dependant on this habitat type for movement, foraging or breeding.

Within the Action Area, wildlife connectivity would be cumulatively impacted by the proposed action and the other projects identified. Private land development, I-90 modifications, and the

proposed action would result in the fragmentation of forest habitat and an increase in human activity in the area, thereby reducing opportunities for travel and movement by wildlife species and reducing connectivity between the north and south cascades. The 390 acre land donation included in the proposed action, combined with the wildlife connectivity emphasis package of the I-90 East project would cumulatively contribute to improved connectivity by proving alternative links between the north and south cascades.

8.0 DETERMINATION OF EFFECT

Table 8 presents the effect determination for each listed species. Additional information can be found in the following paragraphs.

Table 8
Determination of Effect to Listed Species

Species	Effect Determination
Northern Spotted Owl	May Affect, Not Likely to Adversely Affect
Northern Spotted Owl Critical Habitat	No Effect
Marbled Murrelet	May Affect, Not Likely to Adversely Affect
Marbled Murrelet Critical Habitat	No Effect
Grizzly Bear	May Affect, Not Likely to Adversely Affect
Gray Wolf	May Affect, Not Likely to Adversely Affect
Canada Lynx	No Effect
Bull Trout	May Affect, Not Likely to Adversely Affect

8.1 Northern Spotted Owl

No individual spotted owls are expected to be affected by the Proposed Action as no individuals or nests have been documented within the Action Area during previous surveys. The nearest known nests are greater than one mile from the Action Area and no proposed activities would occur within inner core spotted owl sites. Suitable habitat within the Action Area is not expected to be utilitized due to the proximity of noise disturbance from I-90, SR 907, the existing ski area operations, and private developments within the vicinity. However, the Proposed Action would remove approximately 3.77 acres of NRF habitat and 20.28 acres of dispersal habitat within the Action Area.

The loss of approximately 3.77 acres of NRF habitat for construction of the *Rampart* chairlift and associated ski trails is expected to be insignificant as spotted owls have been determined to be absent from the Action Area based on the lack of detections during surveys. Implementation of the Conservation Measures listed in Table 6-1 would reduce impacts to owls in the vicinity of construction activities. The seasonal and flight restrictions on helicopter use during the critical breeding season as described in Conservation Measure 4 would reduce impacts to nesting owls potentially occurring within adjacent NRF and Critical habitat. **Therefore the Proposed Action May Affect, but is Not Likely to Adversely Affect northern spotted owl as spotted owls are not likely to be present during construction activities.**

8.1.1 Northern Spotted Owl Critical Habitat

The Proposed Action would have No Effect on northern spotted owl critical habitat as no project activities would occur within CHU WA-33. Conservation measures listed in Table 6-1 would place seasonal and location flight restrictions on helicopters so that overflight of CHU-WA-33 would be avoided.

8.2 Marbled Murrelet

The Proposed Action would remove approximately 3.77 acres of suitable murrelet habitat within the Action Area. However, based on survey data, marbled murrelets are considered to be absent from the Action Area. **Therefore the Proposed Action May Affect, but is Not Likely to Adversely Affect marbled murrelet as there has been no documented occurrence within the Action Area and are not likely to be present during construction activities.**

8.2.1 Marbled Murrelet Critical Habitat

The Proposed Action would have **No Effect** on marbled murrelet Critical Habitat. The Snoqualmie Pass Action Area partially overlaps designated critical habitat for marbled murrelets, CHU WA-10-c (approximately 150.26 acres). It is unlikely that the Proposed Action would directly affect marbled murrelet habitat within the CHU. The Proposed Action would not adversely affect the function of CHUs outside the Action Area utilized by marbled murrelets.

8.3 Grizzly Bear

A portion of the Action Area (by Alpental) occurs within the North Cascade Recovery Zone for grizzly bear. This portion of the Action Area is within a BMU and contains core habitat. However, the area is partially designated with a winter sports emphasis and experiences a high level of human activity and development. The Proposed Action does not include summer activities and therefore there would not be a subsequent increase in human use of the area during the times when grizzly are likely to be present. **Therefore, the Proposed Action May Affect, but is Not Likely to Adversely Affect grizzly bear as no bears have been documented within the Action Area.** Grizzly bear are considered habitat generalists and the removal of habitat (clearing) within the Action Area is not expected to affect bears.

8.4 Gray Wolf

The Proposed Action is not expected to impact individuals or populations of gray wolf as no sightings of wolves have been documented within the Action Area. Since wolves are habitat generalists, the removal of habitat through project activities (clearing) is not expected to impact wolf habitat within the Action Area. Potential impacts to wolf prey, ungulate populations, include an avoidance of the Action Area during summer construction activities. This could impact wolf foraging opportunities during the summer. Ungulates are known to avoid the Action

Area during the winter as it does not contain suitable wintering grounds due to the high elevation and snowpack. **Therefore, the Proposed Action May Affect, but is Not Likely to Adversely Affect gray wolf.** The proximity of I-90, SR906, and year-round human disturbance at the existing ski area would likely lead to an avoidance of the area by gray wolf.

8.5 Canada Lynx

The Proposed Action would have No Effect on Canada lynx. No lynx have been documented within the Action Area. The Action Area is not located within a LAU. Occurrence of lynx within the Action Area is expected to be limited to rare pass-through events. As previously described, the Action Area is not considered lynx habitat due to lack of suitable denning or foraging habitat which is due to the lack of plant associations identified as suitable lynx habitat as defined by the USFS (Forbes, pers. comm., 2004). According to the Canada Lynx Recovery Outline (USFWS 2005), the Action Area is located within peripheral habitat which has been classified as "unoccupied" by the amended Lynx Conservation Agreement (USFS and USFWS 2006).

8.6 Bull Trout

Clearing and grading activities associated with the Proposed Action have the potential to increase soil erosion and subsequent sediment yield to Coal Creek and Mill Creek by 2.69 and 2.71 tons per year respectively. Increased sediment yield have the potential to effect bull trout spawning and rearing habitat to Keechelus Lake and Coal Creek. However, the use of BMPs per Conservation Measure 8 would substantially reduce actual yields to streams within the Action Area. **Therefore, the Proposed Action May Affect, but is Not Likely to Adversely Affect bull trout.**

9.0 SUMMARY AND CONCLUSION

The Summit-at-Snoqualmie master Development Plan Proposal May Affect and is Not Likely to Adversely Affect northern spotted owl, marbled murrelet, grizzly bear, gray wolf, and bull trout. The proposed project would have No Effect on Canada lynx, or Critical Habitat for northern spotted owl and marbled murrelet.

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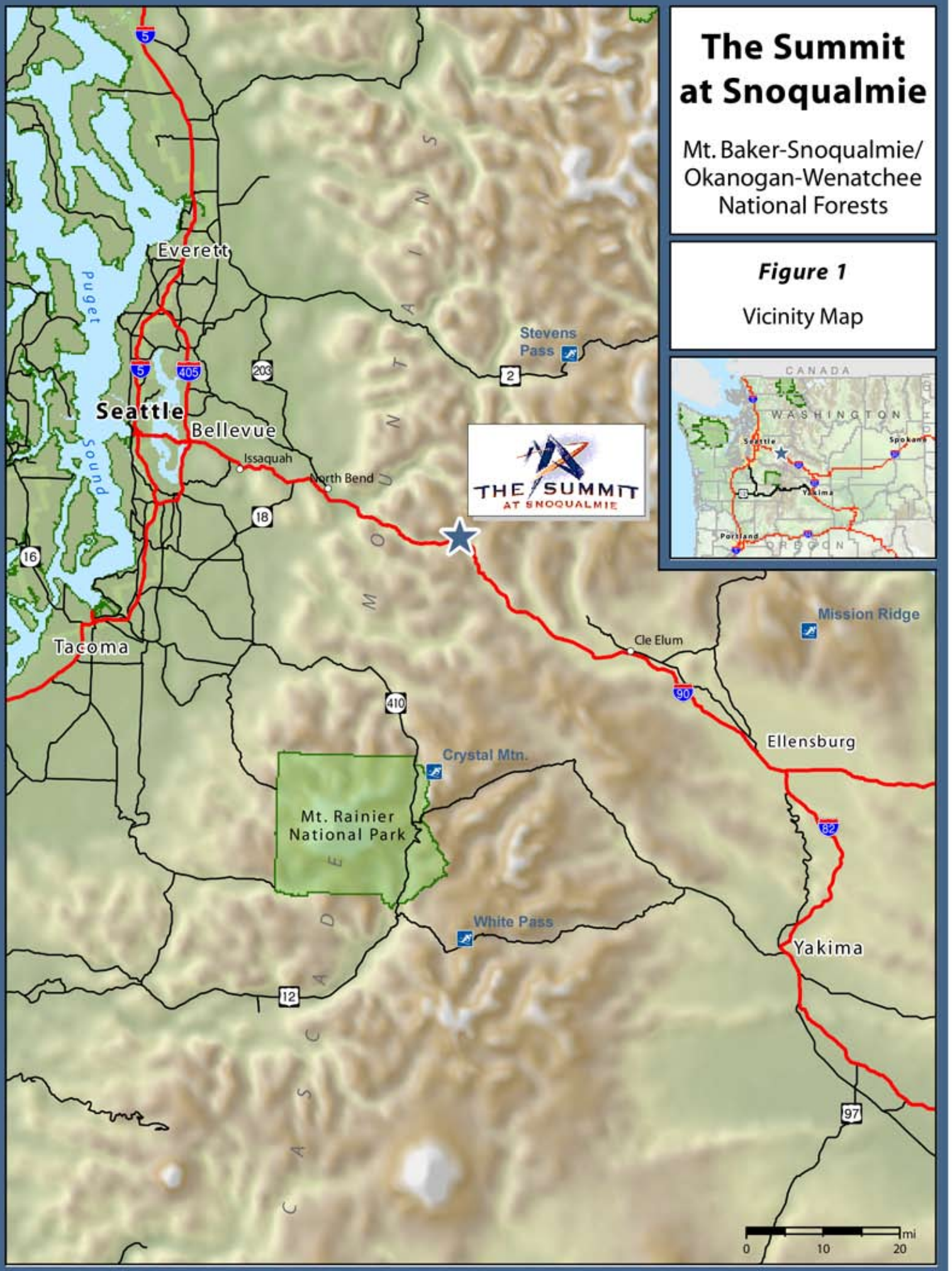
The Summit at Snoqualmie

Mt. Baker-Snoqualmie/
Okanogan-Wenatchee
National Forests

Figure 1

Vicinity Map

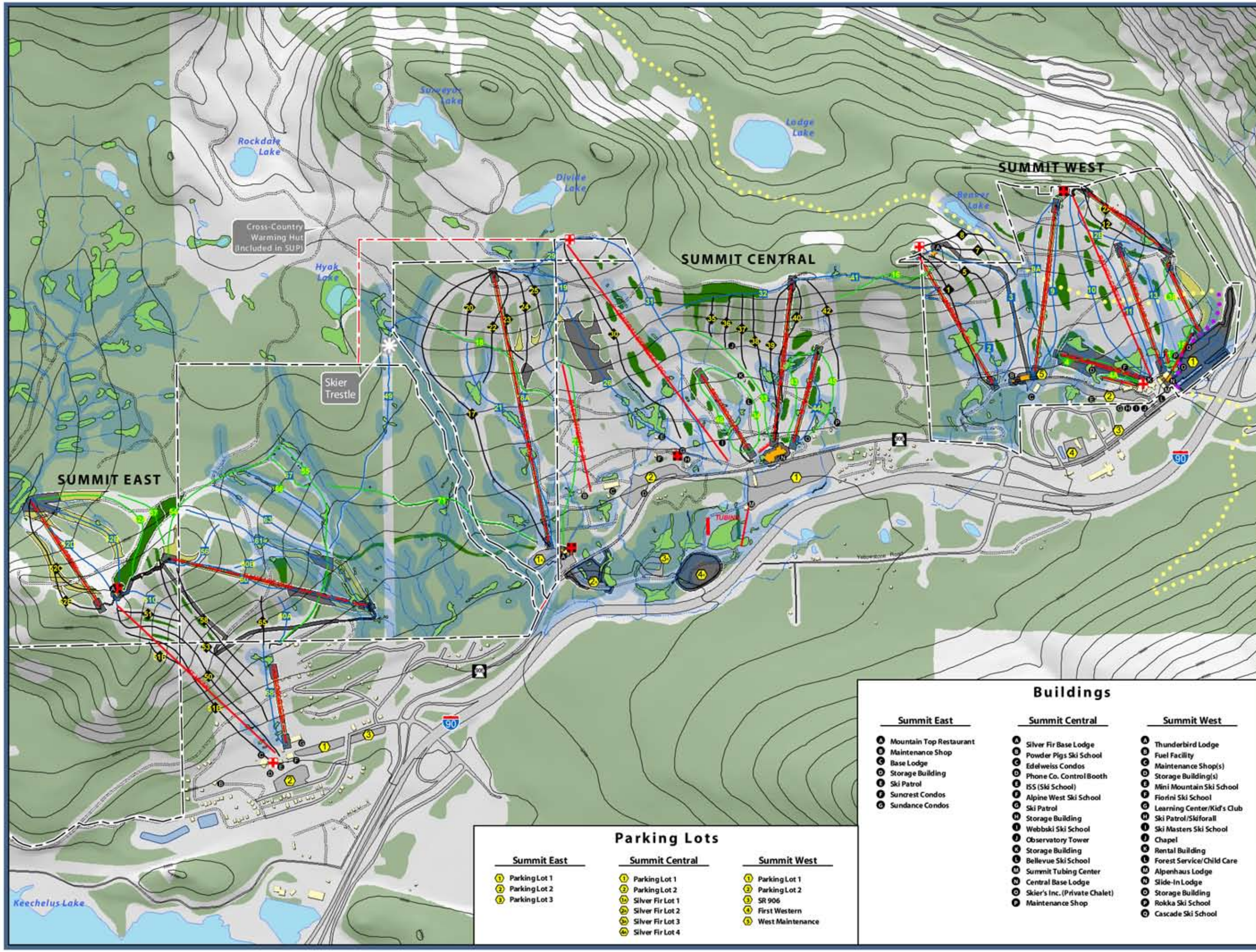


The Summit

Mt. Baker-Snoqualmie/
Okanogan-Wenatchee
National Forests

Figure 2

Proposed Action



Parking Lots

Summit East

1. Parking Lot 1
2. Parking Lot 2
3. Parking Lot 3

Summit Central

1. Parking Lot 1
2. Parking Lot 2
1a. Silver Fir Lot 1
2a. Silver Fir Lot 2
3a. Silver Fir Lot 3
4a. Silver Fir Lot 4

Summit West

1. Parking Lot 1
2. Parking Lot 2
3. SR 906
4. First Western
5. West Maintenance

Buildings

Summit East

- A Mountain Top Restaurant
- B Maintenance Shop
- C Base Lodge
- D Storage Building
- E Ski Patrol
- F Suncrest Condos
- G Sundance Condos

Summit Central

- A Silver Fir Base Lodge
- B Powder Pigs Ski School
- C Edelweiss Condos
- D Phone Co. Control Booth
- E ISS (Ski School)
- F Alpine West Ski School
- G Ski Patrol
- H Storage Building
- I Webbski Ski School
- J Observatory Tower
- K Storage Building
- L Bellevue Ski School
- M Summit Tubing Center
- N Central Base Lodge
- O Skier's Inc. (Private Chalet)
- P Maintenance Shop

Summit West

- A Thunderbird Lodge
- B Fuel Facility
- C Maintenance Shop(s)
- D Storage Building(s)
- E Mini Mountain Ski School
- F Fiorini Ski School
- G Learning Center/Kid's Club
- H Ski Patrol/Skiforall
- I Ski Masters Ski School
- J Chapel
- K Rental Building
- L Forest Service/Child Care
- M Alpenhaus Lodge
- N Slide-In Lodge
- O Storage Building
- P Rokka Ski School
- Q Cascade Ski School

LEGEND

- Chair Lift - Existing
- Chair Lift - Proposed
- Chair Lift - Modified
- Ski Trail - Beginner
- Ski Trail - Expert
- Ski Trail - Intermediate
- SUP Boundary - Existing
- SUP Boundary - Proposed
- Ski Patrol - Existing
- Ski Patrol - Proposed
- Building - Existing
- Building - Proposed
- Parking Lot - Existing
- Parking Lot - Proposed
- Pacific Crest Trail
- Pacific Crest Trail - Reroute
- Retention Pond
- Streams & Riparian Buffers
- Lake/Pond
- Wetland
- Paved Road
- Grading
- Clearing
- Revegetation

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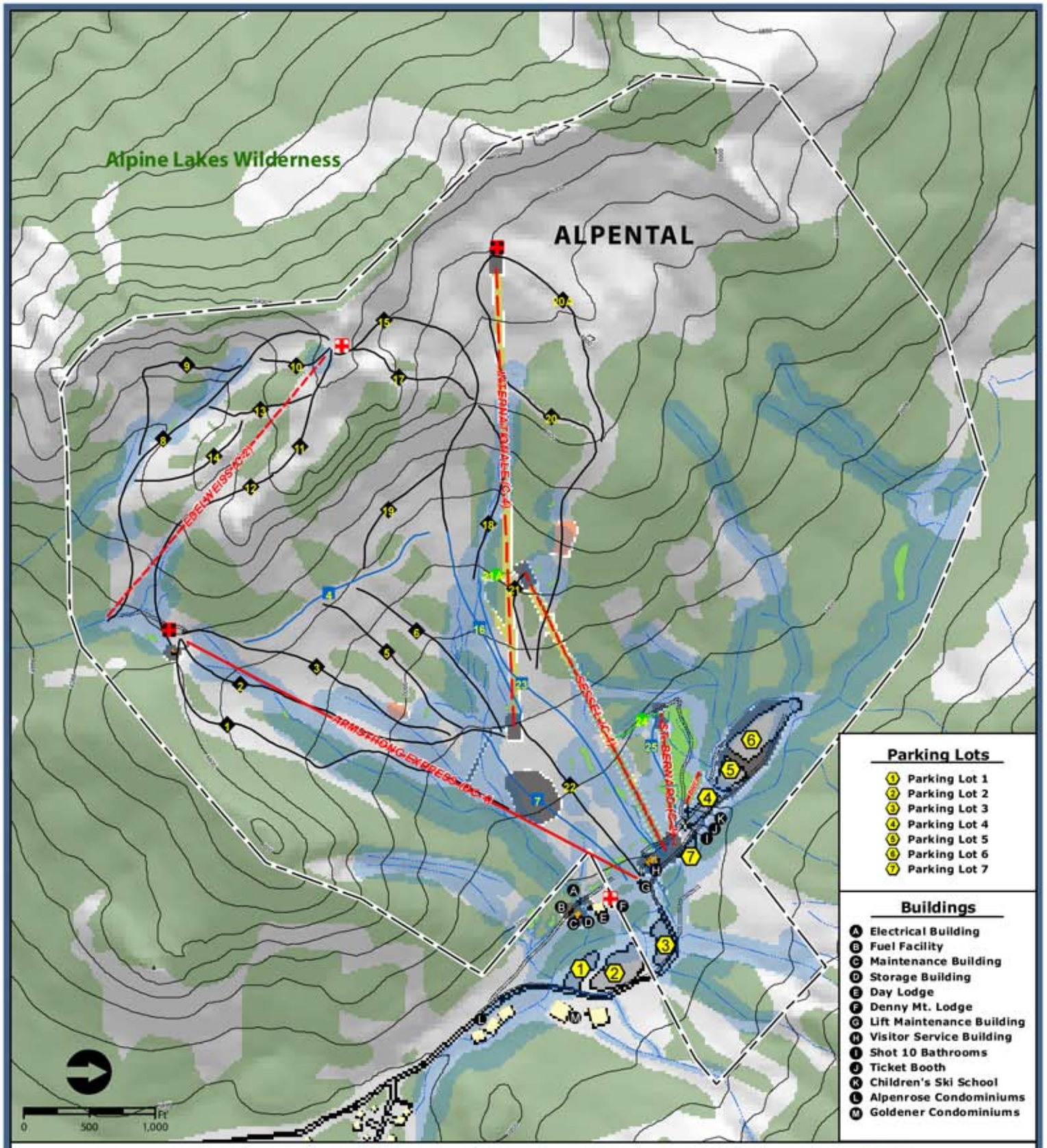

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Mt. Baker-Snoqualmie/
Okanogan-Wenatchee
National Forests

Figure 3
Proposed Action

- Chair Lift - Existing
- Chair Lift - Proposed
- Chair Lift - Modified
- Ski Trail - Beginner
- Ski Trail - Expert
- Ski Trail - Intermediate
- SUP Boundary - Existing
- Wilderness Boundary
- Ski Patrol - Existing
- Ski Patrol - Proposed
- Building - Existing
- Building - Proposed
- Parking Lot - Existing
- Paved Road
- Streams & Riparian Buffers
- Wetland
- Blasting
- Grading
- Clearing

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The Summit

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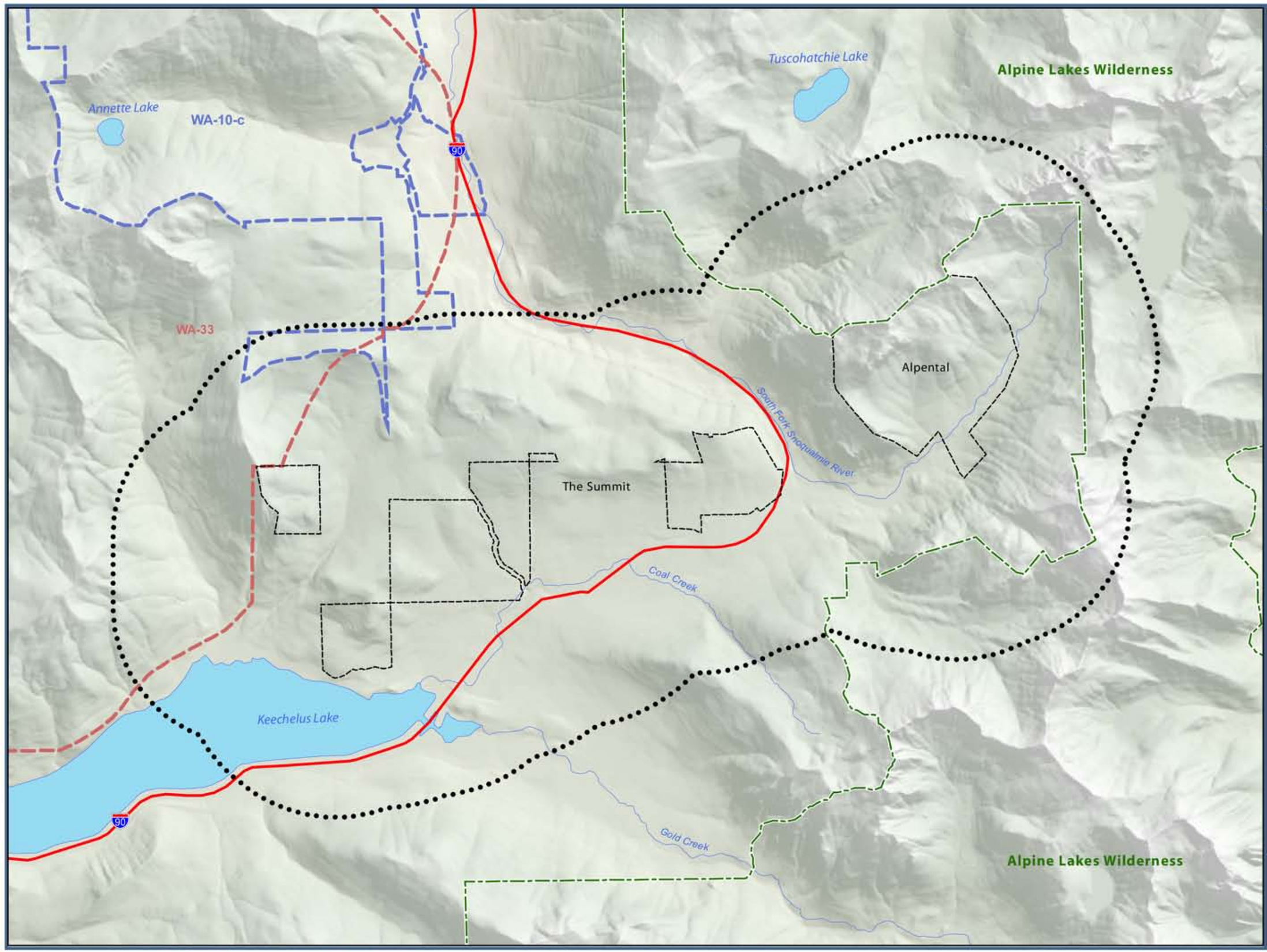
National Forests

Figure 4
Action Area



LEGEND

- Action Area Boundary
- Critical Habitat Unit - Spotted Owl
- Critical Habitat Unit - M. Murrelet
- Wilderness Boundary
- SUP Boundary - Existing
- Lake/Pond

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The Summit

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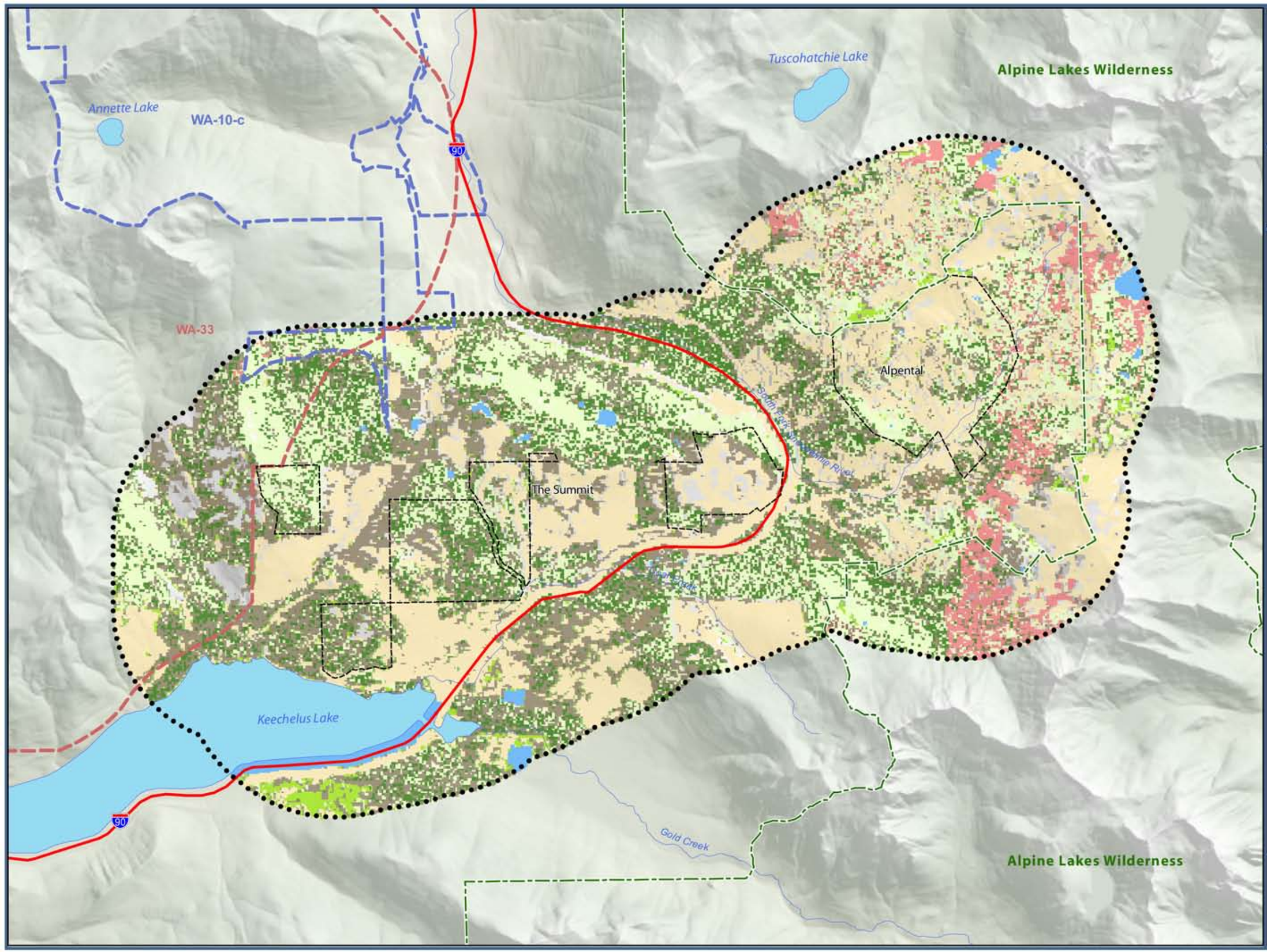
Figure 5
Existing Vegetation Type



LEGEND

- Action Area Boundary
- Critical Habitat Unit - Spotted Owl
- Critical Habitat Unit - M. Murrelet
- Wilderness Boundary
- SUP Boundary - Existing
- Lake/Pond

Vegetation Type

- Grass/Shrub
- Douglas Fir
- Grand Fir
- Mixed Conifer
- Mtn. Hemlock
- Noble Fir
- Pacific Silver Fir
- Sub Alpine Fir
- Western Hemlock
- Hardwood
- Water
- Rock/Talus

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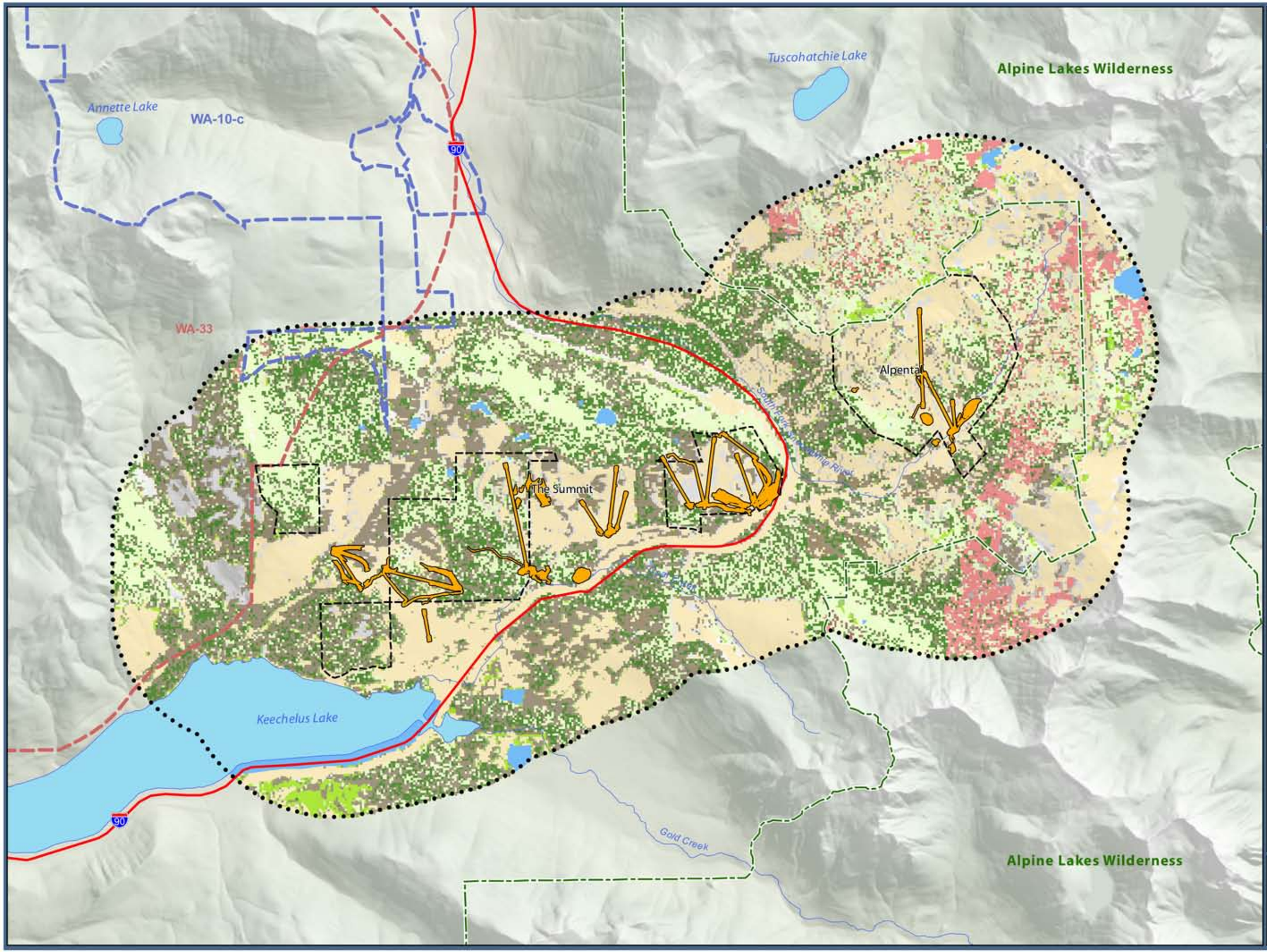
The Summit

Mt. Baker-Snoqualmie/
Okanogan-Wenatchee
National Forests

Figure 6
Existing Vegetation Type Impacts



LEGEND

- Action Area Boundary
- Critical Habitat Unit - Spotted Owl
- Critical Habitat Unit - M. Murrelet
- Wilderness Boundary
- SUP Boundary - Proposed
- Lake/Pond
- Impacts*

Vegetation Type

- Grass/Shrub
- Douglas Fir
- Grand Fir
- Mixed Conifer
- Mtn. Hemlock
- Noble Fir
- Pacific Silver Fir
- Sub Alpine Fir
- Western Hemlock
- Hardwood
- Water
- Rock/Talus

* Impacts are associated with lift, trail, utility and building construction as described in Section 3.2 - Proposed Action.

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The Summit

Mt. Baker-Snoqualmie/
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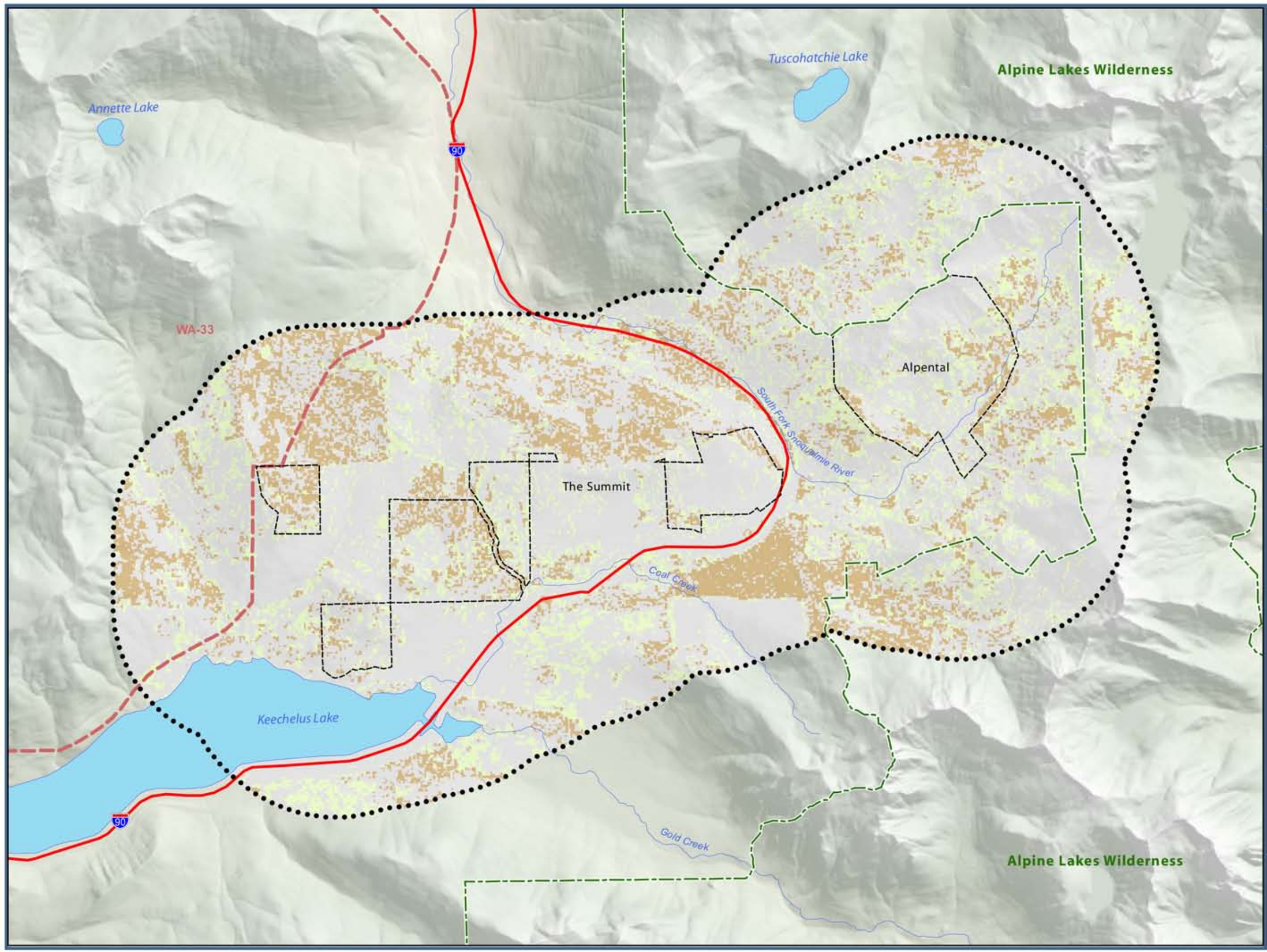
National Forests

Figure 7
Spotted Owl Habitat



LEGEND

Owl Habitat

- NRF
- Dispersal
- None
- Action Area Boundary
- Critical Habitat Unit - Spotted Owl
- Wilderness Boundary
- SUP Boundary - Existing
- Lake/Pond

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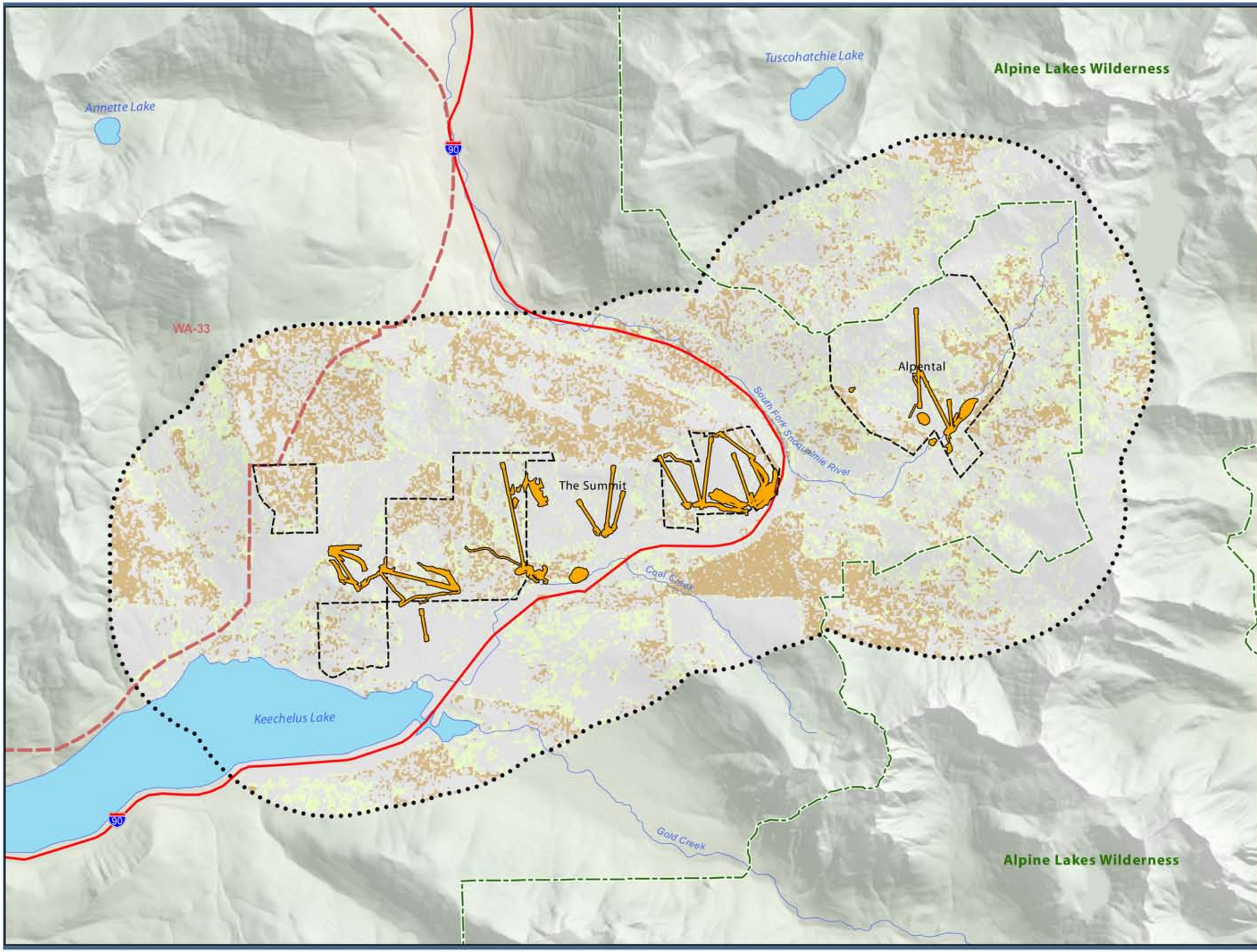
Figure 8
Spotted Owl Habitat Impacts



LEGEND

Owl Habitat

- NRF
- Dispersal
- None
- Impacts*
- Action Area Boundary
- Critical Habitat Unit - Spotted Owl
- Wilderness Boundary
- SUP Boundary - Proposed
- Lake/Pond

* Impacts are associated with lift, trail, utility and building construction as described in Section 3.2 - Proposed Action.

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