United States
Department of
Agriculture

Forest
Service

November 2012

Timberline Ski Area Mountain Bike Trails and Skills Park

Environmental Assessment

Zigzag Ranger District
Mt. Hood National Forest

Clackamas County, Oregon

Cover photo: Downhill mountain biker on an intermediate singletrack near Hood River, OR. Photo by Carl Warren.

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Legal Description: T3S, R9E, Sections 7, 12, 13, Willamette Meridian

Lead Agency: USDA Forest Service

Responsible Official: Chris Worth
Forest Supervisor
Mt. Hood National Forest

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Chapter 1: Purpose and Need for Action

1.0 Introduction

Timberline Ski Area is located on the Zigzag Ranger District of the Mt. Hood National Forest (Forest), on the southwest side of Mt. Hood, in northwestern Oregon (see Figure 1 - Timberline Ski Area Vicinity Map). RLK and Company (RLK) operates Timberline Lodge and Ski Area (Timberline) under a 30-year Special Use Permit (SUP) issued by the U.S. Forest Service. The Timberline SUP area encompasses approximately 1,415 acres.

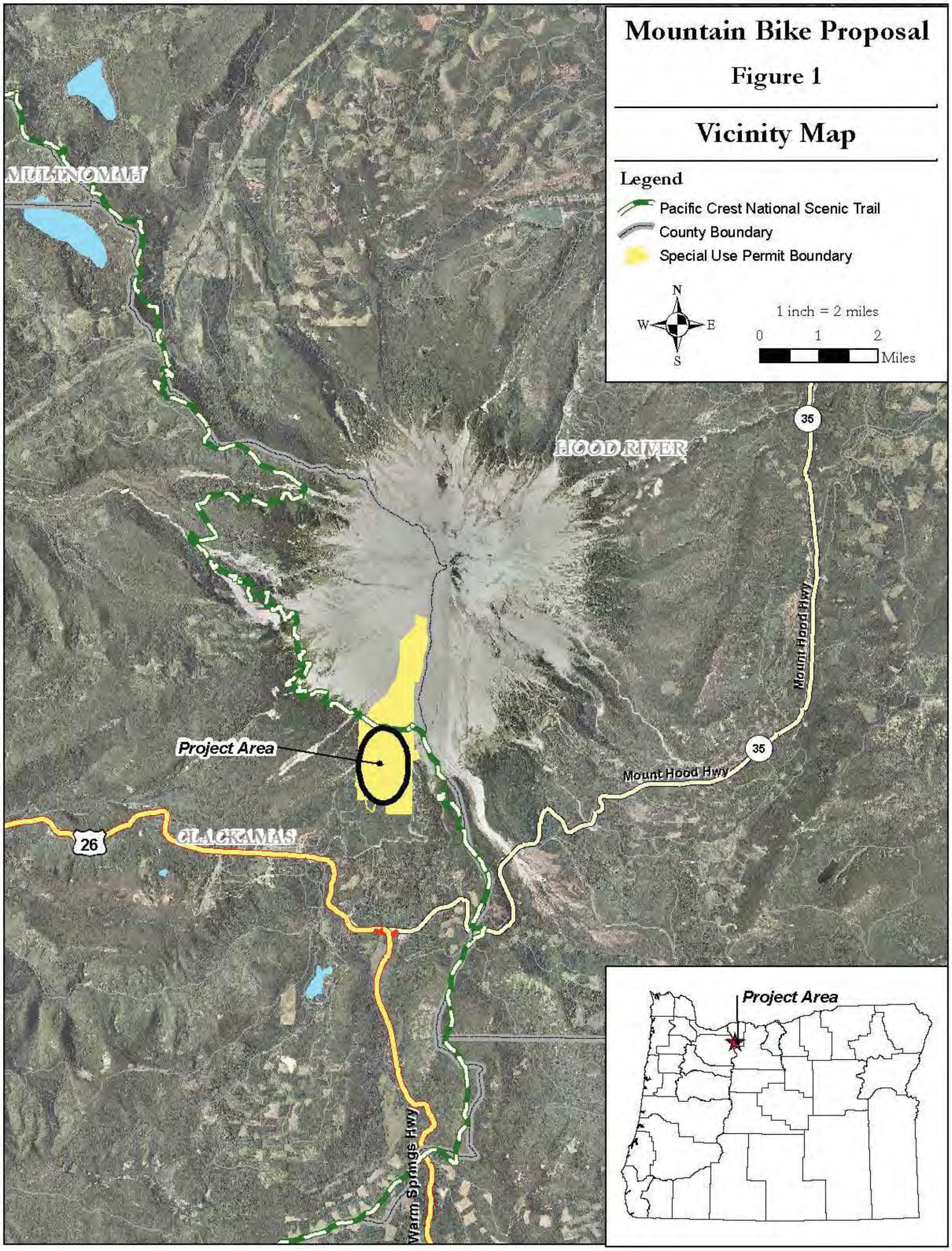
This environmental assessment analyzes the effects of a proposal by RLK to develop a managed, lift-assisted downhill-only mountain bike trails system and skills park. The trails system would be located within the terrain serviced by the existing Jeff Flood Express Lift within the Timberline SUP boundary (see Figure 2 - Proposed Action). The skills park would be located just below the Wy'East Day Lodge. The trail system would include approximately 17 miles of trail, and the skills park would encompass approximately 0.2 acre for a total amount of ground disturbance of approximately 12 acres. The Proposed Action also includes watershed restoration activities that would reduce sediment contribution to the Still Creek and West Fork Salmon drainages. The restoration activities would decommission and/or stabilize approximately 2.1 miles of native surface roads and restore seven sites for a total of approximately six acres of restoration within or adjacent to the project area. The project area is the southern half of the Timberline SUP area, within the Still Creek and West Fork Salmon River watersheds. The trails system, skills park, and restoration activities are described in detail in Chapter 2. This environmental assessment analyzes two alternatives—the Proposed Action and No-Action alternatives. The effects of these alternatives are summarized in Chapter 2 and discussed in detail in Chapter 3.

This document and all appendices are posted on the Mt. Hood National Forest's website (www.fs.usda.gov/mthood) in the "Land and Resources Management" section under "Projects."

1.1 Background

Lift-assisted mountain biking involves riders using a modified chairlift to bring themselves and their mountain bikes to the top of a downhill-specific bike trail system. Using a chairlift allows riders of all abilities and fitness levels to descend a variety of trails multiple times and develop new skills.

Lift-assisted mountain biking is a popular sport that has evolved from an extreme sport for skilled athletes to a mainstream sport accessible to a broad spectrum of riders.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W
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S
1 inch = 2 miles
0
1
2
Miles
MULTNOMAH
HOOD RIVER
CLACKAMAS
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35
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26
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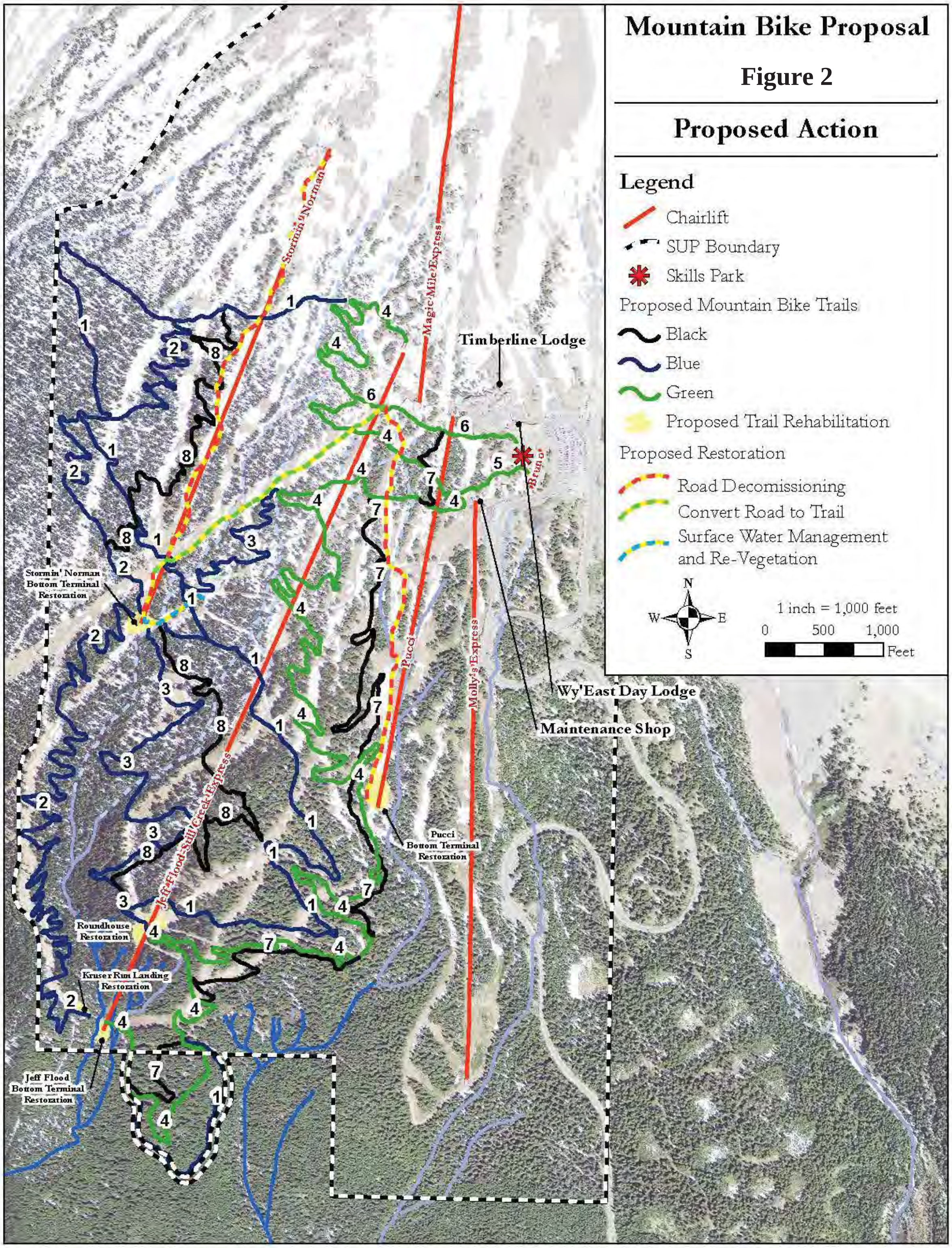
Project Area



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Proposed Trail Rehabilitation
Proposed Restoration
Road Decomissioning
Convert Road to Trail
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N
W
E
S
1 inch = 1,000 feet
0
500
1,000
Feet
Timberline Lodge
Wy'East Day Lodge
Maintenance Shop
Stormin' Norman
Magic Mile Express
Pucci
Molly's Express
Jeff Flood-Still Creek Express
Bruno's
Stormin' Norman Bottom Terminal Restoration
Pucci Bottom Terminal Restoration
Roundhouse Restoration
Kruser Run Landing Restoration
Jeff Flood Bottom Terminal Restoration

Rather than using ski runs, downhill, lift-assisted mountain biking requires a different trail system to be built. While mountain bike trails sometimes cross ski runs, downhill mountain bike trails are built specifically for summer use and are generally far less steep than even the easiest winter ski run. Properly designed, constructed, and maintained lift-assisted mountain bike trails use grade reversals and other techniques to control the downhill speed of the bikes in a safe and well-maintained fashion. This is especially important at turns or other features in the trail as it reduces the need for braking and minimizes impacts to soil and vegetation. Additionally, if trails are well-designed, then riders are able to stay on the trail because of the way the trail flows, speeds up and slows down for the next feature.

RLK's goal is to develop a managed and maintained, high-quality mountain bike park that would appeal to families and feature predominantly beginner and intermediate level trails and areas for learning biking skills and riding etiquette. RLK considers lift-assisted mountain biking to be an efficient way to capitalize on existing infrastructure beyond just the ski season, by providing year-round recreation opportunities for recreationists and a revenue source for them, as the permittee. It can also enable more stable year-round employment for those that might otherwise be seasonal employees. Existing infrastructure such as roads, ski lifts, parking lots, lodge facilities, restrooms and signage could be used to support the use of a mountain bike park.

RLK's Master Development Plan

RLK submitted a Master Development Plan (MDP) in January 2009 to the Forest as required by their SUP. RLK prepared the MDP to serve as a conceptual planning tool to provide their vision as to what the ski area may develop into over the next 10-15 years. The Forest reviewed the MDP and found that the potential projects in the MDP would be consistent with applicable laws, regulations, policies, and the Forest Plan (as amended). Therefore, the Forest accepted the MDP in May 2009. In December 2009, RLK submitted an amendment to their MDP which clarified their interest in the development of a lift-assisted mountain bike trail system served by the Jeff Flood chairlift. The Forest reviewed the amended MDP and accepted it in February of 2010. The acceptance of a MDP does not represent Agency approval of any element in that plan. In essence, the MDP documents compliance with a provision in their SUP to have a master development plan. As stated in the acceptance letter, any element of the plan that is proposed to the Forest Service would be subject to environmental analysis under the National Environmental Policy Act (NEPA).

In February 2010, RLK presented a formal mountain bike proposal to the Forest. The proposal was consistent with the criteria in the Forest Service Handbook at 2909.11, Chapter 10. In June 2010, the Forest began its review of the proposal under NEPA by initiating the scoping process for this proposal. The proposed mountain bike project is not dependent on and does not trigger any of the other potential projects in the MDP. For these reasons, other potential projects in the MDP are not being evaluated at this time.

1.2 Purpose & Need for Action

The following section describes the purpose and need for the Proposed Action.

1) **To respond to RLK's proposal to develop a system of downhill mountain bike trails and a skills park within their permit area boundary.**

The Forest is responding to RLK's February, 2010 proposal to develop a system of downhill mountain bike trails and a skills park within their permit area boundary. RLK's purpose of the project is to provide the public with additional year-round recreational activities to better use the existing ski area infrastructure while helping to meet the demand that they have determined exists for lift-serviced mountain biking in this area.

2) **To meet Forest Plan direction outlined in the Winter Recreation land allocation area.**

The proposal would help to meet the Desired Future Condition for Timberline as described in the Forest Plan. The Timberline permit area, including the proposed project area, is in the Winter Recreation Area management area (Forest Plan, p. Four - 190). The goal for the management area is to provide for areas of high quality winter and summer recreation opportunities, and the Desired Future Condition includes providing summer recreation activities such as hiking, mountain bicycling, and horseback riding (Forest Plan, p. Four–190 and -191).

This proposal is supported by the Service-wide Memorandum of Understanding (MOU) between the USDA Forest Service and the National Ski Area Association. The MOU states, "Enhancing programs for four-season use can more fully utilize infrastructure to encourage outdoor recreation and mitigate the effects of weather fluctuations and climate change, as well as improve workforce stability and the local economy." This proposal is also supported by the 2011 Ski Area Recreational Opportunity Enhancement Act, which provides for four-season non-skiing-related recreation and facilities to be considered viable proposals and uses at ski areas. Mountain biking is an acceptable use of the area within the Timberline SUP.

3) **To reduce sediment delivery to Still Creek and the West Fork Salmon River.**

Existing infrastructure within the Timberline permit area, including ski area facilities, Forest Service roads, and highway sanding associated with Timberline Road have increased sediment delivery to Still Creek and the West Fork Salmon River and negatively impacted water quality and fish habitat. Restoration efforts to reduce sediment delivery are proposed in these areas to enhance and/or accelerate ongoing restoration projects.

1.3 Proposed Action

In February, 2010, RLK submitted a proposal to the Mt. Hood National Forest to develop a managed, lift-assisted downhill-only mountain bike trails system and skills park within the southern portion of the ski area permit boundary. Their proposal has become the Proposed Action. The Proposed Action consists of an approximately 17-mile trail network and a separate skills park that would encompass approximately 0.2 acre. The trail system would be designed to accommodate all skill levels with an emphasis on beginner and intermediate levels. All of the proposed trails would be within the Ski Area SUP boundary except for the lowest portions of trails 1, 4 and 7 (see Figure 2 - Proposed Action). These trail portions would be authorized through a SUP as an ancillary facility to the Ski Area Permit. The bike trails and skills park would be a fee-based system, similar to using lift tickets for downhill skiing, and would be managed and maintained by RLK under the terms and conditions of an operating plan as part of their SUP. A detailed description including project design criteria and a map of the proposed trails system and skills park is provided in Chapter 2.

In addition to the proposed mountain bike park, restoration actions have been developed with the collaboration of RLK and are included in the Proposed Action. The interdisciplinary team (IDT) that is preparing the environmental analysis has identified and developed corrective measures for approximately two miles of native surface roads in the project area that are contributing sediment to nearby stream systems.[1] These older service roads are not part of the Forest transportation system and are not open to the public. There would be no change in public access to roads in this area with this proposal. The IDT also identified several sites associated with chairlift bottom terminals and/or an existing mixed-use trail (the Glade Trail) that were in need of restoration and have also developed corrective measures for these areas. These restoration activities are described in detail in Chapter 2.

Over the last several years, the Forest has utilized site-specific project analysis as an opportunity to identify road-related issues or concerns in a project area, and to design corrective actions that will help reduce road-related aquatic impacts and restore watersheds. Several years ago, the Mt. Hood National Forest began implementing a strategy to help restore watersheds across the Forest. This strategy included a Forest-wide road decommissioning effort, and the Districts were directed to consider opportunities for reducing road-related aquatic impacts during project planning.

1.4 Decision Framework

The deciding official (i.e., Responsible Official) for this project is the Forest Supervisor. Based on the environmental analysis, and considering the public comments received, the Responsible Official will decide whether:

- To construct the mountain bike trails and a skills park and restoration projects as proposed, including all associated project design criteria;
- To construct a mountain bike trails and skills park, restoration projects, and project design criteria with modifications to the proposal; or,
- To take no action at this time.

The primary factor that will influence the Forest Supervisor's decision is based on how well the purpose and need are addressed, and how well the key issues are resolved through project design or through not taking action. The Decision Notice will document and describe what activities will be implemented to address the purpose and need. The decision will be consistent with the Mt. Hood Forest Plan, as amended, and will incorporate the associated project design criteria.

[1] Corrective measures are restoration actions designed to address processes of concern, such as sedimentation and stream drainage network enhancement.

1.5 Management Direction

This environmental assessment is tiered to the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Mt. Hood National Forest Land and Resource Management Plan (hereafter referred to as the Forest Plan) (USDA Forest Service 1990), as amended. The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. Forest Plan objectives include managing ski areas to provide a diversity of winter and summer developed recreation activities that emphasize the forest setting (Forest Plan, p. Four-191).

Additional management direction for the area is also provided in the following Forest Plan amendments:

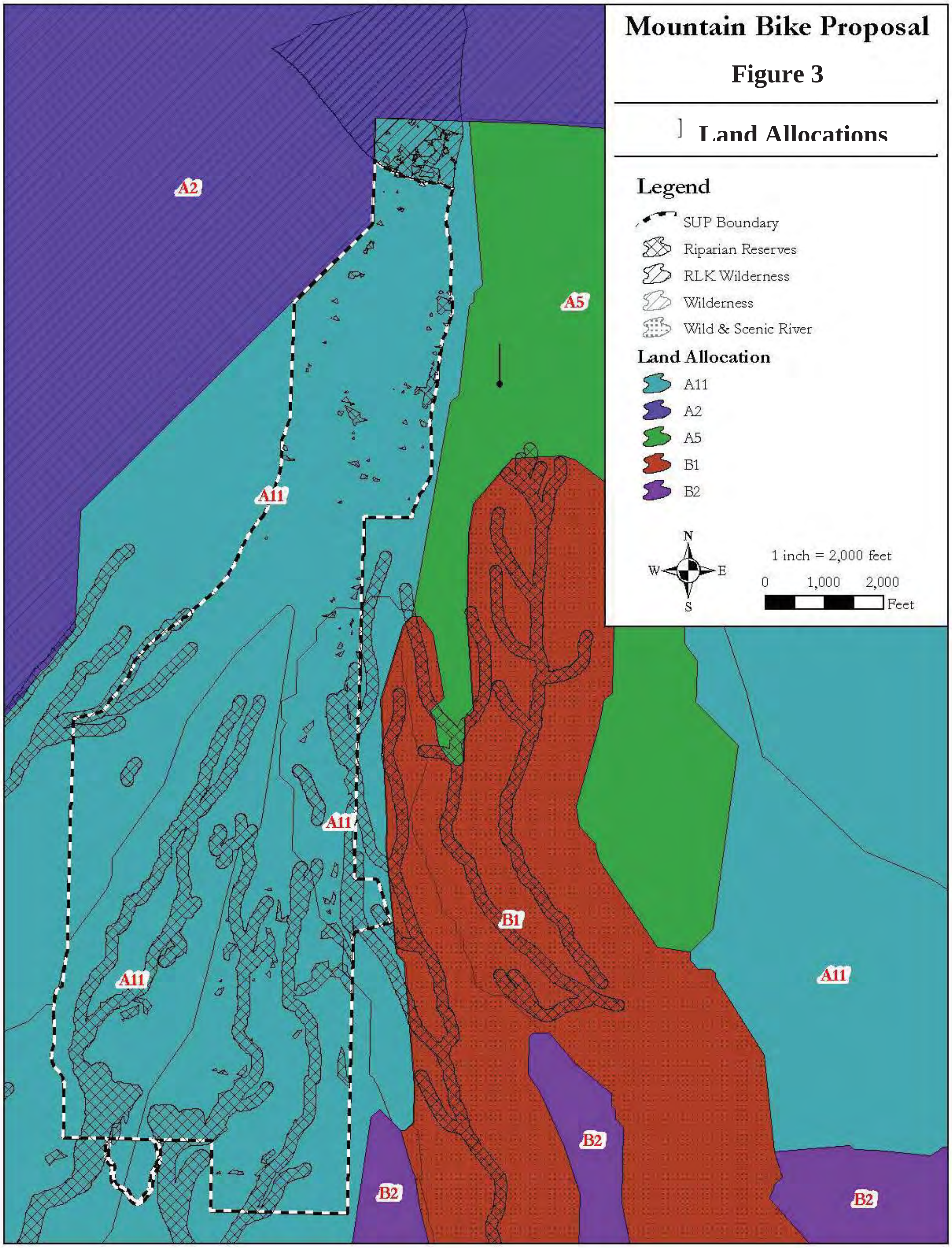
- The Northwest Forest Plan (NWFP) - *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (USDA & USDI 1994);

- Survey & Manage – *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (USDA Forest Service et al. 2001); and,

- Invasive Plants– *Pacific Northwest Invasive Plant Program Preventing and Managing Invasive Plants Record of Decision* (USDA Forest Service 2005); and *Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia Gorge Scenic Area in Oregon* (USDA Forest Service 2008).

Land Designations

The 1994 NWFP ROD land allocations amend those allocations described in the 1990 Forest Plan. There is considerable overlap among some allocations; therefore, more than one set of standards and guidelines may apply. Where the standards and guidelines of the 1990 Forest Plan are more restrictive or provide greater benefits to late-successional forest-related species than do those of the 1994 NWFP ROD, the existing standards and guidelines apply. The proposed mountain biking and road-related restoration activities would occur primarily in Management Area A-11 (Winter Recreation Areas), which emphasizes winter recreation (see Figure 3 – Land Allocations)**Error! Reference source not found.**. The stated goal of Management Area A-11 is o "provide high quality winter recreation (and associated summer) opportunities including: downhill skiing, nordic skiing, snowmobiling, and snowplay within a natural appearing forest environment" (USDA, 1990a). A-11 lands within Timberline's SUP area have been allocated to Administratively Withdrawn Area (AWA) under the Northwest Forest Plan, which includes recreational areas and other areas not scheduled for timber harvest.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Wilderness
Wild & Scenic River
Land Allocation
A11
A2
A5
B1
B2
N
W
E
S
1 inch = 2,000 feet
0
1,000
2,000
Feet
A2
A5
A11
A11
B1
A11
A11
B2
B2
B2

The Timberline SUP area and surrounding National Forest System Lands include several other Forest Plan management area designations:

Management Area A-4 (Special Interest Area): The goal for this management allocation is: Protect, and where appropriate, foster public recreational use and enjoyment of important historic, cultural, and natural aspects of our national heritage. Preserve and provide interpretation of unique geological, biological and cultural areas for education, scientific and public enjoyment purposes.

Management Area B-7 (General Riparian Areas): The goal for B-7 is to achieve and maintain riparian and aquatic habitat conditions for the sustained, long-term production of fish, selected wildlife and plant species, and high quality water for the full spectrum of the Forest's riparian and aquatic areas. A secondary goal is to maintain a healthy forest condition through a variety of timber management practices.

Management Area B-2 (Scenic Viewshed): As identified in the Forest Plan, Scenic Viewsheds "include landscapes which are visible from selected travel routes, rivers and lakes, major viewpoints, and popular recreation areas." The goal of Scenic Viewsheds is to, "Provide attractive, visually appealing forest scenery with a wide variety of natural-appearing landscape features. Utilize vegetation management activities to create and maintain a long term desired landscape character." (Forest Plan, Four-218)

Riparian Reserves (from the Northwest Forest Plan): The Timberline SUP area lies within both the Salmon River and Zigzag River Watersheds, which contain Riparian Reserves along streams, wetlands, ponds, lakes and unstable and potentially unstable areas. Riparian Reserves are one of the four components of the ACS, and are used to maintain and restore riparian structures and functions of intermittent streams, benefit riparian dependent species other than fish, enhance habitat conservation between upslope and riparian areas, and provide travel, dispersal, and connectivity corridors for animals and plants (NWFP, B-13).

Tier 1 Key Watershed (from the Northwest Forest Plan): A portion of the Timberline SUP area lies within the Salmon River watershed, which has been designated as a Tier 1 Key Watershed under the *Forest Plan, as Amended*. Tier 1 Key Watersheds are one of the four components of the Aquatic Conservation Strategy (ACS), as described in the Northwest Forest Plan. Tier 1 Key Watersheds provide (or are expected to provide) high-quality habitat, contribute to conservation of at-risk anadromous salmonids, bull trout, and resident fish species, and have a high potential of being restored (NWFP, B-18).

1.6 Additional Documents Incorporated by Reference

In addition to the documents described in section 1.5, this analysis is tiered to the Final Environmental Impact Statement for the Northwest Forest Plan, 1994; the Timberline Express Proposal Final Environmental Impact Statement (November, 2005), and the Timberline Lodge Final Environmental Statement, 1975 *(40 CFR 1502.20).*

Zigzag Watershed Analysis: The Zigzag Watershed Analysis "develops and documents a scientifically-based understanding of the ecological structures, functions, processes and interactions occurring within a watershed. In doing so, this analysis process identifies trends, conditions and restoration opportunities." (Zizgag Watershed Analysis, 1-1) The analysis is intended to support broad ecosystem management objectives at the watershed scale. The Assessment serves as a comprehensive aquatic resource assessment of the Zigzag River watershed.

Salmon River Watershed Analysis: The Salmon River Watershed Analysis was conducted "to develop and document a scientifically based understanding of the ecological structures, functions, processes and interactions occurring within a watershed, and to identify desired trends, conditions, and restoration opportunities." (Salmon River Watershed Analysis, 1-1) The analysis is intended to support broad ecosystem management objectives at the watershed scale. The Assessment serves as a comprehensive aquatic resource assessment of the Salmon River watershed.

1.7 Public Involvement

1.7.1 Scoping

The Council on Environmental Quality (CEQ) defines scoping as, ". . . an early and open process for determining the scope of the issues to be addressed and for identifying the significant issues related to the proposed action" (40 CFR). Scoping begins early and is an iterative process, both internal and external (public), that continues until a decision has been made by the Responsible Official. Scoping includes refining the Proposed Action, identifying the preliminary issues, and identifying interested and affected persons. The results of scoping are used to identify public involvement methods, identify issues, and explore alternatives to the Proposed Action and associated potential effects *(36 CFR 220.4(e)(1)(2)).*

This project was first published in the spring 2010 issue of the Mt. Hood National Forest's Schedule of Proposed Actions (SOPA), and has appeared in each quarterly issue since then. On June 29, 2010, a letter and map describing the project was mailed to a list of approximately 170 agencies, organizations, and individuals that have been identified as being interested in projects on the Forest. The letter and map were simultaneously posted on the main page of Forest's website. A field trip was also hosted during the fall of 2010, where members of the public were invited to view the proposed trails on the ground and ask questions of the Forest Service, RLK, and Gravity Logic. Nearly 30 members of the public attended.

During the spring 2010 scoping period, the Forest received approximately 200 letters or emails from agencies, organizations, and the general public. Section 1.8, "Issues," summarizes the comments that were received during scoping and how they are addressed in the environmental analysis.

The Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) were contacted several times in 2011 and 2012 regarding this proposal. The Proposed Action was presented to a member of the Cultural Resources staff in November, 2011. In March, 2012, CTWS sent an email to the Forest Service which stated that they had reviewed the proposal and had no issues with the proposal moving forward.

1.7.2 Public Comment on the Proposed Action and Preliminary Analysis

A letter and/or email announcing a 30-day comment period on the Proposed Action and Preliminary Assessment was mailed on March 3, 2011 to everyone who had expressed interest in the project during the scoping period. The Preliminary Assessment was also posted on the Forest's website on March 3rd. A legal notice for the 30-day comment period was published in *The Oregonian* on March 5, 2011. In addition, the Zigzag Ranger District hosted a public open house on March 17, 2011 which was attended by over 100 people. The purpose of the open house was to provide the public an opportunity to review the proposal and ask questions of the agency representatives and RLK representatives that were at the meeting. The public was also invited to provide written comments at that time. Nearly 1,000 comment letters were received. A summary of the comments and the agency responses are found in Appendix A of the EA, and copies of the letters are in the project file at Zigzag Ranger District.

1.8 Issues and Concerns

The interdisciplinary team (IDT) reviewed the results of public scoping and the public comments on the Preliminary Assessment in order to define and understand any issues or management concerns raised. An issue is a point of debate, dispute, or disagreement regarding anticipated effects of implementing the Proposed Action. Issues suggest a problem with the proposed action that would drive the development of an alternative that would avoid or resolve the issue. Management concerns (sometimes called "tracking issues") are potential effects that would cause a modification of the proposed action via project design criteria (PDC), the development of mitigation measures, and/or the tracking of associated environmental effects in Chapter 3 of this document. Some issues are: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence.

Management concerns were evaluated against the following questions to determine whether or not they would be studied in detail as key issues:

- Is the issue/concern relevant to and within the scope of the purpose and need, and does it pertain directly to the proposed action?
- Could the issue/concern be resolved through design and location of activities in the proposed action or mitigated (avoiding, minimizing, or compensating for the effects of the Proposed Action) in all alternatives?
- Has the issue/concern been addressed in a previous analysis, such as an earlier environmental document (EA or EIS), the Forest Plan, or through legislative action?

Public and internal comments were reviewed by the Interdisciplinary Team to identify public concerns and issues relative to the Proposed Action. The Responsible Official reviewed the public comments to determine the key issues to be addressed in this analysis. The Responsible Official determined that the concerns brought forward were addressed by the proposed action, either through Forest Plan-required practices or PDC (see Table 3 in Chapter 2) that would enable the Proposed Action to meet Forest Plan requirements. Because no “key issues” were identified, the creation of an additional action alternative was not necessary.

The following section describes the substantive management concerns and how they are addressed in the Proposed Action or analysis.

Timberline Lodge: The aesthetic values and visitor experience at Timberline Lodge, a National Historic Landmark, would be diminished by the users, increased traffic, visual impacts, and noise of the proposed bike park.
Issue Measure: Number of mountain bikers in the bike park.

> *Response:* From its inception, Timberline Lodge was designed to be a developed, year-round recreational resort for the public to enjoy. Staging activities for the bike park would utilize the Day Lodge, similar to the way snowsport activities are based out of the Day Lodge, which would help keep bike traffic away from Timberline Lodge. See PDC Her-6, Her-9, and Recreation, Heritage, Sense of Place, and Visuals sections in Chapter 3.

Soils: Downhill mountain biking would cause soil erosion, removing fragile vegetation and causing sedimentation in anadromous streams.
Issue Measure: Tons of sediment delivered to streams.

> *Response:* The trails have been designed to prevent erosion through features such as grade reversals, sediment traps, and other surface water control features that would prevent sediment mobilization and/or delivery to streams. All stream crossings have been designed to minimize soil erosion. The proposed action would result in a net decrease in sediment yield to streams associated with the restoration projects. See PDC Mon-1 and 2; Soil-1-5 and 7-13; Veg-10, 13, and 17; WS-1-18; and Soils, Botany, Hydrology, and Fisheries sections in Chapter 3.

Illegal Trails & Off-Trail Use: Off-trail bike riding, and the building of unauthorized trails, would be more likely to occur if the Timberline trails & skills park is built.
Issue Measure: Presence of illegal trails in the project area (yes or no).

> *Response:* The proposed mountain bike trails have been designed specifically for downhill riding where the trail itself offers the best riding experience, so there would be little incentive to build new, unauthorized trails. The trail system would be monitored for any out-of-bounds riding a bike park patrol staff and off-trail riding or trail widening would be reported to the USFS per the monitoring requirements in the PDC. See PDC Mon-1 and 2; Rec-3 and 7; Soil-5, 6, and 9; Veg-9, 14, 15, and 21; and the Recreation, Soils, and Botany sections in Chapter 3.

Public Safety: Downhill mountain biking would be a threat to public safety from collisions between bikers, hikers, and cars.
Issue Measures: Number of foot/bike trail crossings; number or bike trail/road crossings.

> *Response:* The proposed mountain bike park includes trails that are specifically designed for, and are limited to downhill, lift-assisted mountain biking. Several project design criteria are included in the proposal to address safety concerns regarding other trails and roads in the area. See PDC Mon-2 and Rec-1-4, and the Recreation section in Chapter 3.

Traffic/Parking Conditions: The bike trails and skills park would increase the number of recreationists at Timberline, which would exacerbate the current problems with parking capacity and traffic.

Issue Measures: Number of additional cars on capacity days; number of projected visitors.

> *Response:* Timberline's most limited parking is during the ski season in the winter when this proposal would not be operating, but parking is also limited during the summer months. The proposal may further contribute to parking issues near Timberline, particularly during busy periods when the parking reaches capacity. RLK would manage parking during busy periods, similar to the winter operation, in order to monitor parking densities and user groups, and take action to minimize the effect of bike park users on other recreationists wishing to park at Timberline. Also see PDC Mon-2, Rec-2-5, and the Recreation and Socio-Economics sections in Chapter 3.

Invasive Plants: Mountain bikes are vectors for invasive plant species, and their presence within the Timberline permit area would cause establishment of new invasive species populations.

Issue measures: Acres of bike trails to be opened or closed by project; acres of watershed restoration projects.

> *Response:* Several project design criteria that reduce the potential for invasive species introduction or spread, such as washing bikes and equipment prior to entry, are included in the proposed action. See PDC Veg-4-8, 13, 15 and 16; and Botany report.

Wildlife: The construction and operation of the trail system would negatively impact wildlife through the removal of down wood and disturbance to animals (especially elk) due to human presence.

Issue Measures: Miles of trail x 300 feet on each side of the trail; hours of operation in big game summer range.

> *Response:* Although a trail may occasionally be constructed through down woody debris, no down woody debris would be removed from the site for construction or operation of the mountain bike park. The mountain bike system would only be used during a portion of the year (approx. mid July to early October) and PDC have been included in the proposal that would limit the hours of operation from one hour after sunrise to one hour before sunset to allow animals to use the areas during the most active grazing periods. See PDC Mon-2, Soil-1, Wild-1-3, and Wildlife report.

Market Demand: There is inadequate demand for downhill, lift-assisted mountain biking, so this proposal is not needed or viable.

Issue Measure: Number of projected visits over six years.

> *Response:* The Forest Service accepted RLK's application for the proposal because it met the criteria for a viable project (FSH 2709.11, Ch. 10, 12.2 – Initial Screening of Proposals). As part of the environmental analysis, a feasibility analysis and market analysis for downhill, lift-assisted mountain biking at Timberline were conducted. See Chapter 1 and the Socioeconomics section of this EA.

Issues Outside the Scope of the Analysis

Alternatives: The Forest Service must consider whether or not viable alternatives to increased mountain bike use in the Timberline area exist nearby that could be created with less risk of environmental damage, including options for downhill trails in other locations both with and without lift assistance.

> *Response:* This analysis responds to a proposal by RLK for a special use permit to construct and operate a bike park at Timberline. Therefore, the scope of the analysis is limited to a bike park at Timberline. RLK proposed using the Jeff Flood lift because they believe it provides the best opportunity in the Timberline permit area for a lift-assisted mountain bike trail system, and that other lifts in the area would either be not as conducive for this use or would result in greater impacts. Developing an area without lift assistance or at another area would not address the purpose and need of this proposal. See Chapters 1 and 2.

Master Development Plan: The projects in the MDP should be evaluated in an Environmental Impact Statement.

> *Response:* The only element in the MDP that is being proposed by RLK at this time is the mountain bike trails and skills park. Since the MDP does not make any decisions, and since the Forest is not considering approval of any of the other projects (besides the mountain bike trails and skills park) at this time, there are no effects that can be meaningfully evaluated. RLK has not requested approval and the Forest is not considering approval of any of the other potential projects in the MDP at this time. It is expected that other potential projects in the MDP may be modified over time or may never even be proposed. See Chapter 1.

Chapter 2: Alternatives

2.0 Introduction

This chapter includes a description of the range of reasonable alternatives developed to respond to the need for actions described in Chapter 1. First, this chapter describes the alternatives considered but eliminated from further analysis. Next, one action alternative and the alternative of no action are described in detail and are presented in comparative form, so that the differences among them are clear to both the decision-maker and the public. Also described in this chapter are the design criteria that would be implemented to minimize or prevent adverse effects of road decommissioning.

2.1 Alternatives Considered But Eliminated From Detailed Study

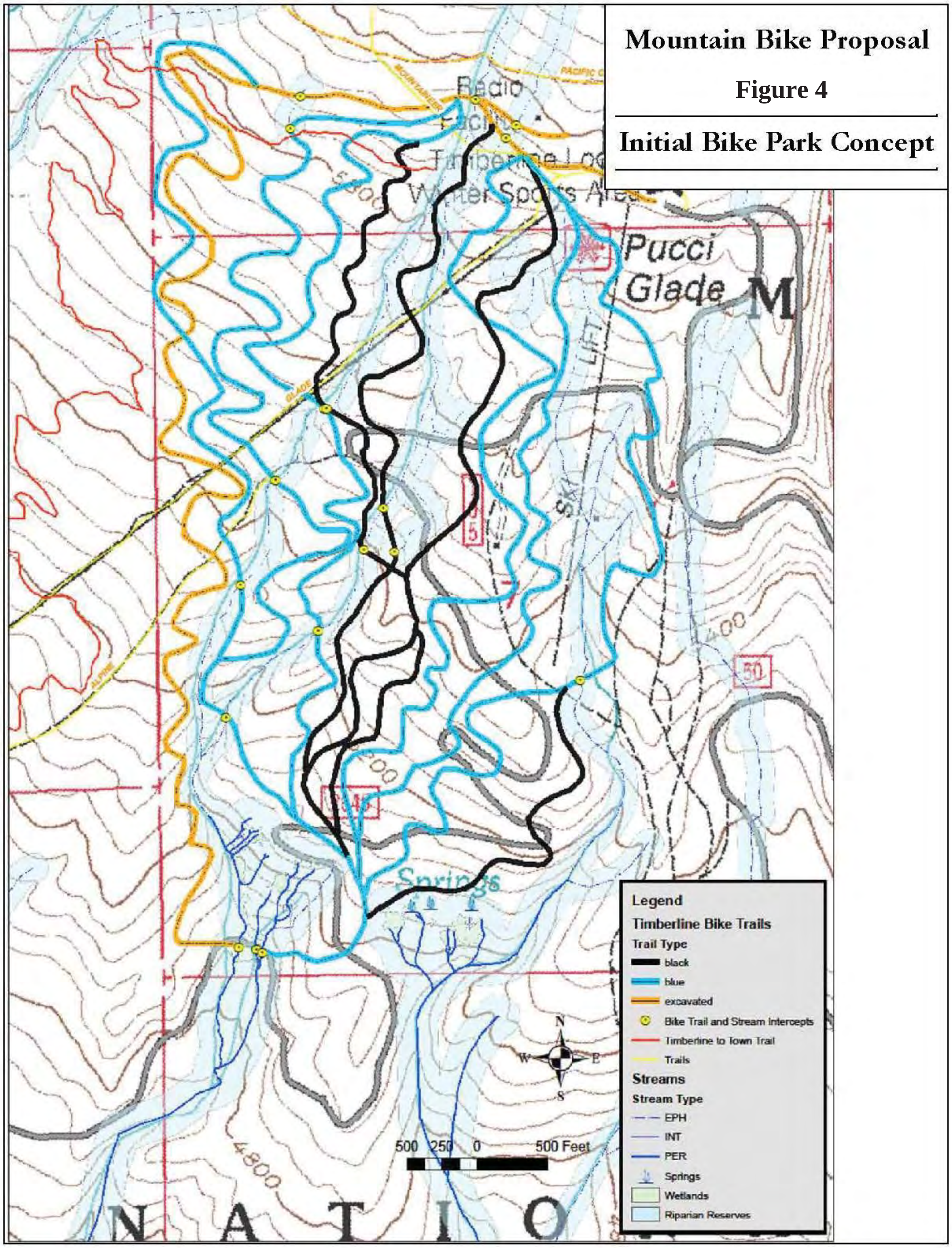
During the early stages of proposal development, RLK submitted an initial conceptual proposal and an initial field proposal to the Forest Service. These proposals are briefly described below along with an explanation of why they were eliminated from detailed study. While these initial proposals were eliminated from detailed study, they were used as the basis for developing the proposed action.

2.1.1 Initial Conceptual Proposal

An initial proposal was sent out for scoping in June of 2010 (see Figure 4 – Initial Bike Park Concept). Although this proposal was developed using aerial photos, contour maps, and field reconnaissance, it was anticipated that further field verification would better define the locations of proposed trails. The conceptual map initially prepared by RLK's consultant, Gravity Logic, used aerial photos that did not clearly indicate West Leg Road. After field review in summer 2010, the detailed trail layout was modified to significantly reduce the number of West Leg Road crossings. Both the Green and Blue free-ride trails were designed to follow either side of the road as much as possible. Once further field investigations provided better data and detail of the trails, this initial conceptual proposal was replaced by the initial field-developed proposal (described in the following section).

2.1.2 Initial Field-developed Trail Network

During the summer of 2010, RLK employed Gravity Logic to design and lay out the mountain bike trails on the ground. In designing the trails, Gravity Logic met with and received input from Forest Service specialists. Early in the process, Gravity Logic and RLK personnel met with the Forest Service interdisciplinary team (IDT) onsite to go over the initial trail layout and discuss sensitive areas to avoid, as well as discuss concerns with the initial trail location and design.



All mountain bike trails have been designed with approximately 4% to 8% average grade over the length of the trail. In an effort to understand how best to approach trail design suitable to the soil and topography at Timberline, Gravity Logic spent time studying local trails (e.g., Highway 44, Sandy Ridge, Bridle Trail, Alpine, and Glade) to better understand what works on Mt. Hood's soil and what does not. Additionally, they visited offsite areas such as Northstar at Tahoe Bike Park, the sandy trails around South Lake Tahoe, and the trails around Mammoth Lakes, California. Based on this reconnaissance, Gravity Logic found that:

- Trails with a ***sustained*** grade over 8% are not suitable for downhill bike traffic, as soil movement and damage to the trail surface would occur. Trails with a grade of 7% or less showed little or no soil movement and a very compact riding surface. Important to all trail design is the installation of numerous rolling dips and grade reversals to both moderate speed and shed water at regular intervals. Trails with short segments from 8%-20% can be sustainable, provided that the approach and exit are designed to manage speed, sightlines, and by avoiding abrupt turns and corners prior to steeper segments.

- Soils are typically well-draining.

- Soils are not negatively affected by a moderate amount of moisture and/or rain, and in fact benefit from damp conditions. An important consideration, however, is to not allow water to follow the trail for sustained pitches. Grade reversals, bridges, and culverts would all manage water before it has a chance to gain enough velocity and volume to recruit sediment and/or cause damage to the trail surface.

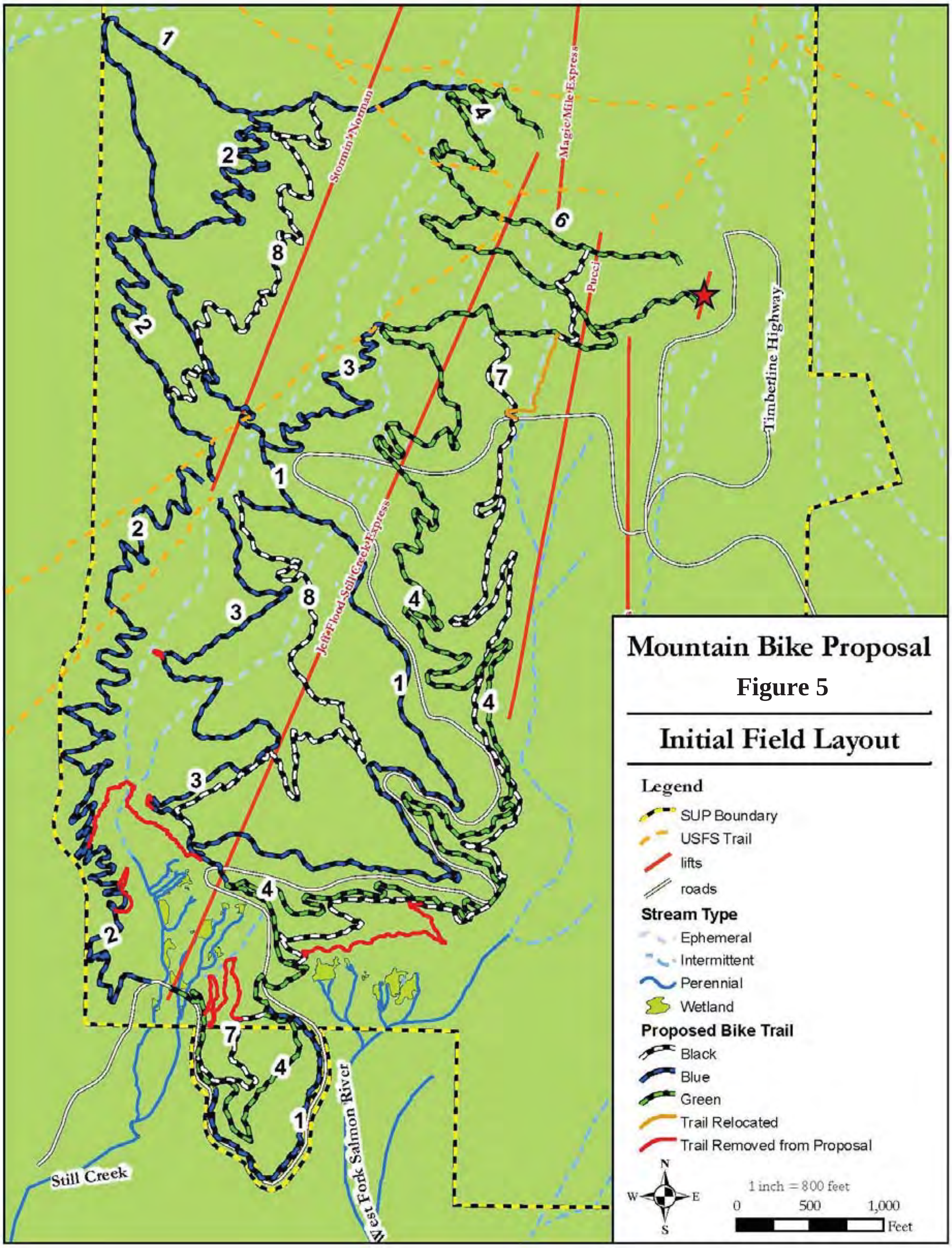
- Corners/switchbacks have significant grade reversals prior to the turn to reduce or eliminate aggressive braking.

- Steep pitches on advanced trails would be successfully armored with wood and/or rock to protect the soil.

The Forest Service specialists on the IDT concurred with the above findings. Once the initial trails were laid out and maps produced, the trails were reviewed by the IDT (see Figure 5 – Initial Field Layout). Based on concerns raised by the IDT as well as scoping comments from the public, several changes were made to the initial trail network. These changes included:

1. A trail from West Leg Road, which headed west and crossed two forks of Still Creek and connected with the lower portion of Trail #2, was removed from the proposed trail network because of potential impacts to aquatic resources.

2. To the extent practical, trails were designed to stay within tree islands between the more obvious ephemeral stream corridors. With input from the IDT, crossings of more sensitive areas were designed to enter and leave with minimal ground disturbance (i.e. crossing at right angles). Segments of trails that lay within important drainages (such as lower portions of Trail #2 near Still Creek) were moved, where possible, to areas outside of drainages.



Mountain Bike Proposal
Figure 5
Initial Field Layout
Legend
SUP Boundary
USFS Trail
lifts
roads
Stream Type
Ephemeral
Intermittent
Perennial
Wetland
Proposed Bike Trail
Black
Blue
Green
Trail Relocated
Trail Removed from Proposal
1 inch = 800 feet
0
500
1,000
Feet
N
E
S
W
Stormin' Norman
Magic Mile Express
Pucci
Jeff Flood Still Creek Express
Timberline Highway
West Fork Salmon River
Still Creek

3. To the extent practical, trails were designed to avoid seepage areas with a high water table.

4. An important part of the overall trail plan was to include a Green trail suitable for riders of all abilities. The terrain near the bottom of the Jeff Flood lift within the permitted area posed some significant design and construction challenges due to the steep terrain, and was further limited by the presence of wetlands and springs. A solution was to propose to use a small section of forest outside the permitted area (see Section 1.3) with a slope angle much more conducive to sustainable trail design and without any identifiable sensitive features. This area also includes a Blue and a Black trail all of which benefit from the far more suitable terrain.

5. A trail from the top of Jeff Flood back to the parking lot was needed. The initial design had two crossings of the mountaineers trail and/or the Timberline to Town trail. To reduce the number of crossings, one of the crossings was eliminated.

6. The upper portion of Trail #7 that was within 50 feet of and paralleled the headwaters of the West Fork Salmon River for over 500 feet in a stringer of riparian forest was rerouted to be outside the riparian reserve and the intact stringer of riparian forest.

7. Lower portions of Trail #7 that were adjacent to wetland seep areas of both West Fork Salmon River and Still Creek were removed from the trail network.

The initial field-developed trail network along with the changes described above became the proposed action as described in Section 2.3.

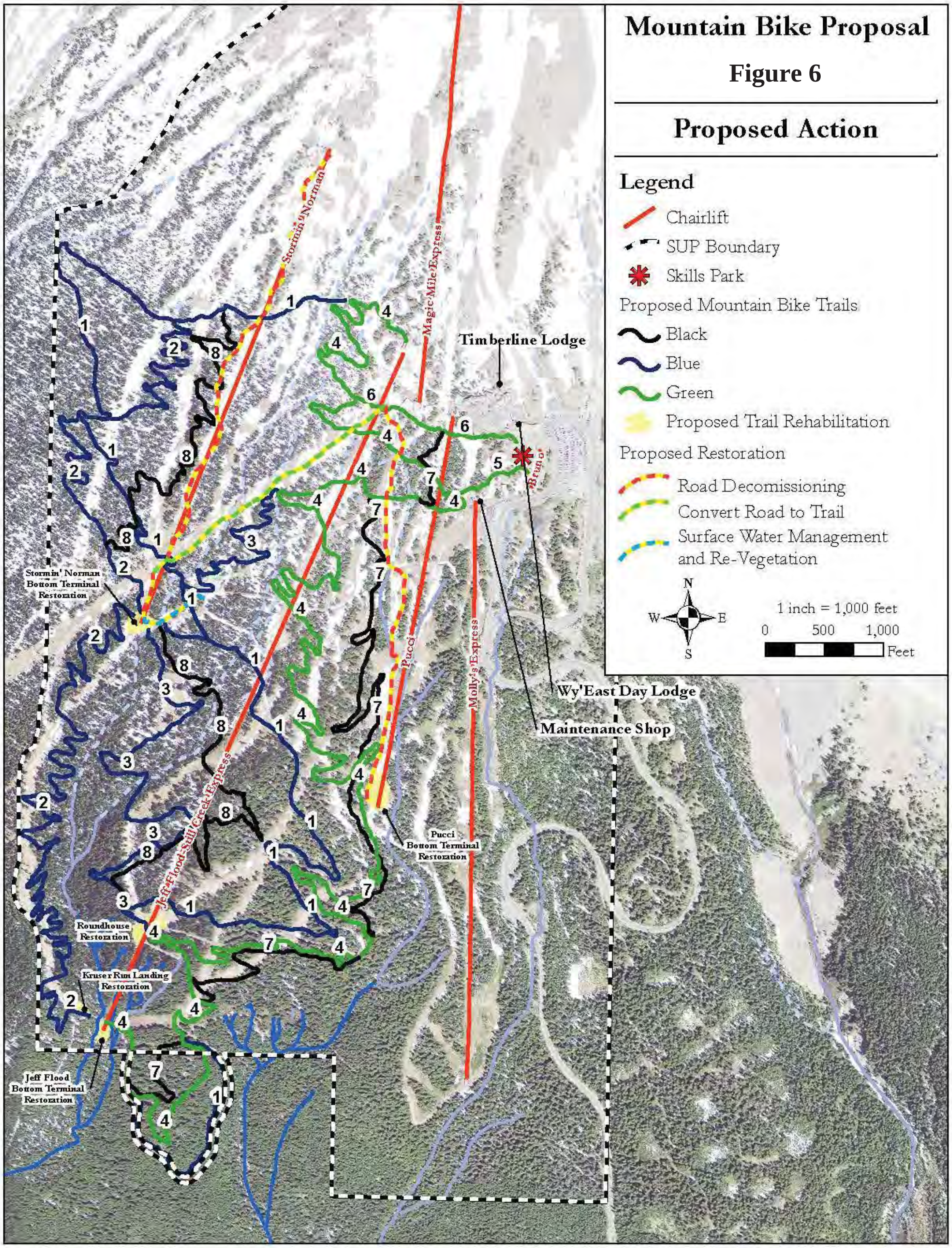
2.2 No Action

Under the no action alternative, current management plans and the current special use permit would continue to guide management of the area. No new mountain bike trails or a skills park would be constructed, and the proposed restoration projects would not be implemented. The no action alternative provides a baseline to evaluate impacts of the proposed action.

2.3 Proposed Action

The proposed action is to develop a managed, lift-assisted, downhill-only mountain bike trail system and skills park within the southern portion of the Timberline Ski Area permit boundary (Figure 6 – Proposed Action). The trail system would be located within the terrain serviced by the Jeff Flood Express Lift. The skills park would be located just below the Wy'East Day Lodge. The trail system would include approximately 17 miles of trail, and the skills park would encompass approximately 0.2 acre for a total amount of ground disturbance of approximately 12 acres. The trail system would be designed to accommodate all skill levels with an emphasis on beginner and intermediate levels.

The proposed action also includes watershed restoration activities that would reduce sediment contribution to the Still Creek and West Fork Salmon drainages. The restoration activities would decommission and/or stabilize approximately 2.1 miles of native surface roads and restore seven sites for a total of approximately six acres of restoration within or adjacent to the project area.



Mountain Bike Proposal
Figure 6
Proposed Action
Legend
Chairlift
SUP Boundary
Skills Park
Proposed Mountain Bike Trails
Black
Blue
Green
Proposed Trail Rehabilitation
Proposed Restoration
Road Decomissioning
Convert Road to Trail
Surface Water Management and Re-Vegetation
N
W
E
S
1 inch = 1,000 feet
0
500
1,000
Feet
Timberline Lodge
Wy'East Day Lodge
Maintenance Shop
Stormin' Norman
Magic Mile Express
Pucci
Molly's Express
Jeff Flood-Still Creek Express
Bruno's
Stormin' Norman Bottom Terminal Restoration
Pucci Bottom Terminal Restoration
Roundhouse Restoration
Kruser Run Landing Restoration
Jeff Flood Bottom Terminal Restoration

2.3.1 Bike Park Trails

The trail network would be constructed in phases over a two-year period, and would be located in the area served by the Jeff Flood Express Chairlift (see Figure 3). The eight proposed trails would be within the Ski Area SUP boundary except for the lowest portions of trails 1, 4 and 7 (see Figure 6 – Proposed Action, lower left of the figure). These trail portions would be authorized through an SUP as an ancillary facility to the existing SUP. The trail system would offer trails for all ability levels, with a design emphasis on beginner and intermediate levels. Trails would include natural and human-created features and banked turns where appropriate, particularly on the intermediate and advanced trails. Human-created features would include structures such as ladder bridges. A summary of each of the proposed trails is provided in Table 1, and more detailed information is included in Appendix B.

Under this proposal, mountain bike trails would cross through ski runs and adjacent forest within the Timberline Special Use Permit Area.

Three ability levels would be served by the mountain bike trail network. Similar to the ski terrain at Timberline, these include Beginner, Intermediate, and Advanced.

Beginner (Green): Easiest. Gentle climbs and descents with obstacles such as rocks, gravel, roots, bridges and pot holes. Rider must have ridden a bike before using these trails.

Intermediate (Blue): More difficult than Green. Challenging riding with steep slopes and/or obstacles, including narrow trail or elevated skills park with poor traction. Riders must have off-road riding experience.

Advanced (Black): Most difficult. Mixture of steep descents, loose trail surface, numerous trail and man-made obstacles including jumps, ramps, elevated features, berms, drops, and rocks.

If the bike park is authorized, construction would take place over a span of two years (refer to Appendix B for more detail on the phasing of bike trails). Six trails of all ability levels would be available to riders after the first year of construction. During construction, approximately three mini-excavators and/or mini-loaders and 5 - 10 person trail crew would be used to construct trails.

Three types of mountain bike trails would be constructed: Wide- excavated trails; narrow-excavated; and single-track trails.

Wide-Excavated Trails: Beginner and Intermediate trails with an average tread width of 66 inches and a construction corridor that averages 99 inches in width. The tread is graded primarily using excavators, which are capable of working around individual trees or other sensitive areas. Excavated trail features such as berms, jumps, drops, rocks, and elevated ladders are located during construction.

Narrow-Excavated Trails: Intermediate trails with an average tread width of 42 inches and a construction corridor of approximately 63 inches. The tread is graded primarily using excavators, which are capable of working around individual trees or other sensitive areas. Excavated trail features such as berms, jumps, drops, rocks, and elevated ladders are located during construction.

Single-Track Trails: Intermediate and Expert trails with an average trail width of 16 inches and a construction corridor of 24 inches. The tread is constructed primarily by hand, with some use of machinery where necessary.

Table 1 provides details on the proposed Bike Park trails.

Table 1 - Trail Specifications for the Proposed Action

Trail No.	Phase	Total Vertical (ft)	Total Length (mi.)	Average Grade (%)	Average Tread (in)	Avg. Disturbed Width (in)	Total Area (ac)
1	1	1,135	3.25	4 - 7	66	99	3.2
2	1 and 2	1,010	3.11	6 - 7	16 - 42	24 - 63	1.8
3	1	653	1.74	7	16	24	0.4
4	1	1128	4.66	5	66	99	4.7
5	1	43	0.15	5	66	99	0.2
6	1	-16	0.29	-1	66	99	0.3
7	2	846	2.00	7 - 8	16	24	0.5
8	2	751	1.99	6 - 8	16 - 42	24 - 63	0.8
Skills Park	1			n/a	n/a	n/a	0.2
Total			17.19				12.1

An important operational consideration is the management of surface water along the trail system. Grade reversals, bridges, and culverts would all manage water before it has a chance to gain enough velocity and volume to rill or recruit significant sediment. As described in Section 2.1.2, the trails were designed to minimize sediment mobilization that would cause damage to the trail surface and potential delivery of sediment to streams. The average gradient of 4% -8% has been established in the field by not aligning trails along the fall line. Rather, the trails typically run across the fall line. The trail system has been designed to include numerous rolling dips and grade reversals to both moderate speed and divert surface water away from the trail at intervals no greater than 50 feet. The trail location has been identified and flagged in the project area. The location of trail features such as rolling dips and grade reversals would be designed during construction with USFS supervision. As a result of the grade reversals and rolling dips, very short trail segments (approximately 20 - 40 feet in length) ranging from 8-20% may be present along the downward pitch of a rolling dip, for example. Depending upon the field conditions, these steeper pitches may be armored with wood, rock and/or some other similar armoring to protect the bike trail surface.

Bike Park staff (RLK employees) would patrol the trails on a daily basis and sediment deposited in sediment basins or rolling/drain dips would routinely be cleaned out and replaced onto the surface of the trails to protect the trail surface and to prevent delivery of this sediment downslope.

An example of a singletrack, intermediate trail.

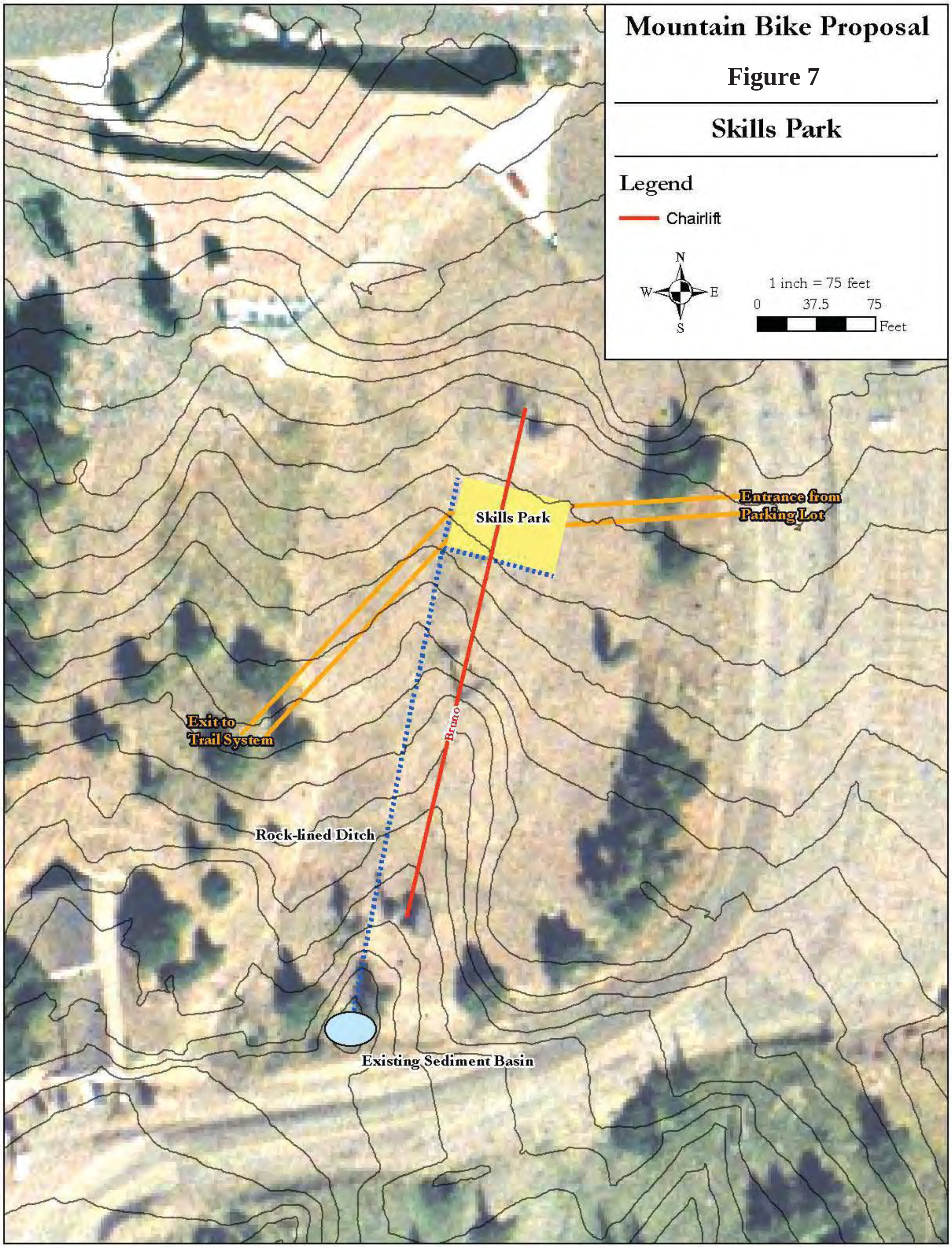
Another important operational consideration is the management of biker velocity along the trails. Sharper turns such as corners and switchbacks have been designed with grade reversals prior to the turn to reduce or eliminate aggressive braking in order to minimize damage to the trail surface from braking.

Wooden features such as bridges, boardwalks, wall rides, ladders, wood tables, rollers, and doubles (see Appendix B) would be used to avoid sensitive areas such as puddles and tree roots. It is estimated that a total of 70-90 wooden features would be constructed in the Timberline Bike Park, providing a total protected trail length of approximately 2,400 linear feet, or 2-3% of the total trail length.

2.3.2 Skills Park

In addition to the individual trails, a skills park would be constructed on approximately 0.2 acre (80 feet by 100 feet) in the vicinity of the *Bruno's* chairlift (See Figure 7 – Skills Park). The skills park would include temporary, removable wooden structures built by hand tools on site and removed prior to winter operations (see Appendix A). These structures would consist of elevated ladder systems, teeter-totters, rock structures and other obstacles. The skills park would offer practice areas for all skill levels.

The skills park would include entrance and exit gates and it would be encircled with native materials that would serve as a fence – this may include logs, rocks or actual fencing. This fencing would direct riders into and out of the Skills Park. The perimeter of the Skills Park would include drainage ditches that would convey surface water from the area to a sediment basin. Water leaving the sediment basin would be conveyed via a 300-foot long rock-lined channel to the existing sediment basin near the wastewater treatment plant (see Figure 7).


Mountain Bike Proposal
Figure 7
Skills Park
Legend
Chairlift
N
W
E
S
1 inch = 75 feet
0
37.5
75
Feet
Skills Park
Entrance from
Parking Lot
Exit to
Trail System
Bruno
Rock-lined Ditch
Existing Sediment Basin

Left: Typical skills park. Note raised ladders and features for different ability levels.

Above: Intermediate teeter-totter

Above: Typical elevated ladder.

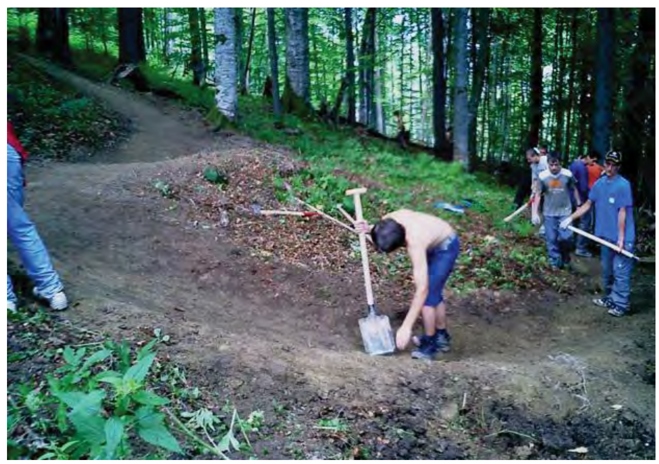
2.3.3 Construction of the Trails and Skills Park

Should the Forest Service decide to authorize the trails and skills park, construction would occur in the two summers following the decision. The trails and skills park would be flagged in the field for approval by the Forest Service prior to any construction activity. In addition, the Construction Plan/SWPCP[2] would be approved by the Forest Service prior to construction. Whether excavated or single-track, the first step in the construction of a bike trail would be grubbing the organic matter from the trail surface. The trail surface would then be shaped using native soil material and stone. Once the rough trail tread is established, trail features such as rock or wooden structures would be constructed, and surface water management structures would be installed. As final grading is completed, organic material would be broadcast onto slopes and other areas that are to be re-vegetated, and re-vegetation would take place. The construction of wooden trail features may reduce the need for grubbing or disturbance to soil. For example, post-holes may be excavated for an elevated ladder, resulting in less ground

[2] Stormwater Pollution Control Plan

disturbance than grubbing the entire trail. As stated in Section 2.1.1, it is estimated that a total of 70-90 wooden features would provide a total protected trail length of approximately 2,400 linear feet, or 2-3% of the total trail length.

Above and Upper Right: Mini-excavator preparing narrow-excavated bike trail.



Lower Right: Hand crew preparing final grade on narrow-excavated trail.

Prior to demobilizing for the day, trail workers would install temporary erosion and sediment control protection (e.g., mulch, native organic material) along the outer edges of the trails using hand equipment. Equipment access to the trails would be via West Leg Road and newly constructed trails. For example, if an excavated trail takes three days to excavate, the mini-excavator would begin work at West Leg Road and work north or south away from the road. At the end of the first day, the mini-excavator would de-mobilize using the newly constructed trail. The next day, the operator would use the same trail for access to complete the trail.

Construction equipment, fuels, spill response materials and erosion control materials would be staged in disturbed areas throughout the project area, depending upon the location of trail work at any given time. Staging areas would include the ski area maintenance shop, the top and bottom terminals of the *Jeff Flood Express*, the bottom terminals of *Pucci* and *Stormin' Norman*

Express, existing work roads, and other existing open areas. West Leg Road would provide access to the construction areas.

During the second summer of construction, the trails constructed in the first year would be reviewed and maintained after snowmelt, and the Timberline Mountain Bike Park operation would begin. Construction of the remaining trails would then begin, as described above. Staging and construction activities during the second summer of construction would be designed so that the construction equipment and activity results in the least amount of disturbance to mountain bikers. If necessary, segments of the trails built during the first summer may be closed temporarily to allow for construction of the remaining trails.

2.3.3 Watershed Restoration Activities

Based on comments received from the public during scoping, as well as concerns raised by the interdisciplinary team conducting the environmental analysis, watershed restoration activities are being included as part of the proposed action. Site-specific project analysis afforded the Forest Service the opportunity to identify existing problems in the project area and propose corrective measures.

There are approximately two miles of native surface service roads in this area that are contributing sediment to downstream areas in both the Still Creek and West Fork Salmon River drainages (see Figure 6 – Proposed Action). These roads are not part of the Forest Service transportation system and are not managed or maintained by the Forest Service; they are used as service roads by RLK to maintain the ski area.

Under the proposal, service roads like these would be decommissioned

The proposed action would include 5.9 acres (2.1 miles) of restoration in both the Still Creek and West Fork Salmon drainages. In the Still Creek drainage, a total of approximately 1.4 miles (4.3 acres) of roads and disturbed areas would be treated. In the West Fork Salmon drainage, approximately 0.7 mile (1.6 acres) would be treated. Decommissioning approximately two miles of existing service roads[3] would include grading the roadway surface to match natural topographic contours. The decommissioned service roads would be topped with topsoil or amended local material, and seeded with native plant species or suitable stabilizing cover. Table 2 summarizes the restoration activities.

[3] The Glade Trail currently consists of a series of ill-defined user trails that have resulted in a road-like situation. This restoration action would decommission the majority of the disturbed area and convert it to a defined trail. This trail would not be constructed until after the Timberline to Town Trail is completed and the Glade Trail is closed to mountain biking.

Table 2 - Watershed Restoration Activities Included in the Proposed Action

Road/Project	Action	Length (ft.)	Width (ft.)	Area (ac.)
Still Creek Basin				
Glade Trail	Convert Road to Trail (Decommission Road)	2,512	15	0.9
Alpine Trail	Trail Surface Enhancement and Surface Water Management	332	12	0.1
Stormin' Norman Access Road	6" lift of gravel, surface water control	686	18	0.3
Stormin' Norman Service Road	Decommission	3,937	12	1.1
Jeff Flood Bottom Terminal	Surface Water Management and Re-Vegetation	-	-	0.4
Kruser Run Landing	Surface Water Management and Re-Vegetation	-	-	0.2
Stormin' Norman Bottom Terminal	Surface Water Management and Re-Vegetation	-	-	0.8
Roundhouse - West Leg Road	Surface Water Management and Re-Vegetation	-	-	0.6
Still Creek Subtotal				*4.3*
West Fork Salmon				
Pucci Service Road	Decommission	3,651	12	1.0
Pucci Bottom Terminal	Drainage Control and Re-vegetation	-	-	0.6
West Fork Salmon Subtotal				*1.6*
Total		11,118 (2.1 mi)		**5.9**

The existing access road to the bottom terminal of the *Stormin' Norman* lift would be enhanced to provide improved surface water management, including re-grading the road surface to divert surface flows to ditches and sediment basins, and the new road prism would be surfaced with six inches of gravel. The areas surrounding several bottom terminals of the *Pucci* and *Stormin' Norman* lifts would be restored by better defining service vehicle access routes and parking areas for terminal maintenance. Road areas to remain would be re-graded to provide improved surface water management and surfaced with a 6-inch lift of gravel. Areas outside of the gravel would be scarified and seeded with native plant species. The mazing area at the bottom terminal of the Jeff Flood Express would be protected through the installation of a geo-grid, which will harden the loading area to protect the ground surface from mountain bikers loading the chairlift. The geo-grid would be framed with a hard curb or other similar structure to prevent bikers from leaving the geo-grid and trampling the restored bottom terminal area[4] (See Figure 8 – Bottom Terminal Phase 2).

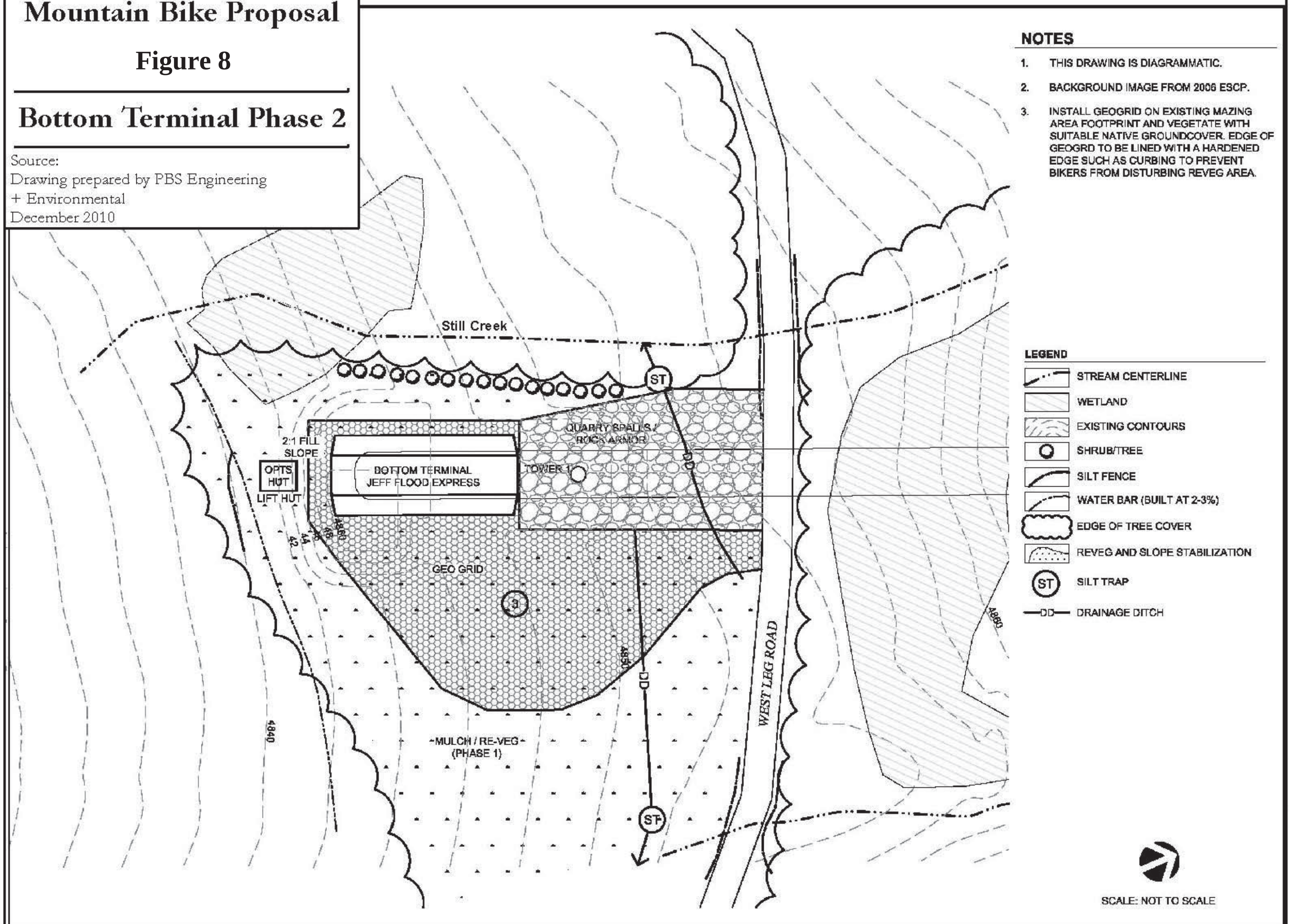
[4] The restoration of the bottom terminal of the *Jeff Flood Express* is a requirement of the ROD for the Timberline Express EIS. The action included in this proposal is the protection of the restored area from impacts due to the mountain biking activity at the bottom terminal.

Mountain Bike Proposal

Figure 8

Bottom Terminal Phase 2

Source:
Drawing prepared by PBS Engineering
+ Environmental
December 2010



2.3.5 Implementation of the Watershed Restoration Activities

The equipment used for watershed restoration activities would include the mini-excavators and crews for the bike trails, as described above. RLK would also use a larger excavator and/or small bulldozer to prepare road surfaces for decommissioning (or drainage control and gravel placement). For road decommissioning, equipment would first obliterate the road surface and restore the natural grade, to the extent possible. Depending on the slope gradient and sustained length of roadway on the fall line, surface water control structures such as water bars or cross-drain logs would be installed to prevent high-velocity surface water drainage.

Upon establishment of the rough grade and surface water controls, site stabilization would be completed through application of topsoil and/or mulch and seed material. The mulch crew would follow closely behind the grading crew to ensure that newly decommissioned road surfaces are stabilized. Similar to the bike park trail construction, temporary erosion and sediment control measures would be applied to decommissioned road segments at the end of each work day, if the areas have not been mulched and planted.

Roadway segments to be enhanced would follow a similar construction sequence as decommissioning, except that the roadway surface would be modified to reduce slope gradients or install drain dips to the extent possible, or to install other surface water drainage controls such as water bars, road-side ditches or culverts. Sediment basins would be installed below drainage ditches and culverts, and rock check-dams would be installed in the drainage ditches in accordance with Forest Service standards.

Bottom terminal sites and the roundhouse area of West Leg Road would be treated similar to road decommissioning projects, with a rough grade established to manage surface water, fine grading with topsoil and/or mulch and seeding planting.

Watershed restoration projects would be phased to occur in areas where Bike Park trails are being constructed, in order to reduce the number of incursions into any one area. Consequently, the restoration effort would take place in two phases.

2.3.6 Operation Timing

Similar to the existing ski operations at Timberline Ski Area, Timberline Bike Park operations would be guided by weather and seasonal conditions. On a seasonal basis, the park would open once snowmelt is sufficient to allow trail maintenance crews to maintain the trails, entry/exit trails, and skills park (usually around mid- to late July). Closure of the park in the fall would take place (usually by mid-October) or when soil moisture and the resulting impacts to trail conditions are determined to be sufficient to warrant closure of the park.

On a daily basis, activity at the park would not begin until at least one hour after sunrise. Opening times for the bike park would be determined by site conditions and demand, but trail maintenance crews would be afforded at least one hour to conduct trail maintenance before riders enter the park. Activity at the park would cease at least one hour before sunset. Actual closure times in the evening would also depend on the demand and level of use. However, park patrol staff employed by RLK would be given at least one hour to sweep the trail network after closing and before sunset. Rescue and emergency access to injured guests would be via mountain bike trails or West Leg Road.

2.3.7 Project Design Criteria and Monitoring

Project design criteria (PDC) represent best management practices, and they are part of the proposed action (see Table 3). PDC were developed by the interdisciplinary team to address site-specific environmental concerns and to meet standards and guidelines in the Forest Plan.

Monitoring is also part of the proposed action, and will ensure that during implementation (both construction and operation):

1. Project design criteria and any terms and conditions of the special use permit are met.
2. Anticipated results (the effects as described in this EA) are achieved.
3. Necessary adjustments are made to achieve desired results.

Project design criteria and monitoring requirements are described in Table 3, below.

Table 3 - Project Design Criteria and Monitoring for the Timberline Mountain Bike Trails and Skills Park

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	Monitoring (Mon)		
Mon-1	The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis according to the Monitoring Framework Plan and will have the authority to provide direction and/or take action if construction or operations are not conducted according to the project design criteria.	Both	Yes
Mon-2	RLK would provide a written annual report to the Forest Service detailing any trail damage, soil erosion, vegetation trampling, wildlife issues, “rogue riders,” user conflicts, successes and issues, and restoration efforts in the mountain bike park. The Forest Service would review the report and, if need be, work with RLK to institute needed changes in the management of the mountain bike park.	Both	Yes
Mon-3	A Monitoring Framework Plan would be prepared prior to construction and would be used to provide the basis for the annual monitoring plan.	Both	Yes
Heritage Resources (Her)			
Her-1	Trails and trail terrain features have been sited to	Both	No

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	be the least visible from West Leg Road, allowing for consideration of riparian protection. If the trail design changes, the Forest Service Permit Administrator would provide direction and/or take action.		
Her-2	No new man-made openings in the forest along West Leg Road would be created for this project. Trail crossings of West Leg Road have been sited in naturally occurring or previously created clearings/openings.	Construction	Yes - RLK would visit West Leg Road during construction, photo-document approved crossings and verify that no new openings in the forest have been created.
Her-3	No cutting of trees larger than 6" DBH would occur along West Leg Road.	Both	No
Her-4	Historic culverts on West Leg Road have been avoided; no trails would be placed adjacent to culvert locations.	Construction	No
Her-5	No treated lumber would be used for terrain features.	Both	No
Her-6	Mountain bike trails have been located within forested areas or tree islands between ski trails to the extent possible to provide vegetative screening and to lessen the visual impacts of the bike park.	Both	No
Her-7	Intentionally left blank.		
Her-8	As specified in the Signage Plan (see Rec-6), bike trail signs or any types of barriers along West Leg Road would be compatible with the character and design of the historic roadway. Wood posts or stone barriers are compatible options.	Both	No
Her-9	Wood or stone barriers, or other approved materials, would be used to delineate the skills park.	Both	No
Her-10	If any heritage resources are discovered during construction, work would be stopped in the vicinity of the discovery and the Forest Archaeologist would be contacted immediately to determine a course of action	Construction	No
Recreation (Rec)			
Rec-1	Parallel trails have been joined into one trail prior to crossing West Leg Road. Mountain bikers would enter each crossing through a chicane (i.e., S-curves) which would slow the rider down and give them clear sight lines down and up the road for at least 50 yards. Signage would be placed to warn mountain bikers and motorists of trail crossings over the road.	Both	No
Rec-2	Bike trail crossings of Forest Service trails and West Leg Road would include signage and the use of chicanes and uphill grades to reduce the speed of bikers as they cross the road or trails.	Construction	Yes – RLK bike park staff would monitor the crossings daily to ensure that speed controls are in

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
			place and working.
Rec-3	As specified in the Signage Plan,bike trail crossings of Forest Service trails and West Leg Road would include signage directing bikers to stay on designated bike trails.	Operations	No
Rec-4	As specified in the Signage Plan,Forest Service trails and West Leg Road would include signage at bike trail crossings and throughout the bike park to warn trail users/motorists of the presence of cyclists and trail crossings.	Operations	No
Rec-5	If events are proposed, a Spectator Management Plan would be prepared by RLK and approved by the Forest Service prior to the event to address the management of spectators. The plan would include the following: • Definition of the roles of the Forest Service and RLK. • Spectator viewing areas would be located in existing disturbed areas; location of viewing areas would be dependent on the event type and location (e.g., skills park or specific bike trail). • Defining spectator areas with rope, fencing, or other similar means. • Access corridors for spectators via West Leg Road, or other roads and trails (including bike park trails). • Spectator parking would not be allowed along West Leg Road. • Preventing spectator access to sensitive areas such as wetlands, meadows, subalpine/timberline environments, and designated riparian areas. • Restroom facility location(s).Port-Potties would not be allowed at the bottom terminal of the *Jeff Flood* chairlift during the summer operation, Porta-Potties may be placed near the bottom terminal but outside of riparian reserves. • The use of shuttles or other means to bring spectators to the site when the parking lots are full. • The management of garbage and human waste.	Operations	Yes – implementation and effectiveness monitoring. The plan would be updated and kept current.

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	The Forest Service Permit Administrator or his/her designee would review each upcoming event with RLK to assess spectator locations and access. The Forest Service Permit Administrator or his/her designee would review the site after each event to assess the success of the plan and provide direction to RLK to address issues for future events.		
Rec-6	A signage plan would be prepared by RLK and approved by the Forest Service prior to the installation of bike park signs, Forest Service trail signs, and signs along West Leg Road.		No
Rec-7	The conversion of the Glade Trail from road to trail would meet Forest Service standards for trail construction as described in the Forest Service Manual and Handbook. A qualified trails designer would oversee the trail layout and design and the final design would be approved by the Forest Service Permit Administrator or his/her designee. Trail maintenance for the converted Glade Trail within the Timberline SUP area would be carried out by RLK. The converted section of the Glade Trail would meet the Forest Wide Standards and Guidelines on page Four-115 and 116 of the Forest Plan for visual quality within five to ten years of conversion activities. Any new trail that is not converted on the road bed (e.g., new switchbacks in the trail that extend outside of the existing road bed) should meet standards within one year of construction.	Construction	Yes – maintenance of the Glade trail would be monitored for implementation and effectiveness.
Rec-8	Bike park users and spectators associated with events at the bike park would be prohibited from parking on West Leg Road or certain areas along Timberline Road, with parking in authorized parking spaces only.	Operations	No
	Soil Resources (Soil)		
Soil-1	Stabilization of mountain bike trail surfaces would be accomplished through a combination of rock armoring and wooden features or other similar protective measures. Any rock or wood used for armoring would be sourced from either the bike park or watershed restoration construction limits, or from an approved offsite source. No quarrying of rock materials would take place.	Both	Yes – implementation and effectiveness
Soil-2	The spacing of surface water control structures along the length of the bike trail network would be per the Forest Service Handbook guidelines at a minimum. The spacing of surface water control structures (e.g., grade reversals, drain dips, water bars) along mountain bike trails within 200 feet of a stream crossing would be no	Construction	Yes – implementation and effectiveness

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	less than 50 feet to minimize extension of the stream drainage network and to minimize sediment delivery to riparian reserves. Water bar placement along decommissioned roads would be determined in the field based on site conditions and approved by the Forest Service Permit Administrator or his/her designee.		
Soil-3	Wood features (e.g., ladder bridges, boardwalks), native soil causeways, and/or rock armoring would be incorporated into mountain bike trails to avoid impacting sensitive resources such as steep soils, tree roots, vegetation, and wet areas. Wood materials would be sourced from local suppliers and would be free of invasive species. (See also Veg-5.)	Both	Yes – implementation and effectiveness
Soil-4	Additional surface water controls, rock armoring, wooden features, or other acceptable measures would be installed on trails that exhibit unacceptable erosion. If drainage continues to be a problem along a section of trail, trail would be re-designed to remedy the erosion.	Both	Yes – implementation and effectiveness monitoring primarily after construction. Monitoring would inform Adaptive Management in problem areas.
Soil-5	Bike park staff (RLK employees) would monitor trail conditions throughout the hours of operation on a daily basis to ensure that erosion or sediment mobilization away from the trail corridor is not occurring and/or to implement corrective action in accordance with the project design criteria.	Operations	No
Soil-6	A Travel Route Plan would be required and included in the SWPCP/Construction Plan for the project to minimize compaction of soils by limiting equipment to designated travel-ways (e.g., existing roads, bike trails that are under construction) as approved by the Forest Service .	Both	No
Soil-7	Along machine-excavated bike trails within 200 feet of streams on all bike trails, and along decommissioned roads and other restoration projects, exposed mineral soil not included in the bike trail tread would be mulched with certified weed-free Woodstraw or equivalent at a rate to achieve 70% ground cover or mulched with a certified weed-free straw, and seeded with approved seed at a predetermined rate. Application rates would be validated and verified in the field to ensure that mulch application is not too sparse or too excessive(See also Veg-12). Mulched areas would be monitored annually to evaluate the need for additional mulch and/or seed.	Construction	Yes – implementation and effectiveness
Soil-8	As described in the SWPCP/Construction Plan, temporary erosion and sediment control	Construction	Yes - implementation

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	measures (e.g., plastic sheeting, mulching) would be in place over soil stockpile areas or disturbed soil areas associated with restoration projects prior to any rain event (as defined by when the National Weather Service, or other accepted source, predicts a 50% or higher chance of measurable precipitation for the local area).		
Soil-9	The bike park staff (RLK employees) would patrol the park on a daily basis to ensure that re-vegetated areas are not disturbed, or to remedy disturbance to re-vegetated areas (see also Soil-5). Project areas with any ground disturbance would be surveyed annually to ensure success of re-vegetation efforts. If seeding or other re-vegetation efforts are not successful in re-vegetating disturbed areas, the Forest Service Permit Administrator or his/her designee would be contacted and a site-specific, alternative re-vegetation solution would be developed.	Operations	Yes – implementation and effectiveness.
Soil-10	In cleared areas, topsoil would be carefully removed and stockpiled for placement onto the cleared area outside of the trail tread width. During construction, topsoil would be carefully stored using approved erosion and sediment control methods. Additional measures (e.g., plastic covering) to cover exposed soils would occur during inclement weather. Excess topsoil from trail construction may be hauled to other construction/restoration sites for placement (see Soil-8).	Construction	Yes - implementation
Soil-11	The Northwest Avalanche Center rain gauge currently at Timberline would be accessible and monitored by RLK and the Forest Service via the internet. Earth-disturbing operations (construction and/or bike park operations) would be suspended if there is more than 1inch of rain in a 24-hour period and/or the Bull Run River above the reservoirs exceeds 200 cubic feet per second (suggesting a rise in base flows in the watershed). Operations would remain suspended until the Bull Run River drops below 200 cubic feet per second and there is less than 1 inch of rain in a 24-hour period or onsite conditions are dry enough to allow operation. Prior to suspending all bike park operations, the Forest Service Permit Administrator may decide to close certain trails, or portions of trails, to allow continued operation of the bike park in locations where trail conditions are dry enough for operation and there is no risk of sediment delivery to the stream system. (See also Soil-5).	Both	Yes - The Forest Service and RLK would collect and maintain the data in order to correlate onsite conditions with the rainfall data for previous years.

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
Soil-12	Stockpile areas, temporary roads, and other areas where soil compaction has occurred from this project would be ripped or scarified prior to the start of re-vegetation.	Construction	No
Soil-13	Construction activities for the season would be suspended if soil moisture is recharged and stream flows rise above baseflow levels and are predicted to stay above baseflow levels (i.e., 200 cfs in the Bull Run River, upstream of the reservoirs) and/or if onsite conditions warrant closure of the park. (See also Soil-11).	Construction	Yes - implementation
Vegetation (Veg)			
Veg-1	All mountain bike trails have been designed to avoid the cutting of trees with a diameter at breast height (DBH) greater than 6" to reduce impacts to upland forest and riparian reserves. No whitebark pine would be cut. Bike park trails would be routed around large trees and, where possible, around the roots of larger trees to prevent damage to tree roots. (See also Soil-3). RLK (bike park staff) would monitor the bike park trails weekly to assess damage to tree roots.	Construction	Yes – effectiveness monitoring would inform Adaptive Management
Veg-2	The final trail alignment and proposed clearing limits (disturbance prism) for bike park trails would be reviewed in the field and approved by the Forest Service Permit Administrator or his/her designee before construction can begin.	Construction	No
Veg-3	If any new populations of special-status plant species are encountered during the construction process, work would be suspended in that area until the Forest Service Permit Administrator or his/her designee is consulted.	Construction	No
Veg-4	Clean equipment either: a) prior to arrival on MHNF, to prevent the introduction of invasive plant seed or other vegetative propagules (e.g., stem and root fragments). The contract administrator or project activity coordinator would inspect all project equipment before it is allowed to operate at the project site. The equipment should be free of soil clumps and vegetative matter or other debris that could contain or hold seeds or other vegetative propagules. Cleaning of the equipment would a) include pressure washing and should be done outside of the National Forest boundary; or b) a self-contained heavy equipment cleaning station may be set up at the project site, for cleaning the equipment thoroughly in order to remove soil clumps and vegetative matter or other debris that could contain or hold weed seeds.	Construction	Yes – implementation
Veg-5	If gravel, soil, or wood is imported from outside	Construction	No

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	the project area, it should be determined to be from a source approved by the Forest Service Permit Administrator or his/her designee to determine if the soil, gravel, or wood is free of invasive species.		
Veg-6	Project areas with any ground disturbance or vehicular traffic would be surveyed annually by the Forest Service and RLK, during the time of year when invasive non-native plants, including noxious weeds, are identifiable. Long-term control would include removal of any invasive non-native plant species and reporting of their presence and exact location, when found, to the Forest Service Permit Administrator or his/her designee, will consult with the MHNF Forest botanist.	Both	Yes
Veg-7	Avoid daylighting the trail by protecting overstory vegetation and defining the limits of the bike trails with vegetation, wood, rocks, or other native materials (see Veg-2).	Both	No
Veg-8	Aggressively treat invasive plants by manual control or with herbicides, in compliance with the 2008 *Record of Decision for Site-Specific Plant Treatments for Mt. Hood National Forest*. The Forest Service Permit Administrator will consult with the MHNF botanist on which method works best for which species.	Operations	No
Veg-9	Bike park staff (RLK employees) would monitor trail conditions throughout the hours of operation on a daily basis to ensure that unauthorized trails or terrain features are not created by riders (see Mon-1 and Mon-2).	Operations	Yes
Veg-10	RLK would prepare a Plant Salvage Plan in conjunction with the Forest Service. The plan would be approved by the Forest Service prior to construction. The plan would identify methods (outlined in the botany specialist report) and locations for the salvage of whole plants from proposed trails in advance of trail construction. The plan would also identify transplant locations for re-planting once construction is completed (e.g., areas along trails where excavated material has been sidecast, in restoration projects, or in sparsely vegetated areas in adjacent ski runs).	Construction	Yes
Veg-11	Vegetation transplanting would be carried out as described in the section "Plant Propagation & Restoration" in the botany specialist report. (see also Veg-10).	Construction	No
Veg-12	As described in the Plant Salvage Plan (See Veg-10), collect seed from native plants in the special-use permit area and propagate seedlings from this seed in a nursery for restoration of	Construction	No

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	disturbed areas in subsequent years. Directly sow collected seed in disturbed areas for those species for which this method is effective. Consult with Mt. Hood National Forest botanist for details.		
Veg-13	Use only native plant materials (seed, transplants, seedlings, divisions, cuttings) collected locally on the Mt. Hood National Forest. If supplies of locally collected native seed (e.g., mountain brome, blue wildrye grass) are low and erosion control or restoration of disturbed areas is urgent, use annual ryegrass (*Lolium perenne* ssp. *multiflorum*), which is a non-persistent, non-native grass species, or a mix of native species mixed with annual ryegrass.	Construction	No
Veg-14	Use GPS and photopoints to provide an accurate and informative assessment of the impact of mountain bike riders on trails in the mountain bike park. Repeating the assessment at regular intervals (e.g., annually) can identify problems (e.g., trail widening, excessive soil disturbance, vegetation trampling, informal trails), document informal trails, and determine where re-vegetation or other remedies are needed. Include this information in the Annual Monitoring Report (see Mon-2).	Both	Monitoring Plan – RLK and Forest Service would establish photopoints in first Monitoring Plan.
Veg-15	As specified in the Signage Plan, through signage, educate riders about the environmental consequences of unauthorized trail development, about the benefits of low-impact riding practices (e.g., avoiding skidding on the trail, riding within established trail corridors, avoiding impacts to vegetation) and about invasive non-native plants and the potential for the transport of invasive plant seed or vegetative propagules on mountain bikers (e.g., tires, wheels, spokes, frame, pedals, shoes, clothing). Educate riders that dirt and mud on their clothes and shoes from riding elsewhere before coming to the Timberline downhill mountain bike park could harbor and spread invasive plant seed or propagules.	Operations	No
Veg-16	RLK would provide a cleaning station for mountain bikes near the proposed skills park in the Wy'East parking lot area and require that all riders coming to the bike park for the first time from riding elsewhere (outside the park) clean their bikes of mud, dirt, and other debris, which could harbor invasive plant seeds or propagules.	Operations	No
Veg-17	Open the mountain bike park each summer only after trails are snow-free and soils are not	Operations	No

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	saturated. Snow drifts may be removed from the trails when the surrounding ground is snow-free, provided no earth or vegetation disturbance takes place. Notify the Forest Service before opening the bike park trails to the public.		
Veg-18	Regulate access to trails and the skills park by use of physical barriers (e.g., boulders, fences, logs, vegetation).	Operations	No
Veg-19	Patrol for trash and clean up trash along trails and elsewhere in the mountain bike park.	Operations	No
Veg-20	Salvage plants currently occupying the proposed skills park and proposed bike park trails and transplant them in and around the historic Timberline Lodge. (See also Veg-11).	Construction	No
Veg-21	Confine soil disturbance around the skills park using entrances and barriers. Prevent soil disturbance and trampling/denudation of vegetation around and outside the skills park.	Operations	No
Wildlife (Wild)			
Wild-1	A review of proposed hazard tree removal along the bike trails would be conducted by RLK and a Forest Service Permit Administrator prior to implementation. Hazard trees that must be felled would remain on site for habitat purposes. For example, if a tree is felled across a trail, cut out a section of the log to allow riders to proceed along the trail, but leave the rest of the log in place for the ecological/ecosystem functions it provides and to confine riders to the trail.	Both	No
Wild-2	If any nest, den, or reproductive sites of vertebrate species are discovered along a mountain bike trail, a Forest Service Permit Administrator or his/her designee would be consulted and measures to ensure reproductive success at the site would be negotiated. Factors such as rarity, likelihood of disruption or reproductive failure, and timing would be considered.	Both	No
Wild-3	Mountain bike park operations would be limited to daytime use only (i.e., from one hour after sunrise to one hour before sunset) to minimize disturbance to nocturnal wildlife.	Both	No
Watershed Resources (WS)			
WS-1	Prior to construction, the Forest Service Permit Administrator and Forest Service specialists (watershed and/or fisheries) would walk the flagged trails with RLK to examine each proposed stream crossing and to determine the appropriate crossing type. Bridge length would span the distance 1.5 times bankfull width and no piers would be placed within this width. For higher-elevation, ephemeral streams, the Forest	Construction	No

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	Service and RLK would apply the following criteria for placement of crossing structure (in order of most impactful to least): 1 – Use out-sloped ford, contoured native material and/or rock-fortified for all ephemeral channels with low-gradient approach (3-5%) 2 – Bridge all intermittent and perennial channels, and ephemeral channels with steep approach (>5%).		
WS-2	No mountain bike trails would cross jurisdictional wetlands.	Construction	No
WS-3	Bike park patrol staff (RLK employees) would review the trails each day to locate wet soil areas or mud puddles. If the problem persists, the area would be crossed, if necessary, using a combination of raised mineral soil causeways, raised wooden boardwalks, rock armoring and/or other appropriate measures.	Operations	Yes
WS-4	A Construction Plan and Stormwater Pollution Control Plan (SWPCP) would be prepared for each year of construction to guide decision-making by contractors, RLK staff, and Forest Service staff during construction.	Construction	No
WS-5	A spill prevention and response plan would be developed and included in the Construction Plan/SWPCP. No fuels or construction machinery would be stored within riparian reserves.	Construction	No
WS-6	Deleted		
WS-7	Banked turns in bike trails would generally be in-sloped to drain toward the uphill into a sediment trap or into a pipe under the tread that discharges to a sediment trap with an armored outlet.	Construction	No
WS-8	Sediment traps would be rock-fortified. Drainage pipes would be located at least three inches from the bottom of sediment traps to allow for sediment to settle out. Sediment basins would be sized to accommodate a minimum of two significant rain events (e.g., 1” in 24 hours) before maintenance is needed. The outlets of sediment traps would not release water directly to any water bodies.	Both	No
WS-9	During sediment trap maintenance, sediment that is cleaned out of sediment traps would be returned to the mountain bike trails.	Operations	No
WS-10	The skills park would include perimeter drainage diversion structures, drainage ditches, and a sediment basin to capture silt.	Both	Yes - implementation –the silt trap would be monitored for maintenance (i.e., muck out).

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
WS-11	During construction activities, a PDC coordinator would be assigned by RLK and assigned the following duties, to be documented in the SWPCP/Construction Plan: 1.) Oversee the implementation of the soil and water protection design criteria; 2.) Conduct or oversee daily site inspections to ensure effectiveness of soil and water protection design criteria; 3.) Oversee the maintenance of structural soil and water protection design criteria; 4.) Ensure that any changes to the construction site plans are addressed by coordinating with the Forest Service aquatics staff and insuring that any new soil and water protection design criteria are implemented; 5.) Coordinate job site activities with the RLK Project Manager, the Forest Service Project Coordinator, agency representatives, and contractors. (See also Veg-6)	Construction	No
WS-12	Prior to construction, a National Pollutant Discharge Elimination System (NPDES) permit with an associated Erosion and Sediment Control Plan (ESCP) would be obtained if required under current regulations. The permit would be included in the SWPCP/ Construction Plan.	Construction	No
WS-13	An erosion control plan would be included in the SWPCP/ Construction Plan and approved by the Forest Service prior to earth-disturbing activities and the plan would be revised annually to minimize erosion.	Construction	No
WS-14	Redundant erosion protection (such as two rows of silt fence, straw bales, and/or more permanent structures such as logs) would be provided between streams and restoration areas close to stream channels, as described in the Construction Plan.	Construction	No
WS-15	No, staging areas, spoils piles, or other construction-related materials would be staged or stored within riparian reserves.	Construction	No
WS-16	Stream turbidity would be monitored during construction in a manner that allows for evaluation of the effects of the project on turbidity (e.g., monitoring above and below construction, paired stream monitoring). If an	Construction	No

PDC #	Monitoring and Project Design Criteria (PDC)	Construction or Operation?	Monitoring Plan?
	increase in turbidity occurs as a result of project operations that exceeds 10 Nephelometric Turbidy Units (NTU's) for a period exceeding 30 minutes, operations would cease until a plan has been developed and approved to address the cause of increased turbidity. Operations would cease immediately if turbidity is over 100 NTU's and would not resume until a plan has been developed and approved to address the cause of increased turbidity.		
WS-17	A water quality monitoring plan, including pebble counts, would be included in the SWPCP/Construction Plan and would be updated annually assessing project activities. At a minimum, Still Creek and West Fork Salmon River would be monitored in the vicinity of the project.	Both	Yes
WS-18	Cross-sections and channel profiles would be taken at proposed channel crossings prior to construction and for two years after construction. After time after two years, after any 5-year occurrence interval storm, measure the cross-sections and channel profiles. This would help establish the project's effect on channel stability and morphology	Both	Yes

Chapter 3: Affected Environment and Environmental Consequences

3.1 Soils

3.1.1 Affected Environment and Existing Condition

The top of the project area is at slightly over 6,000 feet in elevation; the bottom is at about 4,800 feet. This is a particularly transitional 1,200 feet. Soils nearer the top can barely support a thin groundcover at best, most likely having a bare surface of small stone cover commonly called desert pavement in dryer climates. This is caused by wind erosion blowing away the smallest particles, thus leaving behind a surface of variously sized rock that protects the subsurface from further deflation. This is a commonly seen phenomenon in the areas near and above the timberline zone, basically nature's effective groundcover. At the lower elevations soils provide for a much wider array of vegetation.

Despite the differences in vegetation vertically in the area, the physical characteristics of the soils are quite similar, especially texture. In trail locations and skills park, loamy surface soils (very fine sandy loams to loamy sands) are the rule, with varying degrees of gravel and boulders in the subsoil. Soils become slightly coarser on steeper ground near incised drainages, and especially at the higher elevations where wind and water erosion has removed some of the finer soil particles.

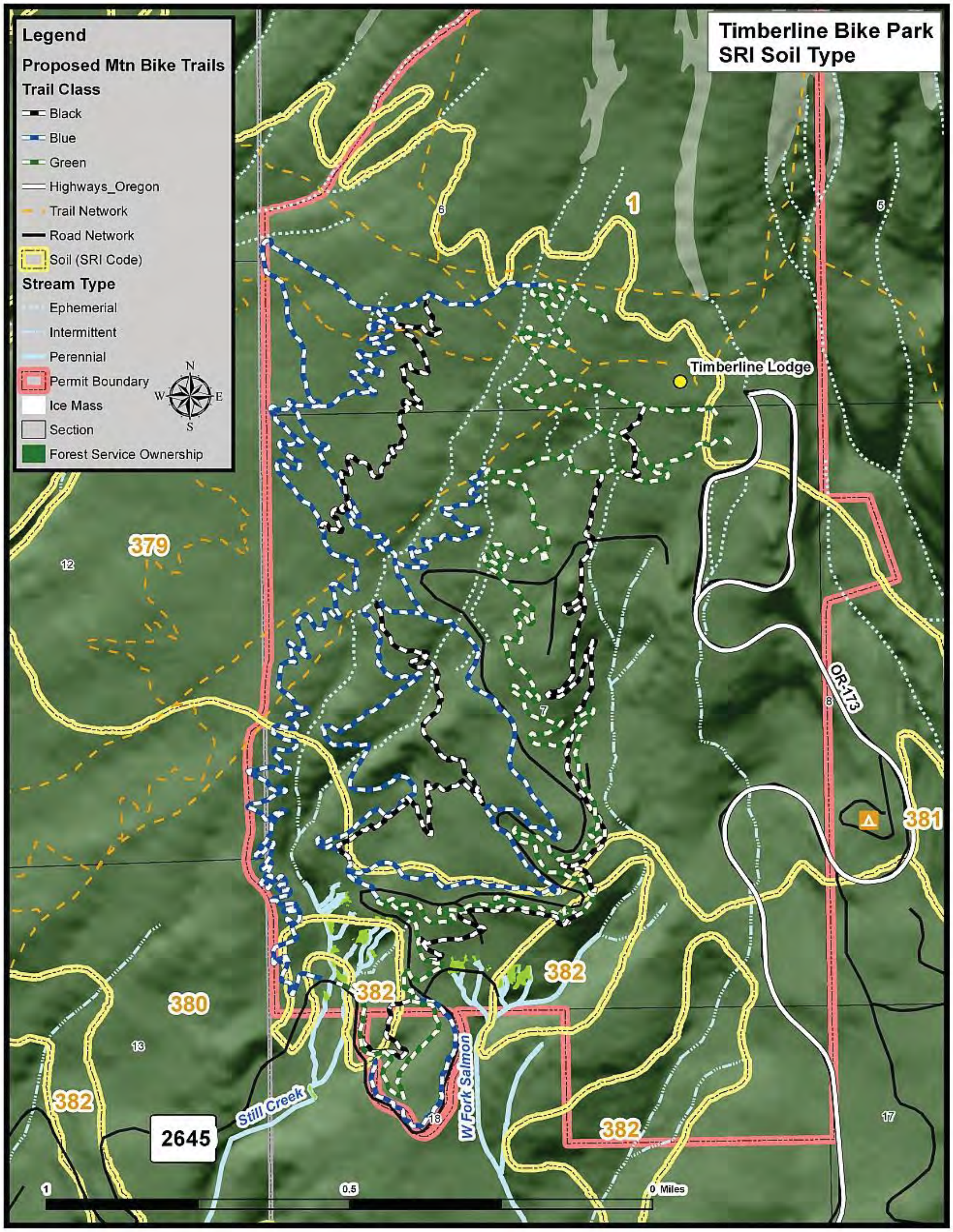
SRI soil types mapped in the area are 379, 380, and 382, with some included areas of 381 (Figure 9). A review of the map units and their accompanying interpretations compared to the field showed a good match, although slightly less gravel content was seen in surface soils in the lower half of the area. These are all glacially derived soils, which contain varying amounts of mixed volcanic ash and sand, which has since been locally reworked by wind action. Most of the proposed trails have been laid out on soil types 379 and 380, which have surface erosion ratings of slight, primarily due to the relatively gentle slopes and high infiltration rates. A slight erosion hazard rating means that in order to meet Forest Plan Standard 025, at least 60% effective groundcover should be met within the first year of construction in areas that are intended to re-vegetate (i.e., bike trail tread widths are not intended to re-vegetate).

Despite the differences in vegetation vertically in the area, the physical characteristics of the soils are quite similar, especially texture. In trail locations and Skills Park, loamy surface soils (very fine sandy loams to loamy sands) are the rule, with varying degrees of gravel and boulders in the subsoil. Soils become slightly coarser on steeper ground near incised drainages, and especially at the higher elevations where wind and water erosion has removed some of the finer soil particles. This information is used in the hydrologic modeling found in the Hydrology Section of this EA.

Observed Geomorphic Process

Near the top of the project area, small drainages form where annual snowmelt begins to define channels that downcut through loose sandy loam material. The ground here is very undulating, with numerous small incised draws and huge supply of erodible material moving around the local landscape via wind and water. Soils in this area are actively eroding at a chronic natural level where they are not otherwise impacted by either user created or sanctioned trails. The naturally coarse material in the upper elevation areas allows for rapid water infiltration compared

Figure 9 - SRI Soil Types in the Project Area



to lower elevations, which results in lower surface erosion that would otherwise occur. The project area is not in any way connected or at risk of experiencing some of the glacial outburst flooding that occurs on the mountain.

Observed Road and Trail Erosion

Several ski area work roads exist within the analysis area, most of which are native surface. Most of these roads provide access to chairlift terminals or towers, and have visible signs of erosion occurring. Most notable are the roads at the bottom of the Stormin' Norman lift, which are rilled and are impacting a small drainageway.

West Leg Road is paved, but the ditchline along the road has not been maintained sufficiently to prevent water from mobilizing sediment. In addition, some culvert pipes under the roadway are blocked or otherwise not functioning, resulting in diversion of surface drainage across native soils and additional rilling/erosion.

The bottom of Pucci Lift has a large compacted area where water runs across the surface, eroding the soil and delivering sediment to downslope locations. A similar situation exists at the bottom of the Jeff Flood lift and further uphill along the Jeff Flood lift at the area known as "The Roundhouse". The Glade and Alpine Trails cutting across the area have erosion occurring on them as well.

The primary reason for erosion in these particular areas is: a sufficiently continuous compacted and bare surface area causing overland flow (i.e. Pucci); and/or sufficiently sized compacted and bare areas that run down the fall line as opposed to along the contour of a slope (i.e. Stormin' Norman), These areas are not meeting the Forest Plan Standard for effective groundcover.

All of these situations can be improved in order to lessen the erosion occurring in each one as well as reduce the erosion risk in the future.

3.1.2 Direct and Indirect Effects

No Action

Under the No Action Alternative, soils would not be affected by development and operation of a mountain bike park. Nor would soils be affected by the implementation of restoration projects in the study area. Soils would remain as described for the affected environment.

Proposed Action

Trail and Skills Park Construction

There are two main things that would happen to the soil in the bike park trail alignments and skills park. First, soil would be exposed through the loss of its groundcover as the trail locations and skills park are roughed in. Second, the trail treads themselves would be compacted in order to establish the running surface. The result would be approximately 12 acres of bare and bare/compacted soil surfaces that are at risk of erosion and that exhibit little to no soil productivity. These bare soil areas would be along long, linear trails that would be dispersed throughout the SUP area. The beginner level trails, which would be the widest, would be at highest risk simply due to the amount of bare ground exposure and because they are constructed with heavy equipment. This would be followed by the intermediate level trails (slightly narrower, smaller machine); and finally at lowest risk would be the expert trails, which would be the narrowest of the three types. Rock and/or organic mulch applied as effective groundcover would be hauled in as trail segments are completed as needed in order to reduce the erosion risk. Further, the way in which the trail locations have been laid out close to slope contours as opposed to up and down the slope is expected to minimize the erosion potential for all trail systems. In the first year following construction, there would likely be a settling of material via wind action at the highest elevations, which would be difficult to discern in terms of origination from the particulates moving about the area in late spring/early summer on an annual basis. The Skills Park location is particularly rocky and excessively well drained. Little, if any surface erosion is expected from this area, and if any does occur would be deposited directly downhill of the park boundary or incorporated into the drainage swale and downstream sediment basin (see Figure 4).

Restoration Projects

The following list of restoration actions are proposed to address specific observations made during the field reconnaissance in summer 2010. Some of the problems observed were summarized in the section above titled 'Observed Road and Trail Erosion'. An observable reduction in human caused erosion would result when these projects are implemented. The following techniques (with the exception of #4) have been used in numerous locations across the Mt. Hood Meadows (MHM) ski area with success.

1. Surface identified native surface roads with at least a 6" lift of gravel, a proven method to reduce erosion potential by over 90%.

2. Form 'fit in the field' rolling dips and water bars on identified roads, which is another proven technique to reduce erosion from roads and similar to PDC Soil-2 above.

3. Define and keep all vehicle access needs for lift maintenance to the narrowest possible corridor. Decompact and revegetate the remainder of the area previously disturbed by maintenance vehicle access.

4. Design and implement a long-term erosion control plan for the Glade and Alpine Trails, including a conversion of Glade from a road to a trail and re-surfacing of the trail corridor along Alpine.

5. Evaluate road maintenance backlog to address blocked pipes, ditches, etc.

3.1.3 Project Design Criteria

It is always preferable to minimize erosion through proper use of various techniques than to try and manage sediment once soil has left the site. Under this premise, PDCs Soil-1 through Soil-13 were developed and incorporated into the Proposed Action (see Table 3 in Chapter 2).

3.1.4 Cumulative Effects

The Proposed Action would add to several existing trail and road systems in the ski area. However, in combination, the restoration component of the Proposed Action has been modeled and evaluated to reduce sediment risk by a six to one ratio, a substantial improvement over the current condition (see Section 3.2). In addition, the restoration actions are scheduled to occur either slightly before, or concurrently with, the proposed trail construction, thereby offsetting potential impacts in both time and space. Restoration projects similar to these have been successfully implemented at Mt. Hood Meadows; therefore the predicted effectiveness of the restoration projects in reducing sediment is high based on the success at Mt. Hood Meadows.

3.1.5 Summary and Consistency Review

In summary, the Proposed Action has been designed to meet Forest Plan Standard 025, effective groundcover based on erosion hazard rating, and therefore would be consistent with the Mt. Hood Forest Plan.

3.2 Hydrology, Geology, and Water Resources

3.2.1 Affected Environment and Existing Condition

The underlying geology within and adjacent to the Analysis Area (defined in the following paragraph) in described as a large pyroclastic-flow (volcanic-flow) and debris flow deposits in the report entitled, "Preliminary Geologic Map of the Mount Hood 30-Minute by 60-Minute Quadrangle, Northern Cascade Range, Oregon" (U.S. Geological Survey, 1995). These highly permeable pyroclastic and debris flow deposits covered older volcanic deposits to create the smooth fan that is currently discernible between Zigzag Canyon and White River Canyon. The thickness of this debris fan is largely undocumented, however a test well located just south of Timberline Lodge revealed a measured thickness of 120 feet (USFS, 1992). The dominant materials found within this layer include poorly sorted pebbles, cobbles, and boulders in a reddish-gray sandy matrix (U.S. Geological Survey, 1995). It is likely that the young age and high permeability of these deposits are the dominant factors responsible for the limited stream development above Timberline Lodge and the large amount of shallow groundwater flow. Finally, it is thought that the older volcanic deposits found under the permeable pyroclastic and debris flow materials have low permeability and act to concentrate groundwater flow and create groundwater springs at specific elevations where bedrock is exposed (DeRoo, Pers. Comm., July, 2004).

Water Resources Management Direction

For analysis purposes, a hydrologic planning area was identified for this project. The hydrologic analysis area (analysis area) extends from the uppermost extent of any drainage that is intersected by trail construction to the bottom of the drainage associated with trail construction. For the proposed action, the hydrologic planning area is 1,732 acres, divided into four subwatersheds Table 4 and Figure 10.

Table 4 - Analysis Subwatersheds

Subwatershed	Area (ac.)
Glade	199
Sand Canyon	495
Still Creek	464
West Fork Salmon	573
Total	**1,732**

There are 4 land allocations in the analysis area that address water resources. These allocations are detailed in Table 5.

Figure 10 - Watershed Resources Analysis Area

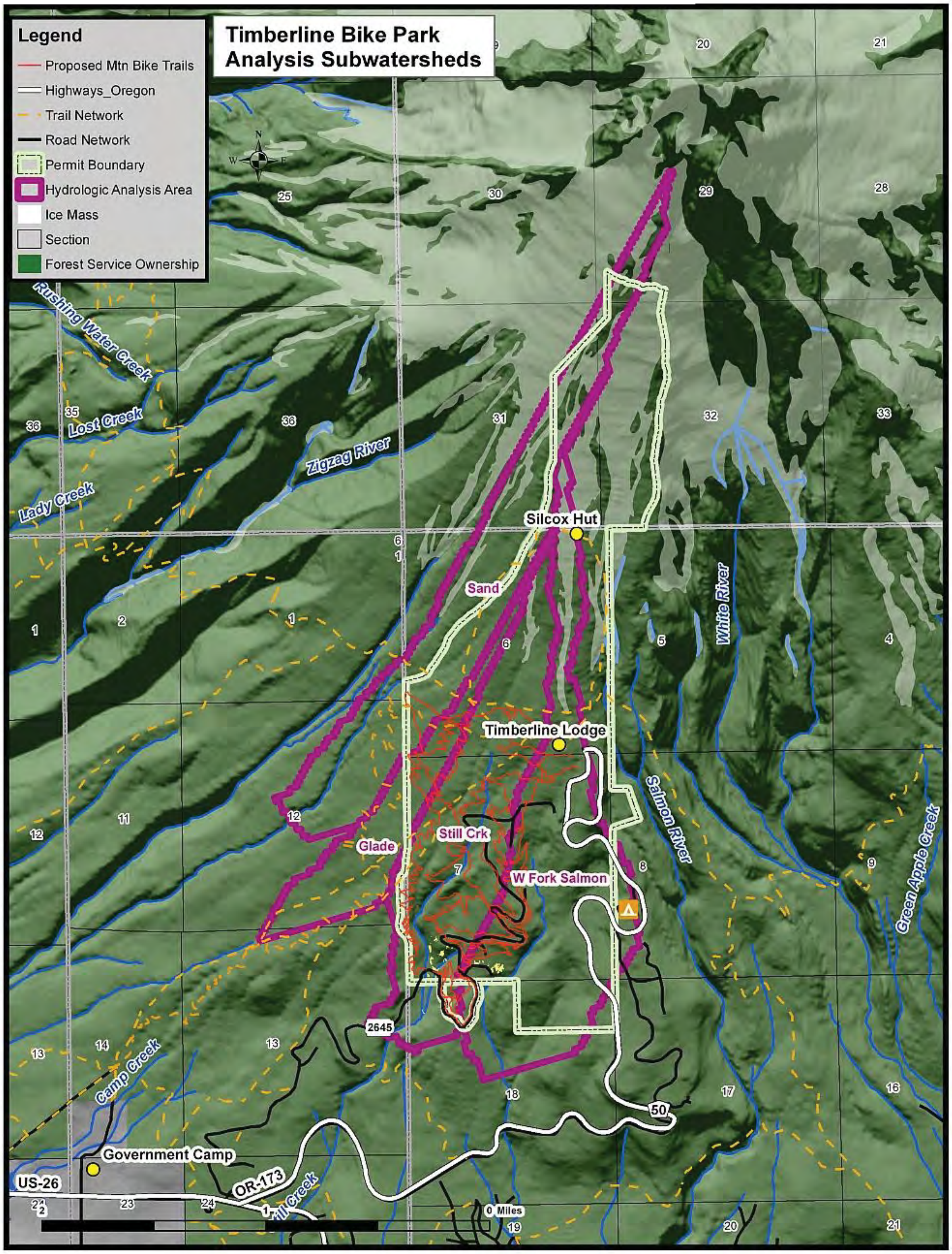


Table 5 - Land Allocations Related to Watershed Resources

Allocation	Management Direction
Special Emphasis Watershed	Maintain or improve watershed, riparian and aquatic habitat conditions and water quality for municipal uses and/or long term fish production.
Wild and Scenic River	Protect and enhance the resource values for which a river was designated into the Wild and Scenic Rivers System
Riparian Reserve	Riparian resources receive primary emphasis and special standard and guidelines apply
B7 General Riparian Area	Achieve and maintain riparian and aquatic habitat conditions for the sustained, long-term production of fish, selected wildlife and plant species, and high quality water for the full spectrum of the Forest's riparian and aquatic areas.

In addition to the land allocations listed in Table 5, the Salmon River Fifth Field Watershed is a Tier 1 Key Watershed under the Northwest Forest Plan. There are 573 acres of the analysis area in the Key Watershed. The objective of Key Watersheds is to contribute directly to conservation of at-risk anadromous salmonids and resident fish species. The emphasis within Key Watersheds is to reduce existing system and non-system road mileage and receive priority for restoration.

The Study Area also contains a portion of the Government Camp Drinking Water Protection Area (DWPA) and the entire Timberline Lodge DWPA (Figure 11). Both of these areas are associated with wells. The Timberline DWPA contains 243.3 acres and is located entirely within the analysis area. The Government Camp DWPA includes a total of 582.4 acres, 385.3 of which are located in the analysis area (see Figure 11). The process for developing a Drinking Water Protection Plan includes an Assessment Phase and a Protection Phase. The Assessment Phase including delineating the area that serves as the source of the public water supply; inventorying the potential risks or sources of contamination and determining the areas most susceptible to contamination has been completed. The development of a protection plan associated with the protection phase is voluntary and has not been completed and therefore, no management guidelines or protection standards have been established.

Climate

Average yearly temperature within the analysis area is 37 degrees Fahrenheit during the period of record. Temperature ranged from average highs of 54 degrees in August to average lows of 27 degrees in December, January, and February. Average annual precipitation within the Study Area is 106.6 inches, ranging from a high of 152.6 inches observed in 1997 to a low of 68.4 inches recorded in 2001. An average of 65 inches falls as snow within the analysis area, measured as a snow water equivalent at the Mt. Hood Test Site Snow Telemetry (SNOTEL) site. With approximately one half of the annual precipitation arriving as snowfall, the flow characteristics of channels draining the analysis area are dominated by snowmelt.

Data from the Mt Hood Test Site from 1981 through 2004 is summarized in Table 6.

Figure 11 – Drinking Water Protection Areas

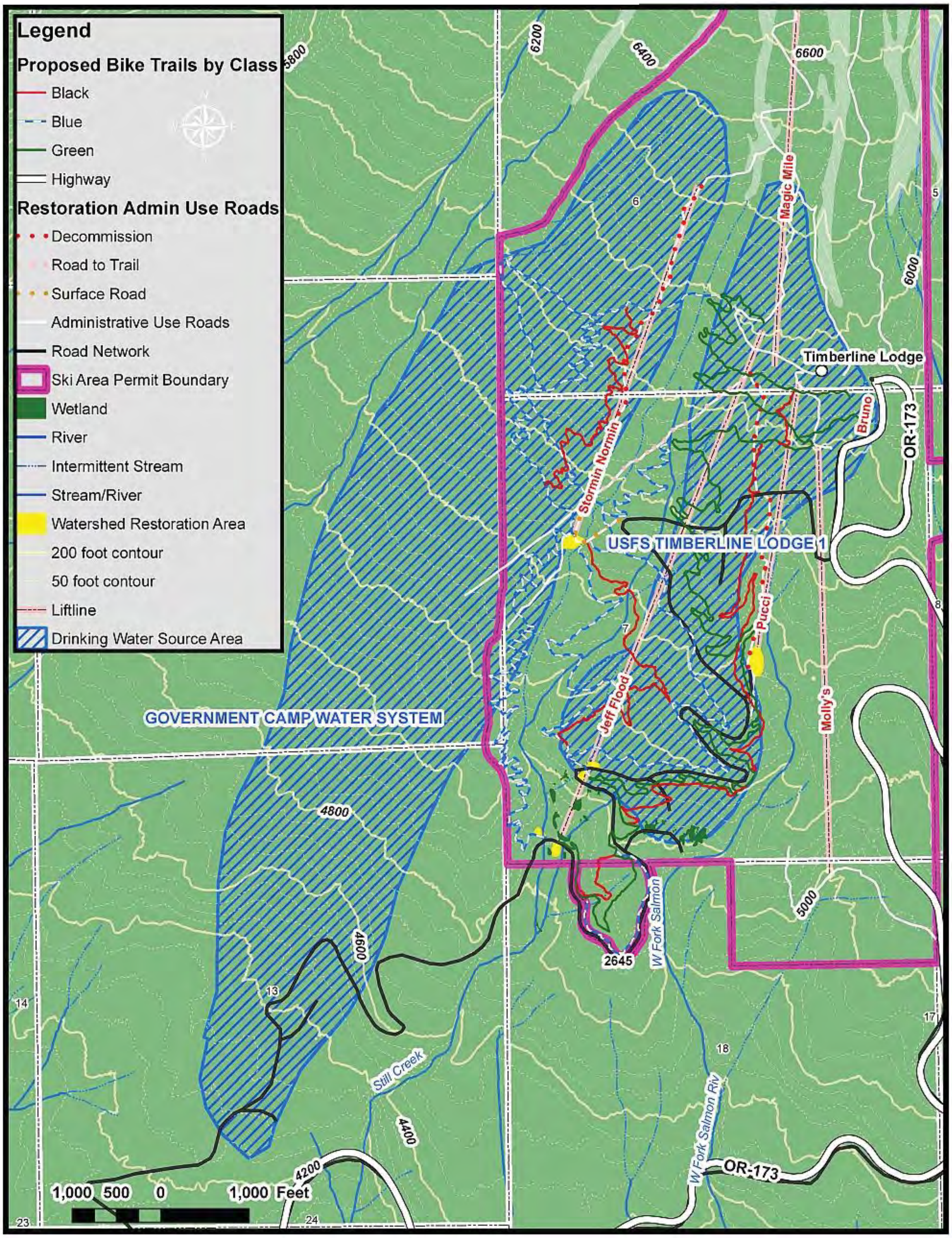


Table 6 - Mt. Hood Test Site Climate Summary

	Total Precipitation	Snowpack measured as inches of Snow Water	% of Total Precipitation
Average	106.6	67.1	63
Minimum	68.4	37.9	39
Maximum	152.6	102.4	81

Surface Water Resources

The total length of streams in the analysis area is approximately 12.0 miles. The stream system in the analysis area is based on field validated streams during the planning process for the Timberline Express FEIS (USDA, 2005a). Table 7 shows the length of these channels by flow regime. The streams are depicted in Figure 12.

Table 7 - Stream Length by Flow Regime

Watershed	Ephemeral	Intermittent	Perennial	Subtotal
Glade	0.1	0.0	0.0	0.1
Sand Canyon	1.7	0.7	0.0	2.4
Still Creek	3.0	0.5	1.4	4.8
West Fork Salmon	0.7	2.7	1.3	4.7
Total	**5.4**	**3.9**	**2.7**	**12.0**

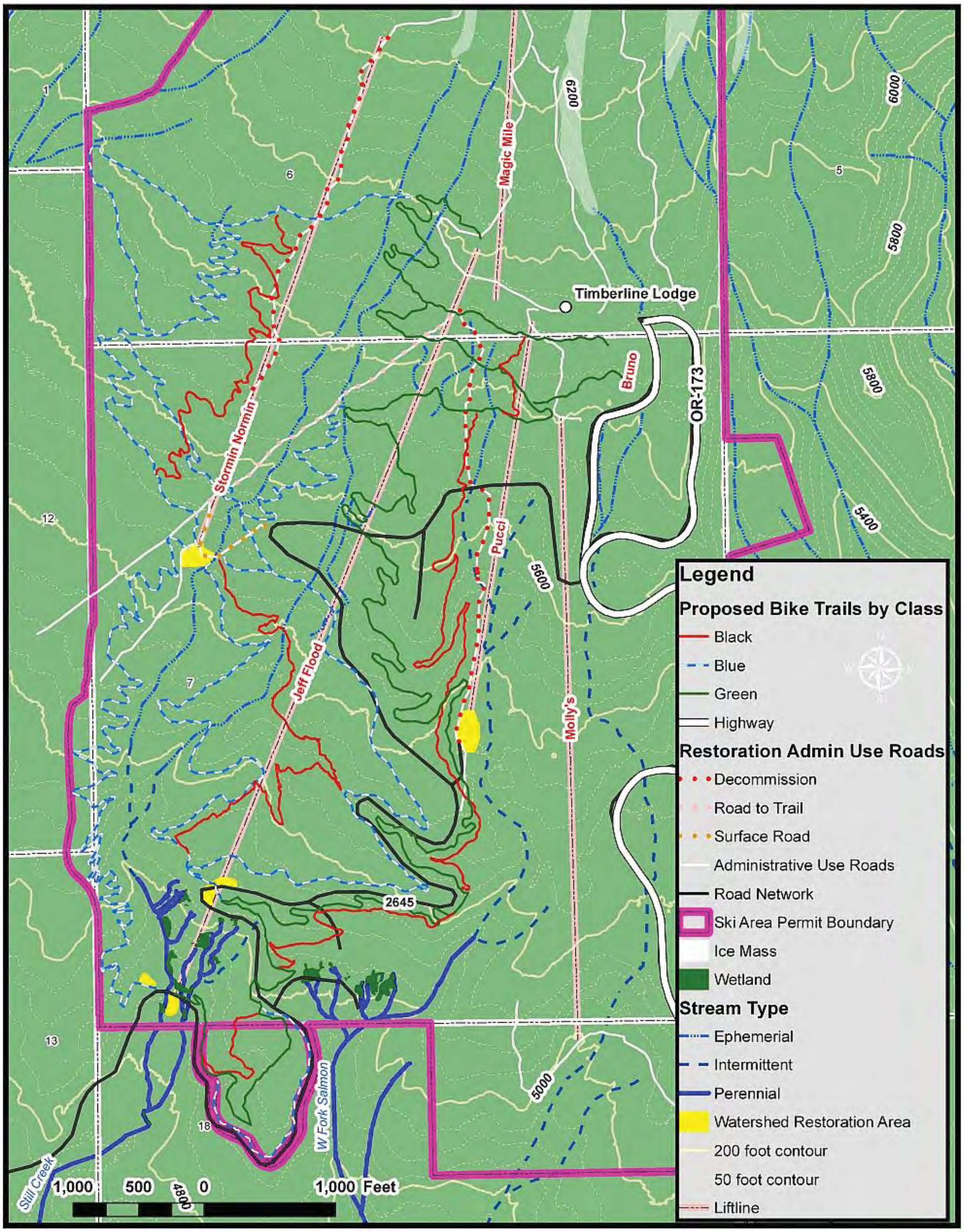
Geomorphology

The headwaters of Still creek emerge out of a set of perennial and ephemeral wetland seeps originating at about 4,800 feet elevation on the south side of Mt. Hood. Fed by snowmelt surface runoff and groundwater flow emanating from the Palmer Snowfield, these numerous wetland seeps join together at the 4,800' elevation level and form the mainstem channel of Still Creek (USDA, 2005a).

Thick pyroclastic flow and debris flow deposits from approximately 1,500 years ago comprise the surface material in the project area. These permeable deposits filled in over the older topographic surface (including stream channels) and created the present smooth fan on the southwest side of Mt. Hood (USGS, 1995). The age and permeability of this material explains the limited stream development above Timberline Lodge; the buried topography (including stream channels) probably helps to concentrate groundwater flow in certain areas and partially explains why springs are located where they are (DeRoo, Pers. Comm).

The topography of the land immediately surrounding these seeps and wetlands is very steep (30% – 50% slopes) and because of the slope, these tributary streams all are moderately to highly incised and have distinct stream morphology with limited floodplain development. The perennial reach of the mainstem of Still Creek in the vicinity of the project area is classified as a Rosgen A4a+ channel type. The A4 stream types typically have a high sediment supply which is

Figure 12 – Stream and Wetland Network



combined with high energy streamflow to produce very high bedload sediment transport rates. The A4 stream types are generally unstable, with very steep, rejuvenated banks that contribute large quantities of sediment. A4a+ stream types are usually located in slump/earthflow landforms and are often associated with debris avalanches and debris torrent erosional processes (Rosgen 1996).

Similar to Still Creek, West Fork Salmon River is in the area affected by pyroclastic flow and debris flow deposits from approximately 1,500 years ago. West Fork Salmon River is very similar to Still Creek in that it is fed by snowmelt surface runoff and groundwater flow emanating from the Palmer Snowfield, into numerous wetland seeps that join together at the 4,800' elevation level and form the channel of the West Fork Salmon River.

The perennial reach of the West Fork Salmon River in the vicinity of the analysis area is also classified as a Rosgen A4a+ channel type, described above for the perennial reach of Still Creek.

However, significant stream bed and bank erosion in the lower perennial reaches of Still Creek and West Fork Salmon River within the Study Area was not observed during stream mapping and characterization surveys associated with the Environmental Impact Statement for the Timberline Express Project that were conducted in 2002 and 2003 (SE Group, 2004a). The 1998 stream survey of Still Creek in the vicinity of the analysis area notes 0.8% of the stream reach with unstable banks. The lack of observed bank erosion and instability that would be expected in this sensitive stream type from existing lift and trail development in the analysis area is likely due to the moderating effect of groundwater contributions to the stream hydrograph, the well-connected floodplain wetlands, and the dense overbank vegetation along both sides of the channel. However, some bank instability approximately 1.5 miles downstream of the analysis area was noted during a survey of Still Creek near the Still Creek Campground (USDA, 1996). Another area of bank instability was noted in the West Fork of Salmon River in the vicinity of Timberline Road where an abundance of road sand and gravel was observed within and adjacent to the channel. Additional sediment/gravels were noted in the channel from a natural slope failure zone that is approximately 75 feet in length and 50 feet high adjacent to the streambank and approximately 500 feet upstream of the Timberline Road (SE Group, 2004d).

Flow Regime

With the lowest elevation in the analysis area at 4,800 feet and the highest elevation area at 10,000 feet (however the majority of the analysis subwatersheds only extend up to 7,000 feet) at least 50% of the annual precipitation is contained in the snowpack based on data from adjacent SNOTEL sites. Based on the amount of precipitation associated with the snowpack, a snowmelt-dominated hydrograph would be expected for this area. Figure 13 details the mean daily values for the Salmon River stream gauge at 3,445 feet, which measures a watershed of 8 square miles. This gauge is approximately 1 mile east of Trillium Lake. Figure 13 clearly details the influence of the melting snowpack (staring in early April and peaking in late May) on the annual hydrograph. Baseflows at this site generally occur from mid-July through mid-November.

Figure 13 - Daily Average Streamflow Salmon River at 3,445 feet

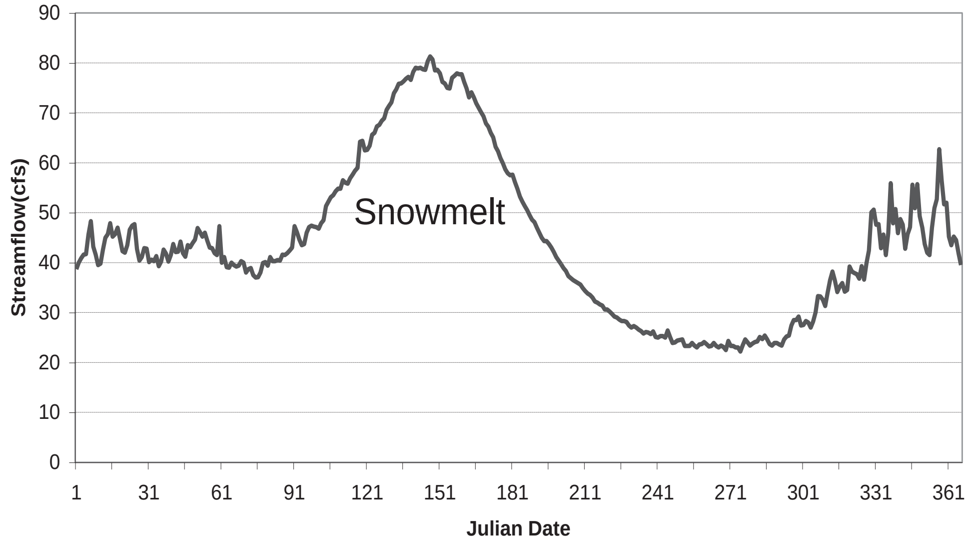
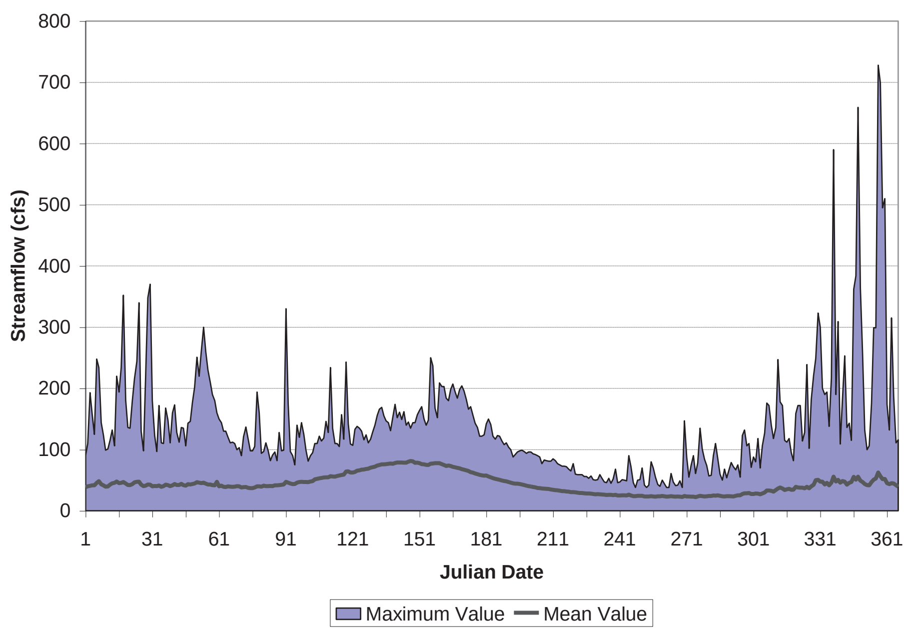


Figure 14 details the maximum daily streamflows for the 67 years of record for the Salmon River gage at 3,445 feet. This figure details that the maximum streamflows occur from late November to early March. This would indicate that peak streamflows are associated with runoff from rapid snowmelt and rainfall during rain on snow events.

Figure 14 - Daily Peak Streamflow Salmon River at 3,445 feet



Current streamflow data from Still Creek in the vicinity of Still Creek Campground indicates Still Creek differs from the Salmon River, as it is fed primarily by groundwater rather than direct run-off from the snowfield. Seepage from the upper snow fields travels through the near surface geology and expresses itself in the springs that provide the source of perennial flow.

Still Creek flow regime is "buffered" by the constant influx of groundwater. Pulses of surface runoff during rain events occur primarily when the ground surface becomes saturated and the ephemeral reaches of Still Creek carry water.

Water Quality

A Total Maximum Daily Load (TMDL) has been established for stream temperature in the Sandy Basin. The federal Clean Water Act requires the Oregon Department of Environmental Quality (DEQ) to develop a plan with goals and pollution control targets for improving water quality in the watersheds where water quality standards are not met. DEQ is doing this by establishing TMDLs for each pollutant entering the water. In this case, heat is considered a pollutant because it raises water temperature. A TMDL describes the amount (load) of each pollutant a waterway can receive while maintaining compliance with water quality standards. An important step in the TMDL process is determining how much stream heating results from natural sources and how much heat comes from human activities.

Oregon requires that a water temperature management plan (TMP) be developed and implemented by sources that contribute to stream heating. The TMP would identify the technologies, best management practices, and/or measures and approaches to be implemented by each source to limit stream heating. Stream heating and sedimentation from forestry activities would be controlled through implementation of measures in the state Forest Practices Act on private lands, the Western Oregon State Forests Management Plan in state forests, and federal Northwest Forest Plan on federal forestlands.

Sediment

The Watershed Analysis for the Zigzag Watershed (USDA, 1995b) identifies moderate problems with turbidity and sediment associated with highway sanding and road surface erosion in Still Creek.

The Watershed Analysis for the Salmon River Watershed (USDA, 1995a) also identifies sedimentation of streams in upper watershed as a process of concern. The Watershed Analysis recommends restoration priorities to reduce sediment within the watershed should focus on the greatest potential sources: highway sanding and roads. Reducing sediment from roads can be further prioritized by proximity to streams, surfacing type, cut and fill slope vegetation and landform.

Wolman pebble counts collected in the summer of 2010 quantify concerns with sedimentation in the project area in both Still Creek and the West Fork Salmon River. In Still Creek, surface fines (material less than 1 mm) were at 21% and in the West Fork Salmon River surface fines were at 41% (the Mt Hood LRMP (USDA, 1990) Standard is less than 20% surface fines).

As described above, a major source of sediment input to the West Fork was observed in the vicinity of Timberline Road where an abundance of road sand and gravel was observed within and adjacent to the channel and additional material from a natural slope failure zone approximately 500 feet upstream of the Timberline Road (SE Group, 2004d).

Below the project area, the 1996 Still Creek stream survey (USDA, 1996) details problems with sedimentation in the area near Still Creek Campground and in the upper portion of the Key Site Riparian area. These observations were validated with pebble counts from that survey that detail surface fines (material less than 1 mm) at 52% and 35% respectively in these reaches (the Mt Hood LRMP (USDA, 1990) Standard is less than 20% surface fines).

Water Temperature

Still Creek and West Fork Salmon River are identified by the Oregon Department of Environmental Quality as core cold water habitat for salmonids with a water temperature standard of the seven-day-average of the daily maximum temperature may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit).

In the Watershed Analysis for the Zigzag Watershed (USDA, 1995b) Still Creek was not identified with stream temperature problems. This was validated by temperatures taken during stream surveys.

According to Golder (2003), Still Creek at elevation 5,000 feet exhibits an average temperature of 3°C. Outside of the analysis area at 3,600 feet, the average temperature is 6.8°C. Since water temperature in streams is cumulative and temperature typically becomes higher downstream, it can be deduced that the stream temperatures within the reaches in the Study Area are between 3°C and 6.8°C (Golder, 1998), which is below the 16.0°C in-stream maximum temperature criterion mandated by DEQ. Golder (1998) indicates that the perennial reach of Still Creek is fed by a series of groundwater seeps and springs that serve to buffer the stream from changes in the watershed. (USDA, 2005a).

In Still Creek, temperatures taken during the 1998 survey from July 6th to August 31st varied from a maximum of 15^0C at river mile 2.4, 2.7, and 3.3 to a minimum of 4^0C from river mile 14.0 to the end of the survey at river mile 14.4. Within the analysis area water temperatures were at 4^0C upstream of river mile 14.0.

In the Upper Salmon River at 3,445 feet in elevation, the average water temperature is 8.0°C (Golder, 1998), which is below the 16.0°C in-stream maximum temperature criterion mandated by DEQ. Similar to the perennial reach of Still Creek within the Study Area, the headwaters of Upper Salmon River within the Study Area are dominated by a series of springs and seeps in the vicinity of Timberline's pumphouse. As a result, the flows in downstream reaches would also be buffered from changes in the upslope watershed. (USDA, 2005a).

Groundwater Resources

Within the project area, highly permeable pyroclastic and debris flow deposits from approximately 1,500 years ago covered older volcanic deposits to create the smooth fan that is currently discernible between Zigzag Canyon and White River Canyon. The thickness of this debris fan is largely undocumented, however a test well located just south of Timberline Lodge revealed a measured thickness of 120 feet (USFS, 1992). It is likely that the young age and high permeability of these deposits are the dominant factors responsible for the limited stream development above Timberline Lodge and the large amount of shallow groundwater flow. Finally, it is thought that the older volcanic deposits found under the permeable pyroclastic and debris flow materials have low permeability and act to concentrate groundwater flow and create groundwater springs at specific elevations where bedrock is exposed (DeRoo, Pers. Comm., July, 2004).

The headwaters of Still creek emerge out of a set of perennial and ephemeral wetland seeps originating at about 4,800 feet elevation on the south side of Mt Hood. Fed by snowmelt surface runoff and groundwater flow emanating from the Palmer Snowfield, these numerous wetland seeps join together at the 4,800' elevation level and form the mainstem channel of Still Creek (USDA, 2005a).

Similar to Still Creek, West Fork Salmon River is in the area affected by pyroclastic flow and debris flow deposits from approximately 1,500 years ago. West Fork Salmon River is very similar to Still Creek in that it is fed by snowmelt surface runoff and groundwater flow emanating from the Palmer Snowfield, into numerous wetland seeps that join together at the 4,800' elevation level and form the channel of the West Fork of Salmon River

In 1996, RLK submitted an application to the DEQ for certification pursuant to Section 401 of the Federal Clean Water Act in conjunction with issuance of the Forest Service Special Use Permit for the Timberline Ski Area on the Mount Hood National Forest. As part of the certification process, DEQ provided RLK with several special conditions specific to the Timberline area. These conditions include a requirement that the RLK prepare a hydrogeologic characterization of the affected area, which includes, but is not to be limited to, recharge estimates, groundwater flowpaths, estimated velocities, ground water discharge areas, and estimates of groundwater volume discharged to surface water within the affected drainage sub basins.

Wetlands

Executive Order (EO) 11990, Protection of Wetlands, calls for the identification, assessment, and protection of wetlands by requiring Federal agencies to avoid, if possible and practicable, adverse impacts to wetlands and to preserve and enhance the natural and beneficial values of wetlands. Section 401 of the Clean Water Act includes provisions that ensure compliance with the Clean Water Act and state water quality laws with respect to activities that are federally permitted. Jurisdictional wetlands and streams are subject to the regulations of the Clean Water Act, in particular, Section 404, which regulates discharges of fill to wetlands and streams.

In order to satisfy conditions of EO 11990 during the planning process for the Timberline Express project (USDA 2005a), wetlands were identified and mapped throughout the entire Study Area to assist with project design and impact analysis. Wetlands were identified and mapped using the three-parameter approach outlined in the Corps of Engineers Wetlands

Delineation Manual (Environmental Laboratory, 1987). Wetlands within the Study Area were also classified using the Hydrogeomorphic (HGM) approach to wetland classification (Brinson, 1993). The wetlands in analysis area are grouped according to their HGM class: slope wetland or riverine wetland. The wetlands are further characterized by whether they are in a natural or modified (historically disturbed) condition. Wetlands in a modified condition contain modified or nonnative vegetation, modified soil profiles, and/or modified hydrology through ditching or levee construction (USDA, 2005a).

The Study Area contains 22 wetlands that encompass a total area of 2.46 acres, as shown in Table 8 and Figure 12.

Table 8 - Wetlands in the Study Area

Watershed	Riverine Wetland	Slope Wetland	Subtotal
Still Creek	0.3	1.0	1.3
West Fork Salmon River	-	1.2	1.2
Total	**0.3**	**2.2**	**2.5**

Nineteen slope wetlands with a total of 2.15 acres are located within the Study Area, most of which are generally located in the middle to lower elevation (4,850 feet to 5,050 feet in elevation) portions of the analysis area. Two of the slope wetlands in the analysis area are adjacent to the mainstem of Still Creek, a Class II stream. The vegetation in these slope wetlands is typically dominated by herbaceous plant communities with limited shrub and tree dominated components along the margins of the wetlands. The composition of the soils observed in the slope wetlands ranges from organic soils (i.e., histosols) to mineral soils with sandy loam texture classes.

Most of the slope wetlands in the analysis area originate from a series of groundwater seeps that form the headwaters of Still Creek and unnamed tributaries of the Upper Salmon River. A review of geologic literature for the surrounding area (Wise, 1969) indicates that the flow from these seeps is relatively constant due to the groundwater flow from Palmer Snowfield.

A total of 0.32 acre of riverine wetlands is present in the analysis area. The three riverine wetlands in the analysis area are located along perennial reaches of Still Creek and tributaries to Still Creek on narrow floodplains and terraces. The primary hydrologic input to the riverine wetlands is surface water that floods out of the Still Creek channel and onto adjacent floodplains during high flow events (e.g., spring melt). Secondary hydrology sources to these wetlands include surface flow from intermittent and perennial streams from adjacent hillsides and groundwater from seeps in the inner gorge of Still Creek. Native hydrophytic shrub species dominate the vegetation communities in the riverine wetlands in the analysis area. Herbaceous communities make up a minor component of the wetland vegetation in one of the riverine wetlands and forest communities are not present in any of the riverine wetlands. The soils within the riverine wetlands are typically mucky mineral soils with loamy sand texture (SE Group, 2004a).

3.2.2 Direct and Indirect Effects

No Action

Under the No Action Alternative, Hydrologic and geologic conditions would not be affected by the construction and operation of a mountain bike park, or by the implementation of any restoration projects. Conditions would remain as described for the affected environment.

Proposed Action

Table 9 presents a summary of the effects to water resources under the Proposed Action.

Table 9 - Comparison of Alternatives – Water Resources

Items of Comparison	Proposed Action	Current Condition
Flow Regime		
Channel Network Expansion by Roads and Trails	Still Creek: 21%	Still Creek: 24%
	WF Salmon: 14%	WF Salmon: 17%
	Total: 14%	Total: 16%
Changes in 2-year peak flow	Still Creek: 4.7%	Still Creek: 4.3%
	WF Salmon: 4.5%	WF Salmon: 4.3%
Changes in low flow	Still Creek: 19.8%	Still Creek: 18.2%
	WF Salmon: 19.0%	WF Salmon: 18.2%
Sediment Yield		
Number of Stream Crossings (roads and trails)	Still Creek: 37	Still Creek: 16
	WF Salmon: 10	WF Salmon: 10
	Total: 49	Total: 28
Modeled Sediment Delivery (tons/year)	Still Creek: 164.5	Still Creek: 323.7
	WF Salmon: 395.0	WF Salmon: 423.4
	Total: 563.9	Total: 753.7

The effects to water resources under the proposed action are addressed by evaluating three elements that address the key issues:

- Flow Regime
- Sediment Yield
- Stream Temperature

Flow Regime

Peak streamflows (flood events)

Peak streamflows have important effects on stream channel morphology, sediment transport, and bed material size. Peak streamflows can affect channel morphology through bank erosion, channel migration, riparian vegetation alteration, bank building, and deposition of material on floodplains. The vast majority of sediment transport occurs during peakflows as sediment transport capacity increases logarithmically with discharge (EPA, 1991).

The ability of the stream to transport incoming sediment would determine whether deposition or erosion occurs within the active stream channel. The relationship between sediment load and sediment transport capacity would affect the distribution of habitat types, channel morphology, and bed material size (EPA, 1991). Increased size of peakflows due to urbanization has been shown to cause rapid channel incision and severe decline in fish habitat quality (EPA, 1991).

Another important consideration is the impact of bankfull flow, often described as the high flow during two out of three years, or as a stream discharge having a recurrence interval of 1.5 years (Dunne and Leopold, 1978). The shape of the channel more closely reflects the bankfull width and height than it does the less frequent floods. If the bankfull flow is raised above the range of natural conditions, excess scouring can occur. If lower, the stream may not have the power to move its natural sediment load, causing sediment deposition within the watershed.

The Aquatic Conservation Strategy (ACS) gives clear direction that “the distribution of land use activities, such as timber harvest or roads, must minimize increases in peak streamflows” (USDA, USDI 1994) to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.

Peak streamflows of large magnitude downstream of the analysis area are generally generated by rain-on-snow events. The transient rain-on-snow zone is normally considered to be from 2,400 to 4,800 feet. Even though the analysis area is slightly above the transient rain-on-snow zone 71% of the of the entire analysis area is below 6,000; 81% of the Still Creek and 85% of the West Fork Salmon River analysis area watersheds are also below 6,000 feet. The 6000 foot elevation level was used because during the recent January 2011 flood on the Sandy River over an inch of snow water equivalent was lost at the Mt Hood Test Site at 5370 feet indicating that during some storm events this area is in the transient rain-on-snow zone. Record floods occur predominantly during November through January, caused by accumulated snow at lower elevations followed by a rapid rise in temperature, unusually high-elevation freezing levels, and heavy rainfall. In some instances, the ground is frozen prior to snow accumulation, producing more favorable conditions for high runoff (SCS 1976).

The 2006 large peak streamflow event, estimated as a 25-year recurrence interval flood event in the Upper Sandy River Basin, was entirely rain-generated. This type of event is consistent with predictions associated with climate change. A recent review of the effects of climate change on salmon (ISAB, 2007) identified the following probable consequences of global warming along the Pacific coast of North America: (1) warmer temperatures will result in more precipitation falling as rain rather than snow, (2) snowpack will diminish and streamflow timing will be altered, (3) peak river flows will likely increase, and (4) water temperatures will continue to rise.

Changes in hydrologic processes associated with management activities can be grouped into two classes according to causal mechanisms. One class consists of change resulting from removing forest vegetation through harvest. A second class consists of changes in hydrologic processes consists of those that control infiltration and the flow of surface and subsurface water. This class is dominated by the effects of forest roads (FEMAT V-20).

The proposed action is not anticipated to have any impact on overstory vegetation and associated canopy closure. As a result, this analysis focuses on the class of changes in hydrologic processes including those that control infiltration and the flow of surface and subsurface water. This class is dominated by the effects of forest roads. The relatively impermeable surfaces of roads cause surface runoff that bypasses longer, slower subsurface flow routes. Where roads are insloped to a ditch, the ditch extends the drainage network, collects surface water from the road surface and subsurface water intercepted by roadcuts, and transports this water quickly to streams. The longevity of changes in hydrologic processes resulting from forest roads is as permanent as the road. Until a road is removed and natural drainage patterns are restored, the road would likely continue to affect the routing of water through watersheds. (USDA, 1993)

For this analysis it is assumed that the Mountain Bike trails are similar to roads in the way that they impact hydrologic process associated with streamflow because of the impermeable surfaces of the trails (that are up to 6 feet wide) and insloped nature with associated ditchlines and cutslopes. It is acknowledged that road surfaces typically occupy a greater surface area than the proposed mountain bike trails, however the effect to hydrologic processes would be similar.

The relatively impermeable surfaces of roads cause surface runoff of rain and snowmelt water to bypasses longer, slower subsurface flow routes in soils. Where roads are in-sloped to a ditch, as most of the roads in the analysis area are, the ditch extends the drainage network, collects surface water from the road surface and subsurface water intercepted by road cuts and transports this water quickly to streams. This process increases flow routing efficiency and may result in increased magnitude of peak stream flows.

Table 10 shows that roads in the analysis area increase the channel network length by 16%. Increases in stream drainage network enhancement vary from 0 to 24% based on analysis area.

Table 10 - Stream Drainage Network Enhancement

Analysis Subwatershed	Current Condition	Proposed Action	Change Associated with Proposed Action
Glade	0%	68%	+68%
Sand Canyon	0%	1%	+1%
Still Creek	24%	21%	-3%
West Fork Salmon River	17%	14%	-3%
Total	**16%**	**14%**	**-2%**

Implementation of the proposed action would decrease the stream drainage network by 2% over the entire project area, 3% in the West Fork Salmon Watershed, and 3% in the Still Creek Watershed. The reductions would be realized through road decommissioning and installation of more frequent drainage structures on user roads and system roads (associated with Still Creek Watershed Restoration Action Plan.). Results from Glade Watershed are suspect because of the very limited length of stream in this area (0.07 mile).

In a study on the effects of forest roads on peak streamflows (LaMarche and Lettenmaier, 2001) in the western slope of the Cascade Range in southwestern Washington forest roads alone were predicted to have increased the mean annual flood in the subcatchments from 2.2 to 9.5 percent, and from 2.9 to 12.2 percent for the ten year event. The largest increases associated with forest roads (without harvest) were roughly equivalent to those predicted for harvest, without roads. The predicted increases in floods due to roads generally increase with flood return period, while vegetation effects decrease. The effects of roads and harvest on peak flows at the subcatchment and catchment levels are essentially independent, and the combined effects on peak flows are therefore roughly additive. At the hillslope scale, modeled as well as field-observed road ditch response was dependent on vegetation state, with higher road effects occurring below harvested hillslopes. The absence of such a synergy at the subcatchment and catchment levels may well be due to scaling issues (most likely due to desynchronization in the channel system) of peak flows from the collective hillslopes.

Both the current condition and proposed action would appear to be above the threshold where peak streamflows may be impacted by roads. However, the research associated with these studies was completed in the rain-dominated and transient rain-on-snow zones (elevations less than 1,150 feet, and 1,150 feet to 3,940 feet respectively) and not the snow zone where this project is planned. Grant, 2008 stated: “There is wide scatter in the data from the snow-dominated zone …The scatter is indicative of the primary importance of other factors (e.g., aspect, elevation, timing and temperature of snowfall) in this hydrologic zone.” It should also be noted that the research associated with this process (Wemple, 1996 and LaMarche and Lettenmaier, 2001) was completed in significantly larger watersheds than that associated with the analysis area(15,320 to 36,818 acres compared to 1,732 acres). Based on these two factors, care should be taken in interpreting these results of these studies in the project area.

Recent studies (Grant, 2008) support the inference that when present, peak flow effects on channels should be confined to a relatively discrete portion of the stream network: stream reaches where channel gradients are less than approximately 0.02 and streambed and banks are gravel and finer material. Peak flow effects on channel morphology can be confidently excluded in high-gradient (slopes >0.10) and bedrock reaches, and are likely to be minor in most step-pool systems. On the other hand, if channels are gravel or sand-bedded, a more detailed hydrologic and geomorphic analysis seems warranted.

The steepest channel types (cascade and step-pool) generally have recurrence intervals for critical flow for sediment transport values above those likely to be affected by peak flow increases. The streams in the project area are on hillslopes from 20 to 50% for the most part so they would fall in the cascade and step-pool channel types which require almost a 10 year recurrence interval event for sediment transport.

Using Still Creek analysis subwatershed as an example, the USGS regional equations (Cooper, 2005) were used to calculate different recurrence interval flows (knowing that the size of the watershed is smaller than that recommended for use of the equation) and from these flows illustrate the maximum increase in peak streamflows associated with roads from LaMarche and Lettenmaier, 2001.

As detailed in Table 11, the maximum increases in the 2 and 5 year recurrence interval events would not increase streamflow so that it would be the same as a pre-road 10 year recurrence interval event where sediment transport within the streams in the project area would begin to be impacted.

Table 11 - Potential Impacts of Roads on Peak Streamflows

Recurrence Interval	Flow (ft^3/s)	Predicted Streamflow with maximum increase
2	19.2	21.0
5	27.0	30.3
10	32.6	36.6
25	40.2	N/A
50	46.2	N/A
100	52.6	N/A

Associated with the Environmental Impact Statement for the Timberline Express Project, a custom stream flow model was created to estimate the potential changes in stream flow conditions as a result of land cover changes from the Proposed Action and other Action Alternatives in the two analysis watersheds (similar in size and position to Still Creek and West Fork Salmon River analysis areas used for this project). This model was used to assess potential changes in 2 year peak flows and low flows associated with implementation of the Timberline Express lift and trails. Table 12 presents the change in peak streamflows predicted by the model.

Table 12 - Changes in 2 Year Peak Streamflows

Analysis Area	Current Condition	Proposed Action
Still Creek	4%	5%
W.F. Salmon River	4 %	5%

It is generally accepted that based on considerations of gage and measurement error at high-flow events, a minimum detectable change in peak flow (detection limit) of ±10 percent for site-scale analysis. Percentage changes in peak flow that fall in this range are within the experimental and analytical error of flow measurement and cannot be ascribed as a treatment effect (Grant, 2008). In addition, removal of groundcover and trees less than 6” dbh associated with the mountain bike trails is not expected to have any impact on the 2-year peak flow using the customized stream model.

Table 13 shows the modeled changes in low flows from the implementation of the lift and trails.

Table 13 - Changes in Low Flows

Analysis Area	Current Condition	Proposed Action
Still Creek	18%	20%
W.F. Salmon River	18%	19%

With respect to low flows, the streamflow analysis for the Timberline Express EIS concludes "The hydrographs of Still Creek and the West Fork Salmon River within the Flow Model Analysis Area are largely controlled by groundwater influx from shallow groundwater from the Palmer Snowfield (Golder, 1998 and DeRoo, Pers. Comm., July, 2004). As stated above, this stream flow model does not account for significant groundwater contributions to the hydrograph. During the summer low flow period, the dominant source of hydrology for Still Creek and the West Fork Salmon River is shallow groundwater. No effects to shallow groundwater are anticipated from the proposed project because no permanent roads would be constructed, utility trenching would be 3 to 4 feet deep, and the documented shallow groundwater table is between 50 and 150 feet below the soil surface in the vicinity of proposed grading activities (Golder, 1998)." With respect to low flows the same logic associated with the current condition would apply to the proposed mountain bike park since any areas where groundwater is exposed are avoided or bridged by the proposed mountain bike trails. Watershed restoration projects in the Still Creek drainage below the 5,500 foot level are in the vicinity of groundwater and should have a beneficial impact by addressing drainage issues in this area and restoring natural water flowpaths.

Sediment Yield

Road networks are the most important sources of accelerated delivery of sediment to fish-bearing streams. Road-related landslides, surface erosion, and stream channel diversions often deliver large quantities of sediment to streams, both catastrophically during large storms and chronically during smaller runoff events. Older roads in poor locations and with inadequate drainage systems pose high risks of future sediment production. Road surfaces and ditches can also serve as extensions of the stream network, thereby increasing flood peaks and efficiently delivering road-derived sediments to streams (USDA, 1993).

Accelerated rates of erosion and sediment yield are a consequence of most forest management activities. Road networks in many upland areas of the Pacific Northwest are the most important source of management-accelerated delivery of sediment to anadromous fish habitats. The sediment contribution to streams from roads is often much greater than that from all other land management activities combined, including log skidding and yarding. Road related landslides, surface erosion and stream channel diversions frequently deliver large quantities of sediment to steams, both chronically and catastrophically during large storms. Roads may have unavoidable effects on streams, no matter how well they are located, designed or maintained. Many older roads with poor locations and inadequate drainage control and maintenance pose high risks of erosion and sedimentation of stream habitats (USDA, 1993).

Increased levels of sedimentation often have adverse effects on fish habitats and riparian ecosystems. Fine sediment deposited in spawning gravels can reduce survival of eggs and developing alevins. Primary production, benthic invertebrate abundance, and thus, food availability for fish may be reduced as sediment levels increase. Social and feeding behavior can be disrupted by increased levels of suspended sediment. Pools, an important habitat type, may be lost due to increased levels of sediment (USDA, 1993).

Road crossings of stream channels create a potential for sedimentation due to the immediate proximity of the road to the stream being crossed. Where roads are insloped to a ditch, the ditch extends the drainage network, collects surface water from the road surface and subsurface water intercepted by road cuts and transports this water quickly to streams. This more rapidly flowing water is moving across a ditch which may not be vegetated, picking up sediment as it erodes. After road construction, this impact lessens, but still persists during storms due to the risk of overtopping of the crossing structure, most commonly culverts. Plugging of the structure by large woody debris or boulders in the streambed can reduce its capacity, and if severe, cause overtopping of the structure and damage to the fill on the downstream side of the road. Just as in the Flow Regime section, considering the number of drainage crossings is useful in assessing the risk of erosion and sedimentation from roads.

The erosive power of water increases at the sixth power of its velocity. Therefore, reducing the concentration of runoff, and thereby its velocity, is important to preventing erosion and the risk of sedimentation to streams.

In a study completed by the U.S. Geological Survey that assessed variations in stream turbidity within the Bull Run Watershed (LaHusen, 1994), it was determined that the most visible sites of erosion are stream channels, streambanks, and roadside ditches.

Modeled Sediment Yield from Road Network

The road based model was used because many of the trails to be built would be constructed by machine (11.4 miles of the 17.2 miles of trail construction) with these machine built trails having a tread up to 6 feet wide (not including the cut or fill slopes), and insloped with a ditchline much like a road system. In addition the trails would remain unvegetated and the native material trail surface would be a chronic sediment source, similar to road. Table 14 details the modeled sediment delivery to streams. Figures 15 and 16 depict the sources and tons of sediment delivered to streams in the Still Creek and West Fork Salmon watersheds.

Table 14 - Total Modeled Sediment Delivery to Streams (tons/year)

Analysis Watershed	Current Condition	Proposed Action
Glade	0.0	2.3
Sand Canyon	0.0	0.8
Still Creek	328.7	164.5
West Fork Salmon	423.4	395.0
Total	**753.4**	**563.9**

The majority of the sediment delivery is associated with indirect sediment delivery and varies by modeled activity as detailed in the table below. For the trail construction associated with the bike park 1% of the total sediment yield associated with this activity is associated with direct sediment delivery, as shown in Table 15.

Table 15 - Modeled Direct Sediment Delivery to Streams (tons/year)

Modeled Activity	% Direct Delivery
System Roads	16
Administrative Use Roads (pre-project)	21
Administrative Use Roads (post-project)	8
Timberline Bike Trails	1

Since the sediment yields in the Glade and Sand Canyon analysis watersheds are very small and the Glade analysis watershed that is not connected on the surface to the rest of the downstream drainage network in this subwatershed the discussion focuses on the Still Creek and West Fork Salmon analysis subwatersheds.

Figure 15 - Still Creek Sediment Yield - Current Condition and Proposed Action

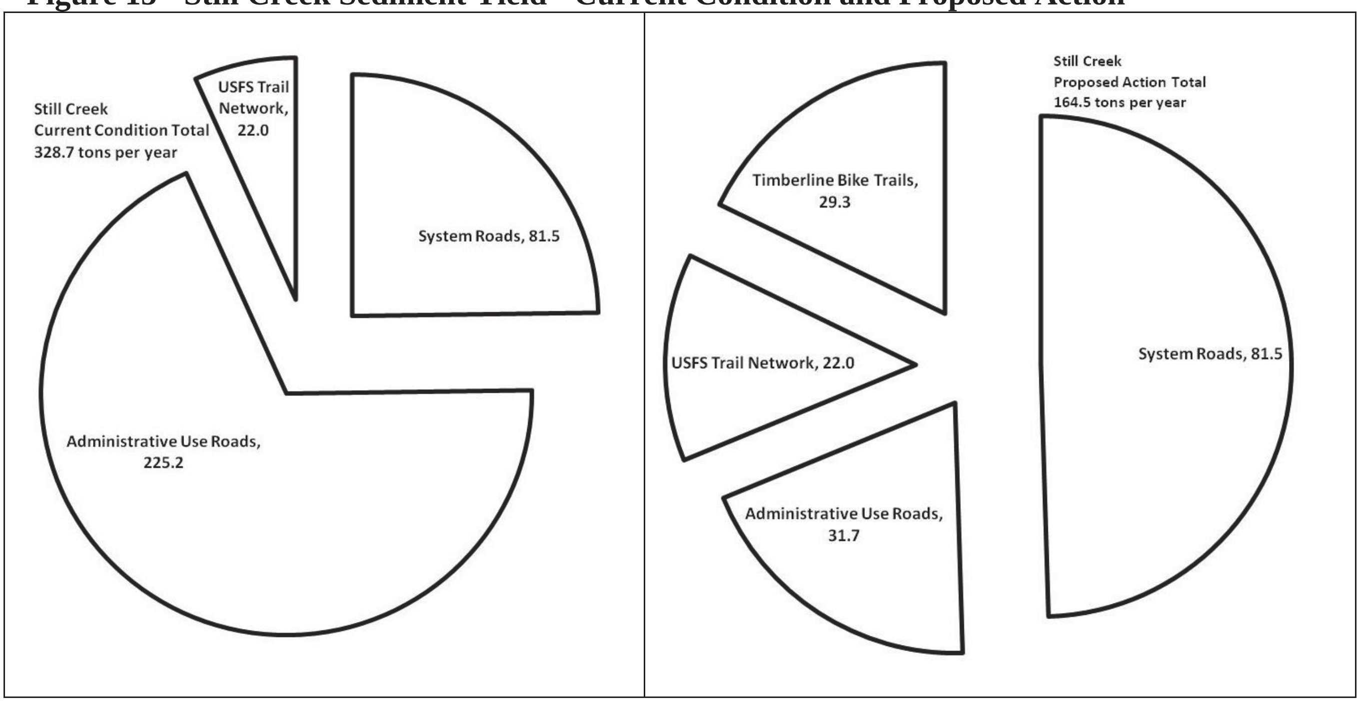
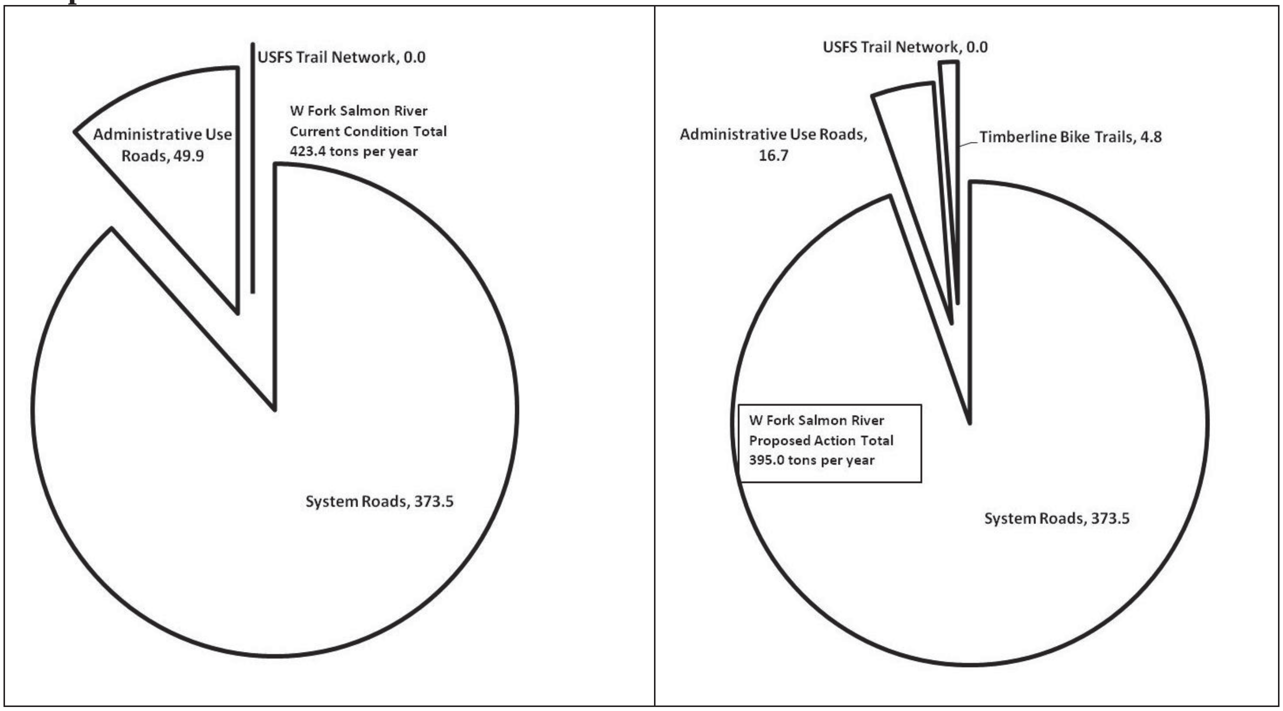


Figure 16 - West Fork Salmon River Sediment Yield - Current Condition and Proposed Action



The model indicates that the current condition yields 328.7 tons of sediment to the stream system annually in Still Creek and 423.4 tons annually in the West Fork of the Salmon River (Table 14). Under the current condition the majority (69%) of sediment in Still Creek is associated with administrative use roads. In the West Fork of the Salmon River the majority (88%) is associated with system roads. As detailed in the existing situation section surface fines in both Still Creek and West Fork Salmon River near the project area exceed Mt. Hood LRMP Standards (USDA, 1990) this condition would be expected to continue under the current condition.

Based on the results of the model (Table 14), implementation of the proposed action would result in 164.5 tons of sediment yield annually in the Still Creek analysis area, which is a reduction of 164.2 tons of sediment delivery annually when compared to the current condition. The West Fork of the Salmon River is predicted to yield 395.0 tons per year, which is a reduction of 28.4 tons per year. These reductions are based on model results and would be achieved through the implementation of the watershed restoration projects in the proposed action, coupled with the implementation of the PDC, which would minimize sediment delivery to streams from the proposed bike trails.

In the first two years after construction the trail system is predicted to yield 37.2 tons of sediment per year to streams, which would be reduced to 20.3 tons per year annually after that. For the first two years after construction 29.3 tons per year would be delivered to Still Creek (Figure 15) and associated tributaries and 4.8 tons per year would be delivered to West Fork Salmon River and associated tributaries (Figure 16). After two years, the yields would be reduced to 16.0 tons per year and 2.6 tons per year respectively (Table 16). The sediment yield associated with the trail construction would be offset by more than a 6 to 1 ratio by improvements to sediment yield from the implementation of the watershed restoration projects (Table 17).

Table 16 - Modeled Bike Park Related Sediment Delivery to Streams (tons/year)

Analysis Watershed	First 2 Years	After 2 Years
Glade	2.3	1.2
Sand Canyon	0.8	0.4
Still Creek	29.3	16.0
West Fork Salmon	4.8	2.6
Total	**37.2**	**20.3**

Table 17 - Sediment Reduction from the Overall Proposed Action

Watershed	Sediment from Trails	Sediment reduction from watershed restoration projects	Sediment Reduction Ratio
Glade	2.3	0.0	N/A
Sand Canyon	0.8	0.0	N/A
Still Creek	29.3	193.5	6.6
West Fork Salmon	4.8	33.2	6.9
Total	**37.2**	226.7	6.1

Based on model results, implementation of the project would result in a reduction of 164.2 tons of sediment per year in the Still Creek analysis area, 28.4 tons per year in the West Fork Salmon River analysis area and 189.5 tons per year for the entire project area. These are a 50% reduction in the Still Creek analysis area, 7% reduction in the West Fork Salmon River Analysis area and a 25% reduction over the entire project area. This reduction should reduce levels of in-channel fine sediment in both Still Creek and West Fork Salmon River in the vicinity of the project.

Sediment yield analysis was completed for the Timberline Express FEIS (USDA, 2005a) using the Water Erosion Prediction Project (WEPP) soil erosion model (a physically-based soil erosion model, particularly suited to modeling the conditions common in forests). Table 18 details sediment yield associated with anthropogenic sources. The subwatersheds analyzed are similar in size and position to Still Creek and West Fork Salmon River analysis areas used for this project.

Table 18 - Predicted Sediment Yield

Analysis Area	Sediment Yield to Streams (tons/year)
Still Creek	11.5
W.F. Salmon	3.5

The Sediment Model Technical Report associated with the Timberline Express FEIS (USDA, 2005a) concludes: “The Disturbed WEPP model provides accurate estimates of soil erosion and sediment yield rates for the existing and proposed conditions of the 20 hill slopes that were modeled in the Sediment Model Analysis Area. While this model provides accurate background erosion and sediment estimates for the hill slopes modeled, it does not provide any estimate of total background sediment yield to the two watersheds in the Analysis Area due in to the high erosion rates above the treeline and the unpredictability of snowmelt driven erosion on bare soils. It is difficult to put the estimated increases in soil erosion and sediment yield from the Action Alternatives into the proper context with respect to background sediment yield rates occurring throughout the Analysis Area. Rather, soil erosion and sediment yield numbers represent condition in the modeled hillslopes only. As such, the model is used to predict the effects of development alternatives on a series of modeled hillslopes.

Based on rough extrapolation of average sediment yield rates for the Riparian Reserves modeled, the total background sediment yield for the analysis area may occur within the range of 114 tons/year to 526 tons/year.”

Using the maximum from the range of background sediment yield from the Timberline Express Project, the modeled sediment associated with the current condition more than doubles sediment yield above background levels and implementation of the proposed action would result in a 36% decrease in sediment yield from background levels in the project area.

Stream Temperature

Stream temperatures can be affected by management activities that remove stream shade, alter channel structure, or alter the flow regime.

With respect to stream shade all of the new stream crossings would be over ephemeral stream crossings (that only flow when snow is melting), and there would be no trees over 6 inches dbh cut as part of the trail construction leaving an intact overstory tree canopy so there whould be no impact on stream shading in the project area.

Open channel crossings are planned on all streams. All crossings would be installed with the input of Forest Service fisheries biologists and/or hydrologists to maintain the function and bedload movement of the natural stream channel. Crossings would conform to the natural channel shape and elevation where possible so there should not be any impacts on channel structure associated with project implementation.

Using the same analysis methodology as used for the Timberline Express EIS there are no impacts anticipated to peak or base streamflows associated with implementation of the proposed action. Since there are decreases in the stream drainage network associated with project implementation, there are no impacts to base or peak streamflows based on the methodologies from the Timberline Express EIS and restoration activities associated with proposed action are designed to restore natural flowpaths the project should maintain or restore in-stream flows.

An additional area of potential concern is shallow groundwater interception with associated exposure of the the intercepted groundwater to solar radiation. No effects to shallow groundwater are anticipated from the proposed project because the documented shallow groundwater table is between 50 and 150 feet below the soil surface in the vicinity of proposed activities (Golder, 1998).

Based on the lack of impacts to stream shade, channel structure, or the streamflow regime stream temperatures in this area which are very low (~40C) are not anticipated to be impacted.

3.2.3 Cumulative Effects

A cumulative effects analysis was performed for watershed processes where adverse direct and/or indirect effects associated with the alternatives were identified. For this project these processes include short-term sediment delivery and stream drainage network enhancement associated with the proposed action.

Past, present, and reasonably foreseeable activities considered include past and present activities which are impacting processes of concern and reasonably foreseeable actions that are likely to occur or probable, rather than those that are merely possible

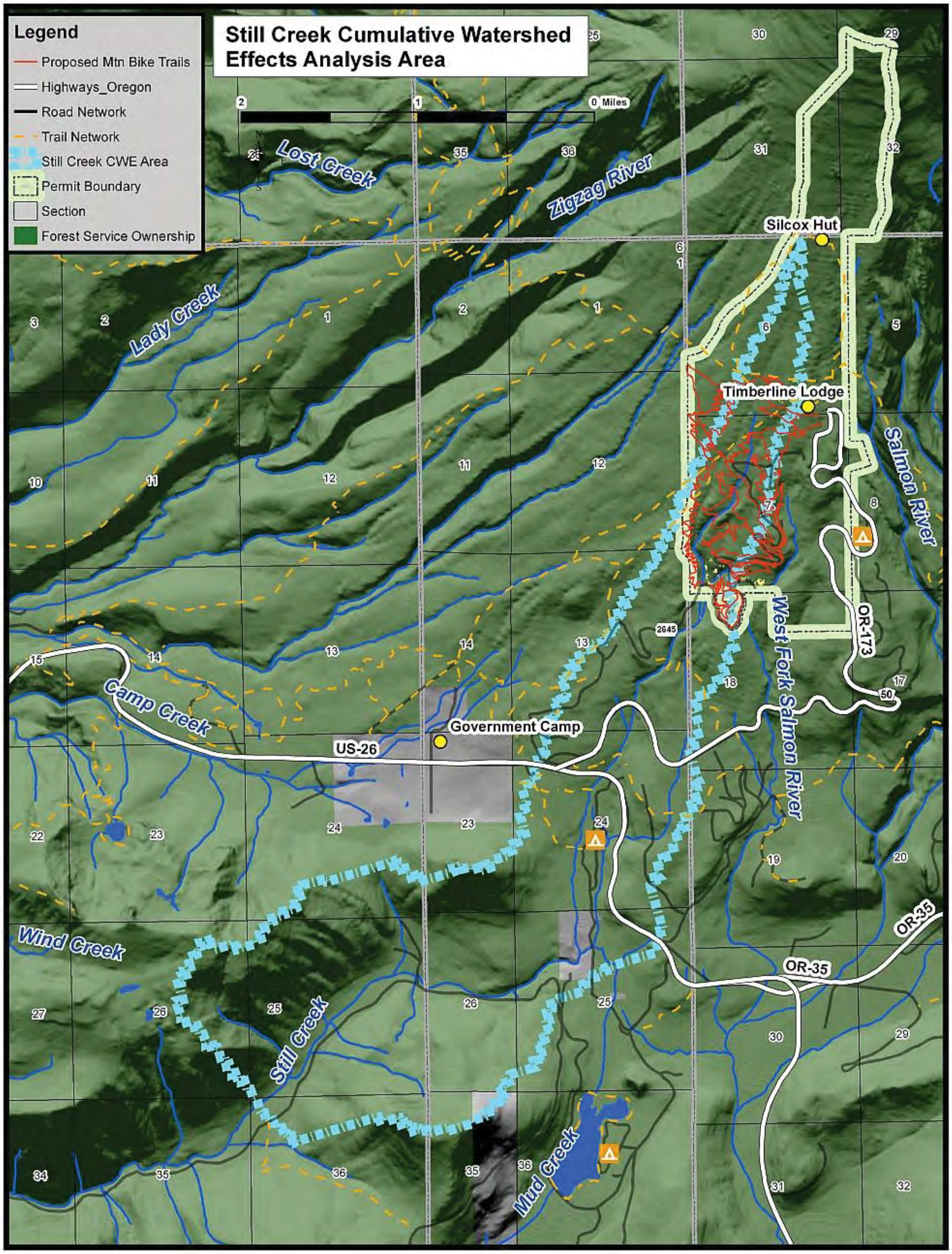
Still Creek

As shown in Figure 17, the cumulative watershed effects analysis area for the Still Creek subwatershed includes the area down to the first key depositional reach (Still Creek Key Site Riparian Area) where sediment from the project area would accumulate. Table 19 presents the modeled sediment contribution of each project that would cumulatively contribute sediment to Still Creek.

Table 19 – Past, Present, and Reasonably Foreseeable Projects that Overlap in Time and Space - Still Creek

Project	Sediment Yield (tons/yr)
Timberline Ski Area mountain bike trails	29
Timberline Ski area administrative use roads (post project implementation)	32
Modeled existing road related chronic sediment	1,229
Oregon Department of Transportation Highway Sanding	694
Forest Service Trails modeled chronic sediment	32

Figure 17– Cumulative Watershed Effects Analysis Area – Still Creek (3,087 acres)



For this analysis the estimated sediment delivery in tons per year delivered to the stream system was used for comparison when possible. This was done in an attempt to normalize values so that values from different sources could be compared.

The short term sediment delivery associated with project implementation is 1.5% of the total short term sediment yield for the cumulative watershed effects analysis area. These results are consistent FEMAT: *The sediment contribution to streams from roads is often much greater than that from all other land management activities combined (FEMAT V-16);* and, a recent assessment on assessing cumulative watershed effects (MacDonald, 2004) *"The median sediment production rate from roads was … nearly an order of magnitude higher than any of the other sources"*

Proposed watershed restoration projects in the proposed action are estimated to reduce sediment delivery in Still Creek by 293 tons per year (for a net reduction of 263 tons per year associated with project implementation). This is a 13% reduction in sediment (comparing the net reduction to the total sediment from roads, highway sanding, and USFS trails) for the cumulative effects analysis area so implementation of the project is not anticipated to have any adverse impacts on the aquatic system.

The same cumulative watershed effect analysis area was used to assess stream drainage network enhancement.

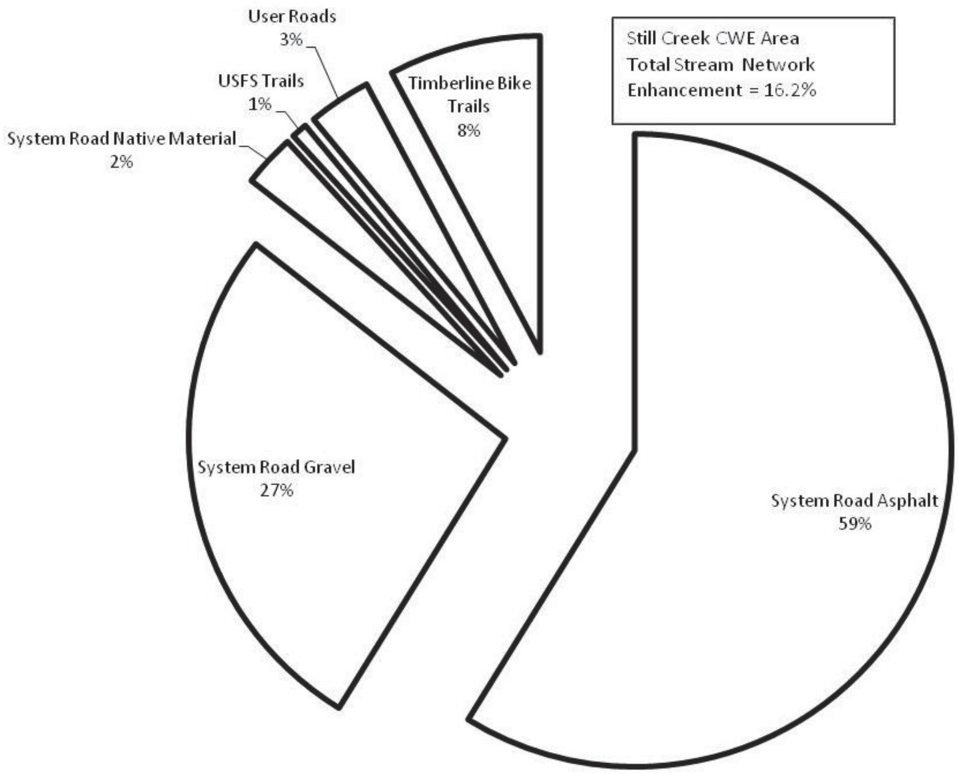
Stream drainage network enhancement within the CWA area is enhanced by 16% with 8% of the total increase associated with the proposed action, as shown in Figure 18.

As detailed in earlier in the stream drainage network enhancement section a 16% increase in the stream drainage network would appear to be above the threshold where peak streamflows may be impacted by roads (with a maximum increase of 12%), however LaMarche and Lettenmaier, 2001 indicated that at the subcatchment and catchment levels there may well be scaling issues (most likely due to desynchronization in the channel system) of peak flows from the collective hillslopes.

Recent studies (Grant, 2008) support the inference that when present, peak flow effects on channels should be confined to a relatively discrete portion of the stream network: stream reaches where channel gradients are less than approximately 2% and streambed and banks are gravel and finer material. Peak flow effects on channel morphology can be confidently excluded in high-gradient (slopes >0.10) and bedrock reaches, and are likely to be minor in most step-pool systems. On the other hand, if channels are gravel or sand-bedded, a more detailed hydrologic and geomorphic analysis seems warranted.

Within the CWE analysis area the stream gradient is greater than 2% for all streams and for the streams north of highway 26 the gradient is greater than 10%. The streams in this area are composed of a gravel substrate. This would indicate that the potential impacts of increased peak streamflows associated with stream drainage network enhancement would be minor due to the stream gradient.

Figure 18 - Still Creek CWE Analysis Area Pie Chart of Reasonably Foreseeable Projects that Impact Stream Drainage Network Enhancement that Overlap in Time and Space



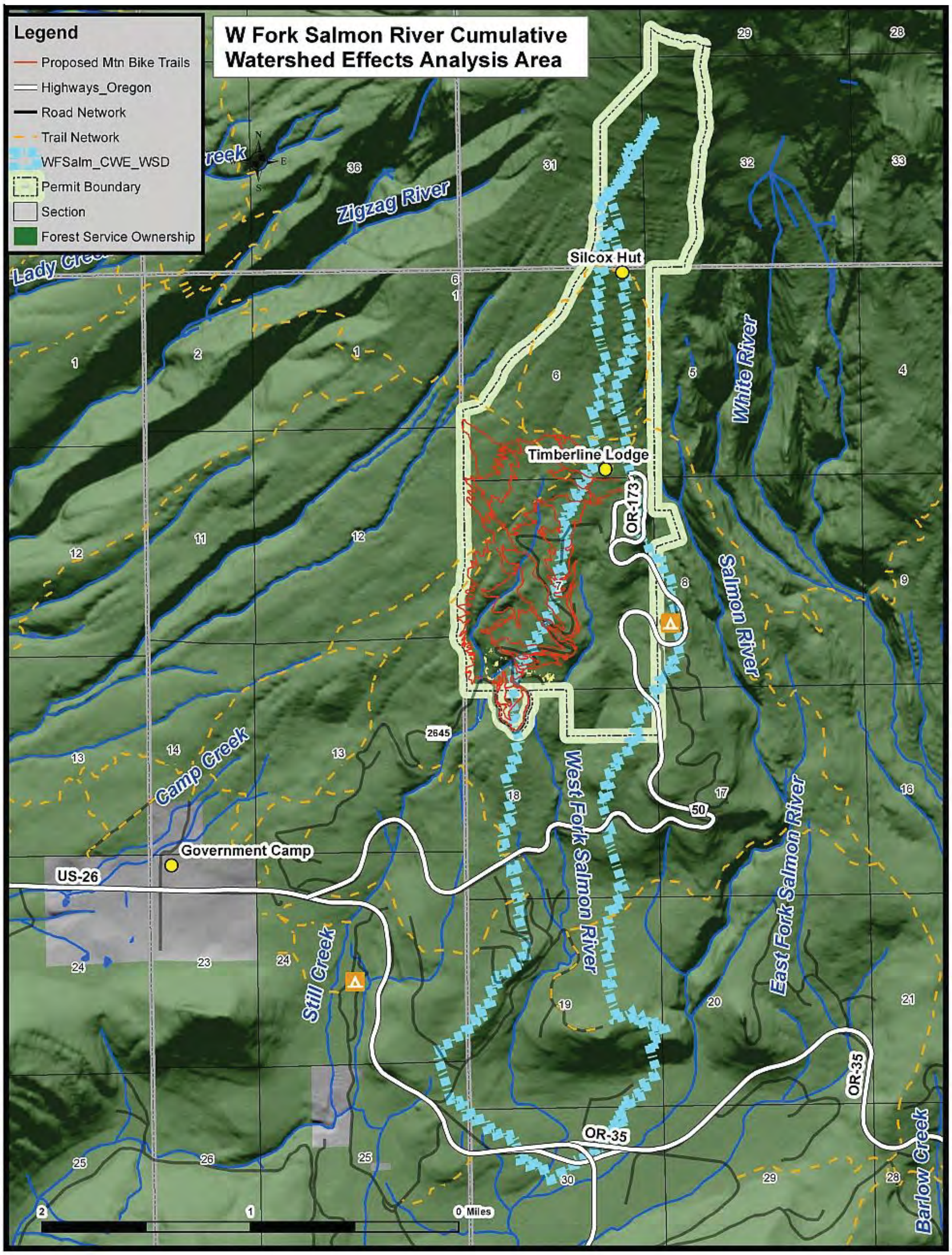
West Fork Salmon River

As shown in Figure 19, the cumulative watershed effects analysis area for the West Fork Salmon River subwatershed includes the area down to the first key depositional reach (Red Top Meadow just upstream of the confluence with the Salmon River) where sediment from the project area would accumulate. Table 20 presents the modeled sediment contribution of each project that would cumulatively contribute sediment to the West Fork Salmon River.

Table 20 – Past, Present, and Reasonably Foreseeable Projects that Overlap in Time and Space - West Fork Salmon River

Project	Sediment Yield (tons/yr)
Timberline Ski Area mountain bike trails	5
Timberline Ski area administrative use roads (post project implementation)	17
Modeled existing road related chronic sediment	462
Oregon Department of Transportation Highway Sanding	781

Figure 19 – Cumulative Watershed Effects Analysis Area – West Fork Salmon River (1,296 acres)



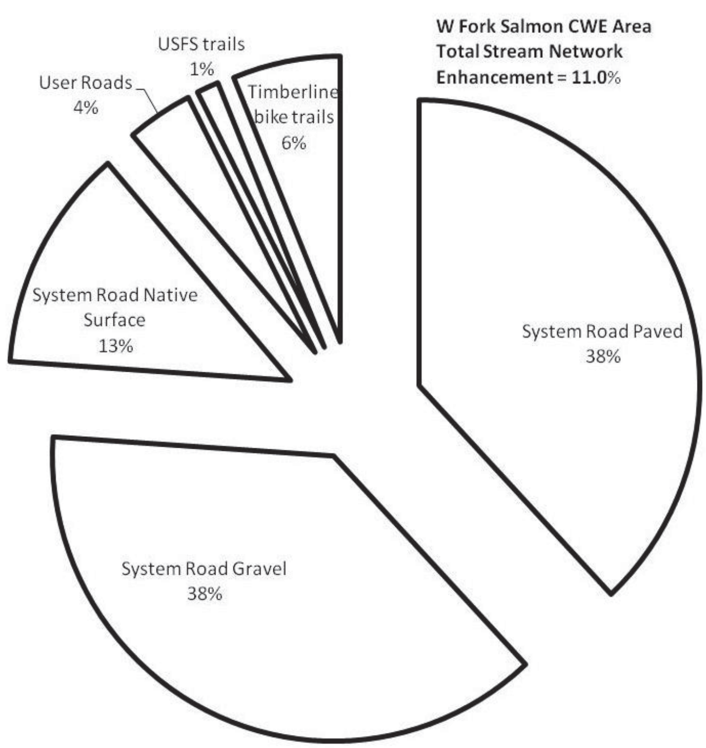
The short term sediment delivery associated with project implementation is 0.4% of the total short term sediment yield for the cumulative watershed effects analysis area. These results are consistent FEMAT: *The sediment contribution to streams from roads is often much greater than that from all other land management activities combined (FEMAT V-16);* and a recent assessment on assessing cumulative watershed effects (MacDonald, 2004) *" The median sediment production rate from roads was … nearly an order of magnitude higher than any of the other sources"*

Proposed watershed restoration activities associated with project implementation are estimated to reduce sediment delivery in West Fork Salmon River by 47.2 tons per year (for a net reduction of 42.4 tons per year associated with project implementation). This is a 3.4% reduction in sediment (comparing the net reduction to the total sediment from roads and highway sanding) for the cumulative effects analysis area so implementation of the project is not anticipated to have any adverse impacts on the aquatic system.

The same cumulative watershed effect analysis area was used to assess stream drainage network enhancement.

Stream drainage network enhancement within the CWA area is enhanced by 11.0% with 6% of the total increase associated with the proposed action, as shown in Figure 20.

Figure 20 - West Fork Salmon River CWE Analysis Area Pie Chart of Reasonably Foreseeable Projects that Impact Stream Drainage Network Enhancement that Overlap in Time and Space



As detailed in earlier in the stream drainage network enhancement section, an 11.0% increase in the stream drainage network would appear to be above the threshold where peak streamflows may be impacted by roads (with a maximum increase of 12%), however LaMarche and Lettenmaier, 2001 indicated that at the subcatchment and catchment levels there may well be scaling issues (most likely due to desynchronization in the channel system) of peak flows from the collective hillslopes.

Recent studies (Grant, 2008) support the inference that when present, peak flow effects on channels should be confined to a relatively discrete portion of the stream network: stream reaches where channel gradients are less than approximately 2% and streambed and banks are gravel and finer material. Peak flow effects on channel morphology can be confidently excluded in high-gradient (slopes >0.10) and bedrock reaches, and are likely to be minor in most step-pool systems. On the other hand, if channels are gravel or sand-bedded, a more detailed hydrologic and geomorphic analysis seems warranted.

Within the CWE analysis area the stream gradient is greater than 4% for all streams. The streams in this area are composed of a gravel substrate. This would indicate that the potential impacts of increased peak streamflows associated with stream drainage network enhancement would be minor due to the gradient of streams in the area.

3.2.4 Compliance with the Clean Water Act, Mt Hood Land and Resource Management Plan, and Aquatic Conservation Strategy Objectives

It is the responsibility of the Forest Service as a Federal land management agency through implementation of the Clean Water Act (CWA), to protect and restore the quality of public waters under their jurisdiction. Protecting water quality is addressed in several sections of the CWA including sections 303, 313, and 319. Best Management Practices (BMPs) are used to meet water quality standards (or water quality goals and objectives) under Section 319. (Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters (http://www.fs.fed.us/r6/water/protocol.pdf)

Current statewide Water Quality Standards for the State of Oregon state: “Pursuant to Memoranda of Agreement with the U.S. Forest Service and the Bureau of Land Management, water quality standards are expected to be met through the development and implementation of water quality restoration plans, best management practices and aquatic conservation strategies. Where a Federal Agency is a Designated Management Agency by the Department, implementation of these plans, practices and strategies is deemed compliance with this Division.” (USDA, 1999)

In addition the Mt. Hood Land and Resource Management Plan (USDA, 1990) contains the following Standards and Guidelines with respect to the implementation of BMPs.

Compliance with State requirements shall be met through planning, application, and monitoring of Best Management Practices FEIS - Appendix H. Best Management Practices (BMPs) describe the process which shall be used to implement the State Water Quality Management Plan on lands administered by the USDA Forest Service. **FW-055, FW-056**

Individual, general Best Management Practices which may be implemented (i.e. on a project by project basis) are described in General Water Quality Best Management Practices, Pacific Northwest Region, 11/88. Evaluations of ability to implement and estimated effectiveness shall be made at the project level. **FW-057, FW-058**

The sensitivity of the project shall determine whether the site-specific BMP prescriptions are included in the environmental analysis, the project plan or the analysis files. **FW-059**

Site specific Water Quality Best Management Practices, with the express purpose of limiting non-point source water pollution, are incorporated into the proposed action and associated project design criteria for this project.

Section 303D

Section 303(d) of the CWA requires that water bodies violating State or tribal water quality standards be identified and placed on a 303(d) list. The Environmental Protection Agency (EPA) regulations also allow States and tribes to include threatened waters (that is, waters that display a downward trend that suggests water quality standards would not be met in the near future).

For each listed water body, the CWA requires States to establish a TMDL for the parameter(s) causing beneficial use impairment. A TMDL is the sum of the waste load allocation for point sources of pollution (for example, outflow from a manufacturing plant) plus the load allocation for nonpoint sources of pollution, including “natural” background levels, plus a margin of safety to allow for uncertainty.

For water quality limited streams on National Forest System lands, the USDA Forest Service provides information, analysis, and site-specific planning efforts to support state processes to protect and restore water quality. Table 21 shows listed streams in or adjacent to the analysis area, indicating that both Still Creek and the Salmon River are listed for sediment.

There are no Section 303(d) listed streams from Oregon's 2010 Integrated Report Assessment Database and 303(d) List in or adjacent to the project area.

Site specific Water Quality Best Management Practices, with the express purpose of limiting non-point source water pollution, are incorporated into the proposed action and associated project design criteria for this project.

Northwest Forest Plan, Best Management Practices

According to the Northwest Forest Plan, Best Management Practices (BMP) would be incorporated into the implementation of the project. BMP are drawn from General Water Quality Best Management Practices, Pacific Northwest Region (November 1988); Draft Environmental Protection Agency Region 10 Source Water Protection Best Management Practices for USFS, BLM (April 2005); and The National Best Management Practices for Water Quality Management on National Forest System Lands - Volume 1: National Core BMP Technical Guide (April 2012). The BMP have been incorporated in the project design criteria as well as the standard contract language for implementing these projects. Individual BMPs have been prescribed based on site conditions and local requirements

Effectiveness of BMPs to reduce sediment are based on models, research and water quality monitoring associated with timber harvest in the Sandy River Basin. Models include:

Erosion Risk Management Tool (ERMiT) Ver. 2012.11.06**.** (Robichaud, 2006).

Relevant research includes:

Effectiveness Of Timber Harvest Practices For Controlling Sediment Related Water Quality Impacts (Rashin et. al. 2006).

Sediment Trapping by Streamside Management Zones of Various Widths after Forest Harvest and Site Preparation (Lakel and others, 2010).

Reduction of soil erosion on forest roads (Burroughs and King, 1989)

Extensive water quality monitoring within the Bull Run Watershed indicated that implementation of BMP's ,similar to those associated with this project for erosion control and suspension of earth disturbing activities during wet weather periods, resulted in no effect on turbidity or suspended sediment from timber harvest operations (USDA, 1994 *Bull Run Annual Activity Schedule 1994, pg 39*).

Implementation and effectiveness of BMPs will be monitored as detailed in the Project Design Criteria:

- The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis according to the Monitoring Framework Plan and will have the authority to provide direction and/or take action if construction or operations are not conducted according to the project design criteria (Mon-1).

- RLK would provide a written annual report to the Forest Service detailing any trail damage, soil erosion, vegetation trampling, wildlife issues, "rogue riders," user conflicts, successes and issues, and restoration efforts in the mountain bike park. The Forest Service would review the report and, if need be, work with RLK to institute needed changes in the management of the mountain bike park (Mon-2).

- A Monitoring Framework Plan would be prepared prior to construction and would be used to provide the basis for the annual monitoring plan (Mon-3).

Burroughs, E.R., Jr., John G. King. 1989. Reduction of soil erosion on forest roads. General Technical Report INT-264. USDA Forest Service, Intermountain Research Station. Ogden, Utah. 21pp.

Lakel, William A. III, Wallace M. Aust, M. Chad Bolding, C. Andrew Dolloff, Patrick Keyser, Robert Feldt. 2010. Sediment Trapping by Streamside Management Zones of Various Widths after Forest Harvest and Site Preparation. Forest Science

Rashin, E. B., C. J. Clishe, A. T. Loch, J. M Bell. 2006. Effectiveness of Timber Harvest Practices for Controlling Sediment Related Water Quality Impacts. Journal- American Water Resources Association, Vol. 42 (5): 1307-1328

Robichaud, Peter R.; Elliot, William J.; Pierson, Fredrick B.; Hall, David E.; Moffet, Corey A. 2006. Erosion Risk Management Tool (ERMiT) Ver. 2012.11.06**.** [Online at <http://forest.moscowfsl.wsu.edu/fswepp/>.] Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

USDA 1994. Bull Run Watershed Management Unit Annual Activity Schedule Water Year 1994. Mt. Hood National Forest.

Table 21 - Water Quality Status -Oregon's 2010 Integrated Report Assessment Database and 303(d) List

Stream	River Miles	Parameter	Status
Salmon River	0 to 33.9	Biological Criteria	Cat 3C: Impairing pollutant unknown
Salmon River	0 to 33.9	Sedimentation	Insufficient data
Salmon River	0 to 33.9	Temperature	Cat 4A: Water quality limited, TMDL approved
Still Creek	0 to 16	Biological Criteria	Cat 3B: Potential concern
Still Creek	0 to 16	Sedimentation	Insufficient data
Still Creek	0 to 16	Temperature	Cat 2: Attaining some criteria/uses

Status - An assessment category assigned to each record based on evaluating water quality information using the assessment methodology decision rules.

Category 1: All standards are met. (This category is not used.)

Category 2: Attaining **-** Specific water quality standards are met.

Category 3: Insufficient data to determine whether a standard is met.

3B: Potential concern - Some data indicate non-attainment of a criterion, but data are insufficient to assign another category.

3C: Impairing pollutant unknown.

Category 4: Water is water quality limited but a TMDL is not needed. This includes:

4A: TMDL approved - TMDLs needed to attain applicable water quality standards have been approved.

4B: Other pollution control requirements are expected to address all pollutants and will attain water quality standards.

4C: Impairment is not caused by a pollutant (e.g., flow or lack of flow is not considered a pollutant.)

Category 5: Water is water quality limited and a TMDL is needed, Section 303(d) list.

Biological Criteria Assignment of Assessment Category:

DEQ has developed the PREDictive Assessment Tool for ORegon, or PREDATOR, to assess the macroinvertebrate communities in Oregon's perennial, wadeable streams. PREDATOR analyzes data from reference sites grouped into three regions in Oregon and models the expected assemblage. Information from a sampling site can be compared to the macroinvertebrate assemblage predicted by the model and an assessment made about how different the observed assemblage is from the expected or reference assemblage. Data collected at a sampling site is used to generate a number for the observed versus expected (O/E) macroinvertebrate taxa. This number represents the "missing" taxa at a site, and can be expressed as "% taxa loss".

Category 3c: Impairing Pollutant Unknown

Comparison to the assessment benchmark shows the biological community is impaired, but the pollutant causing the impairment is unknown, and a TMDL cannot be developed.

Category 3B: Insufficient Data – Potential Concern

Some macroinvertebrate sampling data from perennial, wadeable streams evaluated using the PREDATOR model are inconclusive and are insufficient to assign a status category until additional information is collected.

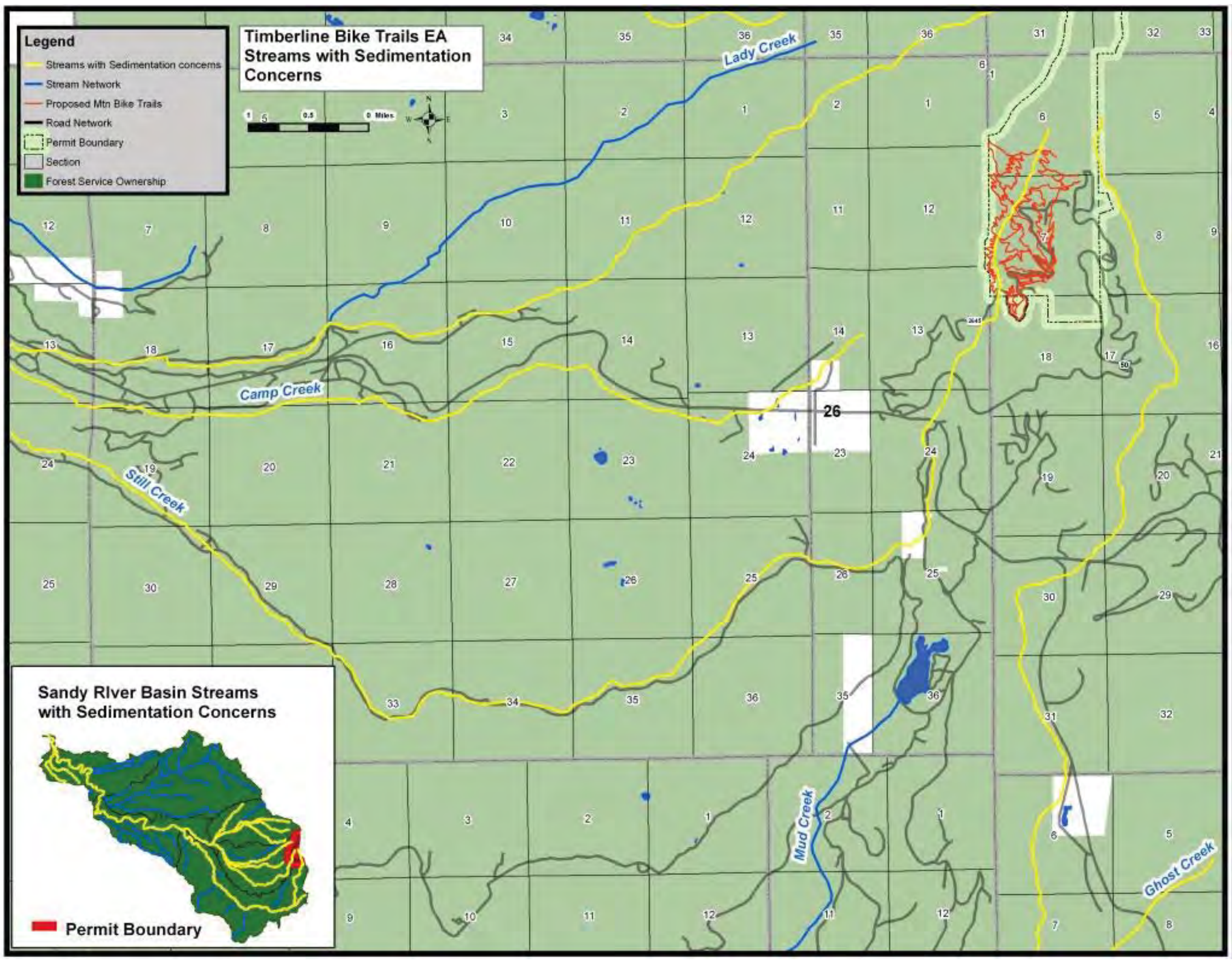
Figure 21 shows the location of streams with sediment concerns relative to the proposed action analysis area.

Sedimentation has been listed as a pollutant for both Still Creek and Salmon River but the streams were not included on the 303D list because of insufficient data.

Within the analysis area Still Creek and Salmon River are on the 2010 State of Oregon status list for stream temperature. A temperature TMDL has been developed for the Sandy River Basin with the following requirement for federal forest lands. All management activities on federal lands managed by the USFS and the Bureau of Land Management must follow standards and guidelines as listed in the respective Land Use and Management Plans, as amended, for the specific land management units. In the Mount Hood National Forest, management activities are guided by the Northwest Forest Plan (USDA, 1994) and the Mt Hood National Forest Land and Resource Management Plan (USDA, 1990). A Reconciliation Document was drafted in 1995 (USDA, 1995c). This document indicates that all standards and guidelines in the Mt. Hood Forest Plan apply unless superseded by the Northwest Forest Plan standards. When standards and guidelines from both documents apply, the one which controls is the one more restrictive or which provides greater benefits to late-successional forest related species.

DEQ and USFS signed a memorandum of Understanding (MOU) in May 2002. The MOU defines the process by which DEQ and the Pacific Northwest Region of the USFS will cooperatively meet State and Federal water quality rules and regulations. In its review of these management plans, DEQ believes that they meet the requirements of a TMDL management. Although developed before the completion of this TMDL, both the Mt. Hood Forest Plan and the Northwest Forest Plan address proposed management measures tied to attaining system potential shade. As part of the public involvement process for the development and approval of both plans, most of the other requirements of a TMDL management plan have also been addressed. As they have in the past, it is expected that the Mt. Hood National Forest will continue to work with the DEQ, NMFS, USFWS, and ODFW in best management practices, research opportunities, and training.

Figure 21 – Streams with Sedimentation Concerns



Implementation of the project would result in a 164 ton per year reduction of sediment in the Still Creek Watershed and a 28.4 tons per year reduction in the West Fork Salmon River Watershed. In light of the sediment reductions associated with this project it is not anticipated to have an adverse impact on stream sedimentation.

Key Mt. Hood Land and Resource Management Plan (USDA, 1990) allocations with respect to protection of the aquatic environment include: Key Watersheds, Special Emphasis Watershed, Riparian Reserves and Riparian Area. Figure 14 shows the location of Key Watersheds and Special Emphasis Watersheds in the vicinity of the analysis area.

Key Watersheds

Key Watersheds are a system of large refugia comprising watersheds that are crucial to at-risk fish species and stocks and provide high quality water. The Aquatic Conservation Strategy includes two designations for Key Watersheds. Tier 1 (Aquatic Conservation Emphasis) Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. The network of 143 Tier 1 Key Watersheds ensures that refugia are widely distributed across the landscape. While 21 Tier 2 (other) Key Watersheds may not contain at-risk fish stocks, they are important sources of high quality water.

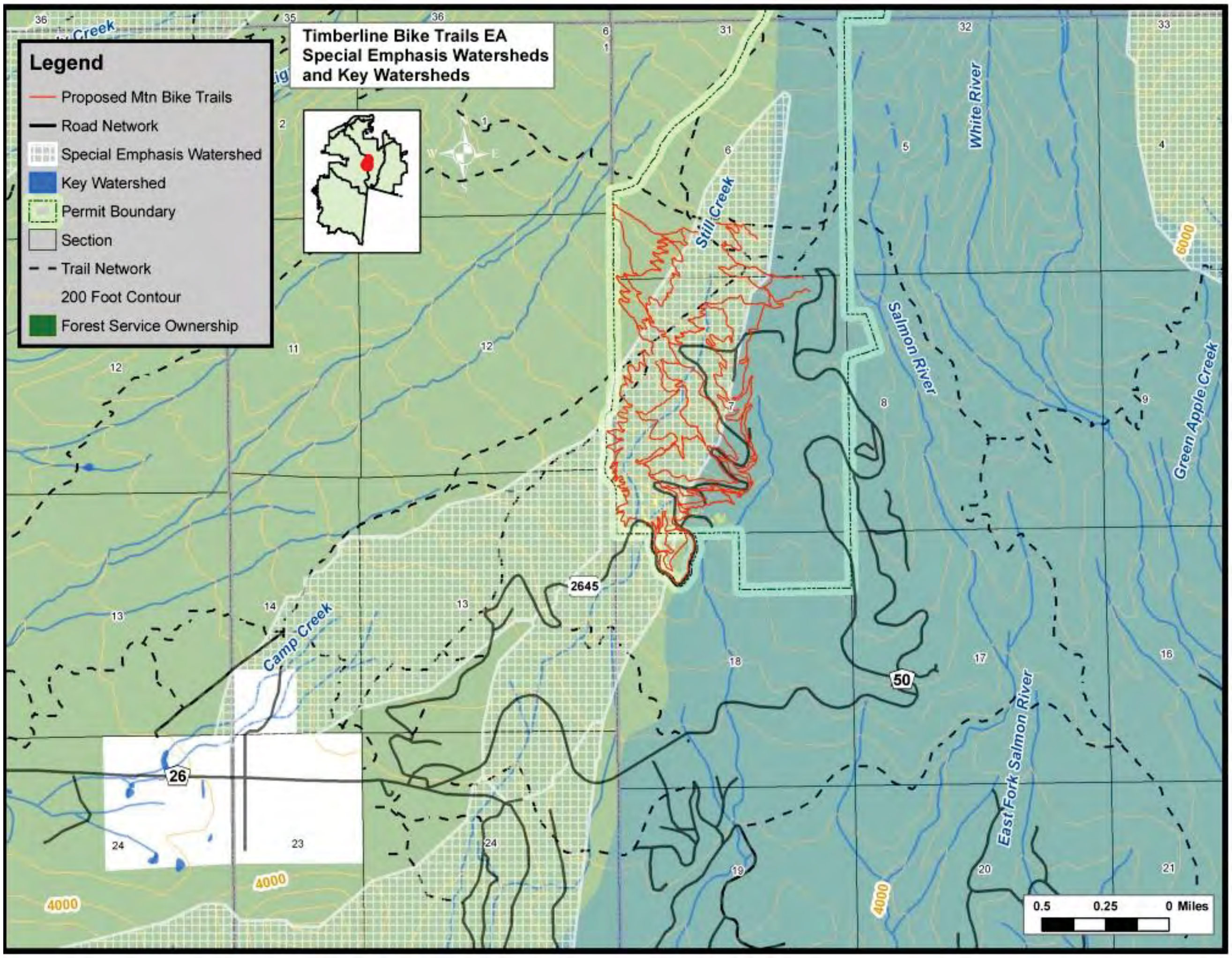
Standards and guidelines for Key Watersheds include:

- Reduce existing system and non-system road mileage. If funding is insufficient to implement reductions, there would be no net increase in the amount of roads in Key Watersheds.

- Key Watersheds are the highest priority for watershed restoration.

The Salmon River fifth field watershed is a Tier 1 Key Watershed so the West Fork Salmon River is included in this area (Figure 22). Project activities are consistent with Standards and Guidelines by reducing existing non-system road mileage by 0.5 mile.

Figure 22 - Key Watersheds and Special Emphasis Watersheds



Special Emphasis Watersheds

The goal of Special Emphasis Watersheds is: Maintain or improve watershed, riparian, and aquatic habitat conditions and water quality for municipal uses and/or long term fish production. The Still Creek subwatershed is within this allocation. Major characteristics include that the transportation system design may be restricted to avoid sensitive watershed lands. Standards and guidelines include:

- New developed recreation sites, or expansions to existing sites, may occur provided watershed (i.e. water, soil, and fish) values are protected.

- The development of new or expansion of existing recreation sites facilities and trails (hiking and cross-country skiing) may occur, but should avoid or protect sensitive watershed lands.

- Developments or expansions should avoid special aquatic and terrestrial habitats (e.g., side channels, ponds, and wetlands). Interpretive facilities and trails may be an exception.

- Where existing developments (e.g., recreation sites, and trails) are not consistent with riparian and/or watershed values, modification or rehabilitation of the site or facility should occur.

The proposed mountain bike park, with the incorporation of site-specific project design criteria was designed to protect sensitive watershed lands and avoid special aquatic and terrestrial habitats. The proposed watershed restoration projects address existing developments that are currently depositing sediment in both the Still Creek and West Fork Salmon River systems.

Riparian Reserves

Riparian Reserves are portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. Standards and guidelines prohibit and regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives. Riparian Reserves include those portions of a watershed directly coupled to streams and rivers, that is, the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing water bodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. Riparian Reserves include areas designated in current plans and draft plan preferred alternatives as riparian management areas or streamside management zones and primary source areas for wood and sediment such as unstable and potentially unstable areas in headwater areas and along streams. Riparian Reserves occur at the margins of standing and flowing water, intermittent stream channels and ephemeral ponds, and wetlands. Riparian Reserves generally parallel the stream network but also include other areas necessary for maintaining hydrologic, geomorphic, and ecologic processes.

There are 296.6 acres of riparian reserves within the analysis area and the proposed mountain bike trails would impact 2.01 acres of riparian reserves or 0.7% of the riparian reserves in this area. The planned restoration activities would completely restore 1.54 acres (2/3 of the restoration polygons and all of the administrative roads decommissioned) within the riparian reserves.

Consistency with Riparian Reserve Standards and Guidelines for roads within the Riparian Reserves is assessed by addressing consistency with the Aquatic Conservation Strategy objectives. However, there are Riparian Reserve Standards and Guidelines that address:

- Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
- Closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to Aquatic Conservation Strategy objectives and considering short-term and long-term transportation needs.

- Minimizing sediment delivery to streams from roads.

An assessment of consistency with the Aquatic Conservation Strategy objectives is completed later in this section. The Proposed Action, with the incorporation of watershed restoration projects is designed to minimize disruption of natural, hydrologic flow paths and minimize sediment delivery.

General Riparian Area

The goal of General Riparian Area is to achieve and maintain riparian and aquatic habitat conditions for the sustained, long-term production of fish, selected wildlife and plant species, and high quality water for the full spectrum of the Forest's riparian and aquatic areas. Key Standards and Guidelines include:

1. The development of new, or expansion of existing, recreation sites, facilities, and trails (i.e. hiking and cross-country skiing) may occur and should be located to protect riparian values.

2. Trails and recreation sites should avoid special aquatic and terrestrial habitats (e.g. side channels, ponds, and wetlands).

3. Where existing developments (e.g. recreation sites and trails) are not consistent with riparian values, modification, rehabilitation, or removal of the site or facility should occur.

4. Whenever damage occurs to riparian resources, the damaged site shall be promptly restored. Rehabilitation and enhancement may be accomplished through re-vegetation and stabilization.

5. Drainage systems for roads should incorporate practical features to minimize or eliminate sediment and/or other pollutants from discharging directly into streams, lakes, wetlands, springs, or seeps.

6. Existing roads causing impacts to riparian values should be mitigated or relocated.

7. Unneeded and/or abandoned roads should be rehabilitated.

The proposed mountain bike park, with the incorporation of site-specific project design criteria, was designed to protect sensitive watershed lands and avoid special aquatic and terrestrial habitats. The watershed restoration projects address existing developments that are depositing sediment in both the Still Creek and West Fork Salmon River systems. The watershed restoration projects also address non-system roads through decommissioning, road to trail conversion and surface enhancement with associated surface water management. These projects are designed to reduced sediment delivery and restore nature flowpaths.

General Water

Applicable Standards and Guidelines associated with the Forestwide Standards for water include are related to the protection of water quality and cumulative watershed effects. The protection of water quality is addressed in the Clean Water Compliance section.

Cumulative watershed effects in this section of the Mt. Hood LRMP address the impacts of vegetation management activities. This standard is assessed though the use of the Aggregate Recovery Percent model (ARP). The ARP model was developed for use in the transient snow zone (2,400-4,800 feet). It provides a methodology for indexing the susceptibility of a watershed to increased peak flows from rain-on-snow events associated with management created openings in the canopy. This method assumes that the greatest likelihood for significant, long-term cumulative effects on forest hydrologic processes is caused by created openings in the canopy (from both timber harvest and from the existence of roads) that impact snow accumulation and snowmelt.

Use of the ARP model assumes that activities that reduce canopy closure below 70% in stands greater than 8 inches diameter at breast height (DBH) would have an effect on the ARP values. Harvest activities that do not reduce canopy closure of stands greater than 8 inches DBH below 70% are considered "ARP neutral." With respect to this project there would be no change in canopy closure associated with project implementation (there would be no trees over 6 inches cut as part of project implementation) so the project is ARP neutral and would not impact ARP values.

An ARP analysis was completed as part of the Timberline Express FEIS, which is in the same area as this project and is included as Appendix C of this EA. The ARP analysis found that at that point in time (2005) all standards with respect to hydrologically disturbed condition and watershed impact area were being met and since that time vegetation has had an additional 6 years to recover lowering the hydrologically disturbed condition and watershed impact area even lower.

Drinking Water Source Protection

The Study Area contains a portion of the State Designated Government Camp Drinking Water Protection Area (DWPA) and the entire Timberline Lodge DWPA. Both of these areas are associated with wells. The Assessment Phase including delineating the area that serves as the source of the public water supply; inventorying the potential risks or sources of contamination and determining the areas most susceptible to contamination has been completed. The development of a protection plan associated with the protection phase is voluntary and has not been completed and therefore, no management guidelines or protection standards have been established. Potential sources of contamination are detailed in Table 22.

Table 22 – Potential Sources of Contamination to DWPAs

Site Name	Activity	Groundwater Risk	Potential Water Quality Impacts
Timberline Lodge and WyEast Day Lodge	Parking Lots/Malls (> 50 Spaces)	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply

Site Name	Activity	Groundwater Risk	Potential Water Quality Impacts
Timberline Lodge and WyEast Day Lodge	UST - Confirmed Leaking but listed as NFA - DEQ LUST List	Lower	Contamination from spills, leaks, or improper handling of stored materials not evaluated by DEQ may impact the drinking water supply.
Timberline Lodge and WyEast Day Lodge	UST - Upgraded/Registered - Active	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.
Two Abandoned Wells	Wells - Abandoned - Two Abandoned Wells	Lower	Abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.
Timberline Maintenance Shop	Maintenance Shop/Equipment Storage - Not Transportation Related	Moderate	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage, and disposal may impact the drinking water supply
Timberline Maintenance Shop	UST - Confirmed Leaking but listed as NFA - DEQ LUST List	Lower	Contamination from spills, leaks, or improper handling of stored materials not evaluated by DEQ may impact the drinking water supply.
Timberline Maintenance Shop	UST - Upgraded/Registered - Active	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.
Timberline STP	UST - Decommissioned/Inactive	Lower	Historic spills or leaks may impact the drinking water supply.
Timberline STP	Large Capacity Septic Systems (serves > 20 people) - Class V UICs	Higher	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water.
Timberline STP	Wastewater Treatment Plants/Collection Stations	Moderate	Improper management of wastewater, treatment chemicals, or equipment maintenance materials may impact drinking water supply.

Activities associated with the implementation of the project would occur at or very near the ground surface and any potential impacts with respect to sediment yield and extension of the stream drainage network would occur near the surface and are not expected to impact the wells associated with these water systems. With respect to identified potential sources of contamination the large parking lots may have more cars parked in the summer when the bike park is in operation. Currently there is a plan to monitor the number of parking lot capacity days, and how many cars per day are for the bike park. Bike park users and spectators associated with events at the bike park would be prohibitted from parking on West Leg Road or certain areas along Timberline Road, with parking in authorized parking spaces only (See Table 3, Rec-8). Contaminate spill kits are currently and would continue to be kept on site at the parking lots to deal with measurable amounts of fluids leaking from vehicles.

Aquatic Conservation Strategy Consistency Findings

The following is a summary of the project's consistency with the Aquatic Conservation Strategy objectives (USDA, 1994).

***Objective 1*:** Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

There are approximately 13 acres of vegetation removal (groundcover and small trees) associated trail construction and 6 acres of restoration with revegetation associated with watershed restoration actions. Forest clearing in the proposed trail corridors would be reduced to the extent practical through careful trail design and layout and trails would be laid out to avoid removal of trees with a diameter at breast height (DBH) greater than six inches.

Within the analysis area there are 296.6 acres of riparian reserves and implementation of the project would impact 2.0 acres or 0.7% of the riparian reserves in the hydrologic analysis area, however, the planned restoration activities would completely restore 1.54 acres (2/3 of the restoration polygons and all of the administrative roads decommissioned) within the riparian reserves.

Project design criteria have been developed to maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands including (See Table 3 in Chapter 2):

- Salvaging whole plants from proposed trails in advance of trail construction and transplant them in disturbed areas once construction is completed (see Veg-10)
- Propagate seedlings from vegetative propagules materials in a nursery for revegetating disturbed areas when whole plants cannot be removed for transplanting (see Veg-12)
- Collect seed from native plants in the special-use permit area and propagate seedlings from this seed in a nursery for restoration of disturbed areas in subsequent years and directly sow collected seed in disturbed areas for those species for which this method is effective (also see Veg-12)

With the minimal amount of trail clearing and associated criteria to minimize disturbance the project is not anticipated to impact the diversity, and complexity of watershed and landscape-scale features.

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

The project is designed to avoid natural water courses and sensitive riparian areas (including wetlands). Where drainage network connections cannot be avoided by the mountian bike trail system an open channel crossing (bridge or ford over ephemeral streams) wouldl be installed. All crossings would be installed with the input of Forest Service fisheries biologists and/or hydrologists to maintain the function and bedload movement of the natural stream channel. Crossings would conform to the natural channel shape and elevation where possible.

Watershed restoration activities would restore natural drainage patterns (both surface and subsurface) by decommissioning user roads, installing more frequent and effective drainage structures on user roads, and addressing drainage issues that have the potential to impact drainage network connections at the bottom terminals of Stormin Norman, Pucci and Jeff Flood ski lifts and the area on West Leg Road directly above the seep and springs area associated with Still Creek.

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

The project is designed to avoid natural water courses and sensitive riparian areas (including wetlands). Where drainage network connections cannot be avoided by the mountian bike trail system an open channel crossing (bridge or ford over ephemeral streams) would be installed. All crossings would be installed with the input of Forest Service fisheries biologists and/or hydrologists to maintain the function and bedload movement of the natural stream channel. Crossings would conform to the natural channel shape and elevation where possible.

Watershed restoration activities would restore the physical intergrity of the aquatic system by decommissioning user roads with associated stream crossings, installing more frequent and effective drainage structures on user roads, and addressing drainage issues that have the potential to impact the physical intergrity of the aquatic system at the bottom terminals of Stormin Norman, Pucci and Jeff Flood ski lifts and the area on West Leg Road directly above the seep and springs area associated with Still Creek.

Through input by of Forest Service fisheries biologists and/or hydrologists using stream simulation methods in designing stream crossings natural streambank and streambed configurations would be established above, though and below the existing stream crossings.

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

> The project has the the objective of restoring or improving water quality by reducing existing chronic sediment sources (user roads and lift terminal areas). There may be short-term impacts to water quality (increased sedimentation) when the project is implemented. All of the stream crossings associated with the new mountain bike trail network, user road decommissioning and user road surfacing and drainage improvement are on intermittent or ephemeral streams. The only area with activities planned near a perennial stream is the bottom of the Jeff Flood ski lift and project design criteria were developed to minimize these impacts and keep them to an acceptable level.

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

> The project has the the objective of restoring or improving water quality by reducing existing chronic sediment sources (user roads and lift terminal areas) and reducing sediment associated with the mountain bike trails by a ratio of at least 6 to 1 (project generated sediment would have associated restoration activies that reduce twice as much sediment as is generated by the project).

> Stream crossings associated with the new mountain bike trails would be designed with input from Forest Service fisheries biologists and/or hydrologists using stream simulation methods that would allow for sediment transport through the stream system. Obstructions or pinch points where sediment transport is impeded associated by decommissioning user roads with associated stream crossings. .

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

> Watershed restoration activities would restore natural flowpaths by decommissioning user roads with associated stream crossings, installing more frequent and effective drainage structures on user roads, and addressing drainage issues that have the potential to impact the physical intergrity of the aquatic system at the bottom terminals of Stormin Norman, Pucci and Jeff Flood ski lifts and the area on West Leg Road directly above the seep and springs area associated with Still Creek. Restoring natural streamflow paths (surface and subsurface) would help to maintain and restore in-stream flows with respect to timing, magnitude, duration, and spatial distribution of peak, high, and low flows.

> Implementation of the proposed action would decrease the stream drainage network by 2% over the entire project area, 3% in the West Fork Salmon Watershed, and 3% in the Still Creek Watershed. The reductions are realized through decommissioning and installation of more frequent drainage structures on user roads and system roads.

Using the same analysis methodology as used for the Timberline Express EIS there are no impacts anticipated to peak or base streamflows associated with implementation of the proposed action. Since there are decreases in the stream drainage network associated with project implementation, there are no impacts to base or peak streamflows based on the methodologies from the Timberline Express EIS and restoration activities associated with proposed action are designed to restore natural flowpaths the project should maintain or restore in-stream flows.

Removal of stream crossings associated with user road decommissioning and design of decommissioned stream crossings and new stream crossing associated with the mountain bike trails using stream simulation techniques would provide for sediment, nutrient, and wood routing.

***Objective 7*:** Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

The project is designed to avoid sensitive riparian areas (including wetlands and meadows) and was delineated in the field to avoid wetlands and indicators of wet soils in subalpine areas. Restoration activies are planned in the vicinity of the wetlands associated with Still Creek that should restore natural flowpaths in this area (by improving infiltration in this area).

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

Project design criteria have been developed to maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands including (see Table 3 in Chapter 2):

- Salvaging whole plants from proposed trails in advance of trail construction and transplant them in disturbed areas once construction is completed (see Veg-10)
- Propagate seedlings from vegetative propagules materials in a nursery for revegetating disturbed areas when whole plants cannot be removed for transplanting (see Veg-12)
- Collect seed from native plants in the special-use permit area and propagate seedlings from this seed in a nursery for restoration of disturbed areas in subsequent years and directly sow collected seed in disturbed areas for those species for which this method is effective (also see Veg-12)
- For restoration of disturbed trail segments and other areas, use only certified

weed-free straw or certified weed-free wood fiber for mulch (see Soil-7)

- Use only native plant materials (seed, seedlings, divisions, cuttings) collected locally on the Mt. Hood National Forest. If supplies of locally collected native seed (e.g., blue wildrye grass) are low and erosion control or restoration of disturbed areas is urgent, use annual ryegrass (Lolium perenne spp. multiflorum), a non-invasive, non-persistent, non-native species (see Veg-13)

- Aggressively treat invasive plants by manual control or with herbicides. Consult Mt. Hood National Forest botanist on which method works best for which species (see Veg-8)

In addition species composition and structural diversity of plant communities would be restored associated with watershed restoration activities.

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

This project is designed to minimize impacts to natural drainage patterns (both surface and subsurface), avoid sensitive riparian areas, restore vegetation and reduce sedimentation. This would allow for protection of sensitive habitats and allow unimpeded flowpaths throughout the riparian network in the project area for plant, invertebrate and vertebrate riparian dependent species

3.3 Fisheries and Aquatics

3.4.1 Introduction

The proposed action would primarily occur in Still Creek (6th field watershed), the West Fork Salmon River (5th field watershed), and the two tributaries to the Zigzag River known as Sand Canyon and Glade (7th field watersheds) (Figure 23). These sub-watersheds are tributaries to Salmon and Zigzag 5th field watersheds. Elevations within the project range from approximately 6,000 feet at the upper reaches of the project and 4,800 feet at the lower reaches of the project.

The Action Area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the project area [50 CFR §402.02] (Figure 23). Therefore, the following aquatics summary, and resultant analysis of cumulative effects, is organized by multiple watershed scales and addresses impacts to the aquatic environment within the project area as well as areas above and below the project area. In Still Creek the Action Area begins near Timberline Lodge and extends below Highway 26. In the West Fork Salmon River the Action Area extends from Timberline Lodge to the area just upstream of the Highway 26 and Highway 35 interchange. The Action Area for the Glade and Sand Canyon stream network is the very similar to the project area (

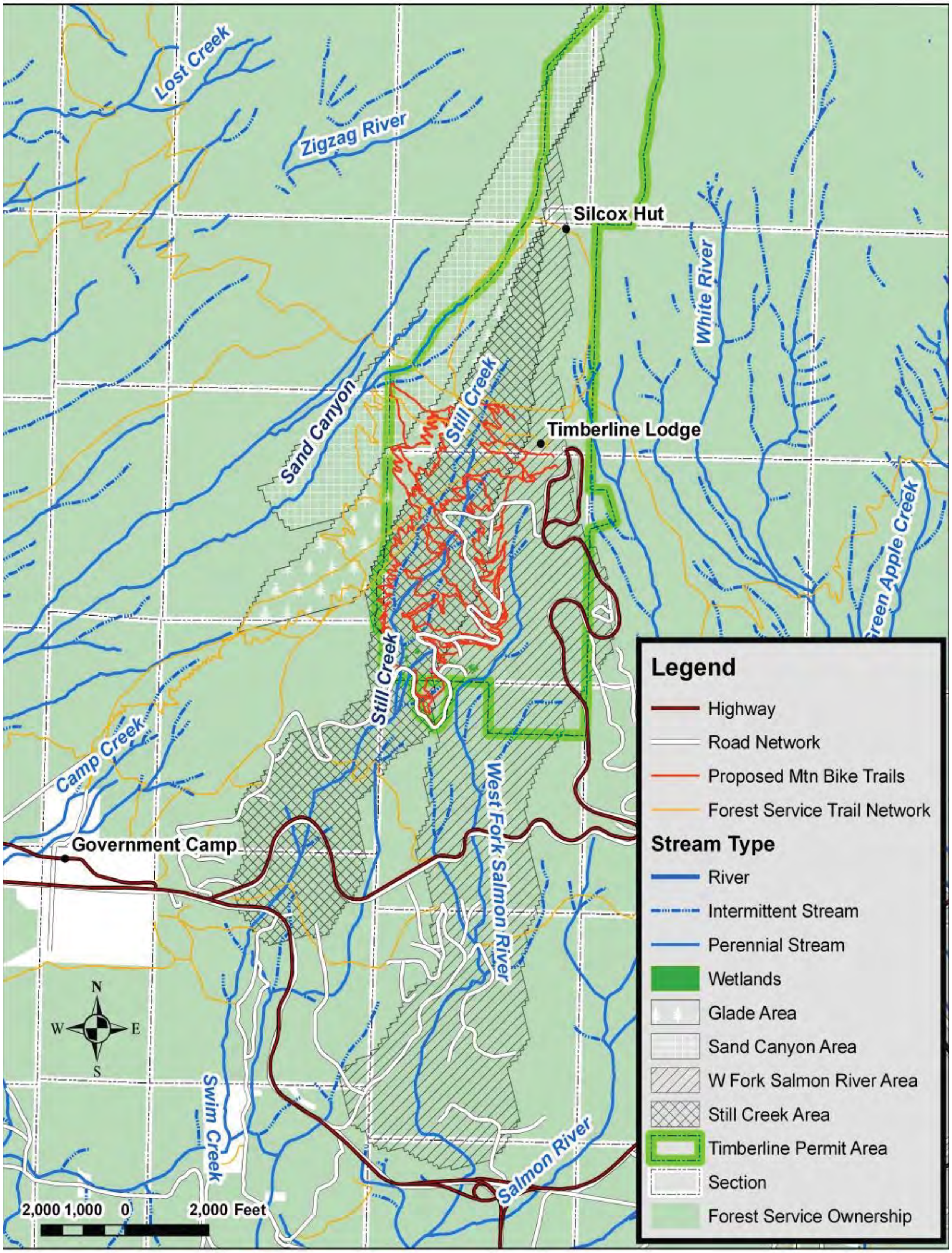
). In developing the boundary for the Action Area, we included the watershed restoration projects, the existing road and trail network associated with ski area operations at Timberline, and the riparian reserves of all three sub-watersheds. For a discussion of the hydrologic planning areas and watershed resources identified for this project, refer to the Section 3.2.

LCR Steelhead and critical habitat are present within the Action Area in Still Creek as are MIS cutthroat trout and R6 Sensitive Aquatic Species. No listed species or critical habitat is present in the Action Area of the West Fork Salmon River or Glade and Sand Canyon streams. However, cutthroat trout, Scott's apatanian caddisfly, redband trout, and Columbia duskysnail are present in the West Fork Salmon.

Several aquatic habitat elements would be impacted by downhill mountain bike trail construction and use. The primary elements are related to erosion that could lead to increased sedimentation into surface waters downstream of the proposed project, the extension of the stream drainage network, and long and short term impacts to riparian buffers.

Fine sediment routing and turbid conditions would extend downstream varying distances from the project depending on stream flow, stream size, gradient, and habitat complexity (the more complex the habitat the more likely sediment would be trapped behind logjams or other structures). For purposes of this analysis, it was assumed that in Still Creek fine sediment generated from the bike park would be transported through the steep gradient below the project area and likely settle out in the first low-gradient section below Highway 26 (adjacent to Still Creek Campground), which is located approximately 1.2 miles below the project area. In the West Fork Salmon, this analysis assumes that sediment would likely be transported to the first low gradient area that exists above the Highway 26 and Highway 35 interchange (see Figure 23). Sediment generated in the Glade and Sand Canyon sub-watershed is not expected to extend beyond the SUP boundary.

Figure 23 – Aquatics Action Area



3.4.2 Existing Conditions and Affected Environment

The Mt. Hood National Forest uses salmonids (salmon, trout and char) as management indicator species for aquatic habitats. Due to their value as game fish and their sensitivity to habitat changes and water quality degradation, salmonids are used to monitor trends within Forest streams and lakes. Although other fish species may be present (e.g., lamprey, sculpins and dace), their population status and trends are unknown. Since more information exists on salmonids, this group serves as a more optimal choice for monitoring aquatic environments.

The Sandy River supports several species of anadromous salmonids, including spring and fall Chinook, coho, and winter steelhead. These salmon and steelhead populations, which historically numbered in the tens of thousands (Taylor 1998), have experienced significant declines during the last century (SRBP, 2005). Within the last decade, the federal government and State of Oregon have listed all of these populations for protection under either the state or federal Endangered Species Act (ESA) (Table 23).

Salmonids listed under the ESA are grouped by distinct population segment (DPS) or evolutionary significant unit (ESU) - large geographic areas that are reproductively isolated from each other (i.e. different run and spawning timing). The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service have agreed the grouping name for Pacific salmon will be ESU and for steelhead DPS. More information may be found in Federal Register ESA listings.

Aquatic macroinvertebrates are important residents of streams, lakes, and ponds in the Forest. Presence, abundance, and status of invertebrate species that reside in area water bodies are not well understood. Most streams within the Forest have good water quality within their natural constraints (e.g., glacial streams are naturally turbid at times and carry a high sediment load) and habitat conditions are generally favorable. Macroinvertebrate populations appear robust and a range of species representing a wide variety of feeding groups (predators, grazers, leaf shredders) are usually present, but definitive studies to characterize diversity, richness, and biomass are lacking. Therefore, the following discussion, as well as the effects analysis, focus on the four snails and one caddisfly listed in Table 23.

Lower Columbia River Steelhead

Winter-run steelhead trout (*O. mykiss*) are indigenous to the Sandy River Basin, and historic returns may have once numbered 20,000 adults (ODFW, 2002, as found in SRBP, 2005). Today the average native run return is size is around 1,500 (Mobrand, 2004). In regards to habitat utilization, they occupy a greater range of habitat than any other salmon or trout species and their range in the Sandy River extends from the Timberline Ski Area Boundary to the Sandy River Delta. Steelhead are more of an opportunist anadromous species compared to salmon. As such, they are often more widespread and can utilize smaller streams more readily than many salmon species which is why steelhead are the only anadromous species known to reside in the Action Area.

Table 23 - Special status Aquatic Species Found in the Sandy River Basin

Species	DPS/ESU	Status[a]	Fifth Field Watersheds
Bull trout (*Salvelinus confluentus*)	Columbia River DPS	Threatened 6/98	Lower Sandy
Steelhead trout (*Oncorhynchus mykiss*)	Lower Columbia River DPS	Threatened 1/06	Middle Sandy, Upper Sandy, Zigzag, Salmon
Chinook salmon (*O. tshawytscha*)	Lower Columbia River ESU	Threatened 6/05	Middle Sandy Upper Sandy, Zigzag River, Salmon
Coho salmon (*O. kisutch*)	Lower Columbia River ESU	Threatened 6/05	Middle Sandy, Upper Sandy, Zigzag Salmon
Smelt (Th. Pacificus)	Southern DPS	Threatened 3/10	Lower Sandy
US Forest Service, Region 6 Regional Forester's Special Status Species (R6 SS)			
Redband/ Inland Rainbow Trout (*O. mykiss*)	Not Applicable (N/A)	R6 SS – 1/08	Middle Sandy, Bull Run, Upper Sandy, Zigzag
Columbia duskysnail (*Colligyrus sp. nov. 1*)	N/A	R6 SS – 1/08, Rare & Uncommon –	Most 5th field watersheds within the MHNF
Barren Juga *(Juga hemphilli hemphilli)*	N/A	R6 SS – 1/08	Unknown[b]
Purple-lipped Juga *(Juga hemphilli maupinensis)*	N/A	R6 SS – 1/08	Unknown[b]
Scott's Apatanian Caddisfly *(Allomyia scotti)*	N/A	R6 SS – 1/08	Salmon and White; may be present elsewhere[b].
Basalt Juga (*Juga* (*Oreobasis*) n. sp. 2)	N/A	Rare & Uncommon – 1/01	Middle Columbia/Mill Creek[c]
Other Species Addressed in this Analysis			
Pacific lamprey (*Lampetra tridentata*)	N/A	Culturally and locally important	Middle Sandy , Upper Sandy , Zigzag, Salmon
Cutthroat Trout (*O. clarki*)	N/A	Forest MIS Species	Middle Sandy Upper Sandy, Zigzag, Salmon

[a]The date in the status column is the date of listing or most recent status review and subsequent Federal Register notice for ESA listed species and the date of the most recent sensitive species list and/or Northwest Forest Plan Record of Decision for special status species.

[b]These three species were recently added to the Region 6 Regional Forester's Special Status Species list. Extensive surveys for these species have not been conducted. Recent surveys (Wissman, 2010) indicate they are present within the Action Area and are assumed to be requirements (see below) indicate they could be present at least in some areas and where habitat is suitable they are assumed to be present.

[c]The Basalt Juga was found for the first time during the 2008 field season in North Fork Mill Creek. It has not been found in any other streams surveyed in the Forest. Given that all other known locations are within the Columbia Gorge near The Dalles it is presumed this snail is localized in distribution and not present in most watersheds on the Forest.

Typically, winter-run steelhead enter the basin in significant numbers from February through May, with peak spawning occurring in mid-May. The majority of suitable spawning habitat is located upstream of the former Marmot Dam site in the Salmon River and its tributaries, and in Still Creek (PGE, 2002, SRBP, 2005). Spawning habitat is also present in Clear Creek, Clear Fork, Lost Creek, Horseshoe Creek, Zigzag River, Cheeney Creek, Henry Creek, Lady Creek, and Camp Creek (Bishop, pers. comm., 2010). Lower basin tributaries (below the Marmot Dam site) that may support additional winter steelhead production include the Bull Run River and Gordon, Trout, and Buck creeks. Natural production in the Bull Run is limited by a lack of fish passage into the upper reaches of the watershed. Since the Little Sandy Dam removal, adult and juvenile steelhead have been documented above the former dam site and appear to be recolonizing their range in the Little Sandy.

Steelhead are a "stream-type" salmonid with much of their lives spent in their natal stream. Following emergence, steelhead fry will often seek refuge from fast currents by inhabiting stream margins and pool backwater habitats (as found in SRBP, 2005). As they begin to mature and grow larger, juveniles will typically inhabit deeper water habitats of pools, riffles, and runs. Steelhead juveniles may rear 2 – 3 years in their natal stream before migrating as smolts to the ocean. As such, the quality of the habitat they inhabit during this time is critical to their survival. Smolt emigration takes place primarily from March through June during spring freshets (USFS, 2003).

LCR steelhead are present throughout most of the Still Creek sub-watershed and trout/steelhead have been documented in the lower gradient depositional reach below the project area at RM 13-14 (USFS 1980, 1984, 1995b, 1996, 2004). Their current distribution extends up to Still Creek Campground which is within the Action Area (approximately 1.2 miles downstream of the proposed project). It is likely the Highway 26 road culvert currently acts as a fish barrier, although shortly thereafter, there are two potential waterfall barriers at RM 14.4 and RM 15.1 which may have acted as the historic upper limits for the anadromous form of rainbow trout, however, the resident form was historically present within the project area. Designated Critical Habitat for LCR steelhead extends upstream of Highway 26 to the bottom end of the proposed project (RM 15.2) and is therefore present within the Action Area.

In the Salmon River watershed there are several main-stem falls which prevent anadromous fish passage into the upper watershed. One of these occurs on the main-stem of the Salmon River at RM 14.3 (Final Falls) (USDA, 2001). On the West Fork, a natural waterfall barrier at RM 2.0 further prevents fish passage (SE Group 2004, Jones & Stokes 2004). Based on the presence of these barriers and the absence of sightings during 2003 and 2004 surveys the LCR steelhead is not expected to occur within the West Fork Salmon River.

LCR steelhead are also present in the Zigzag River Watershed up to where a natural barrier falls on the Little Zigzag River prevents fish passage into the upper watershed (~5 miles below the Action Area). As such, steelhead are not known to occur within either the Glade or Sand Canyon tributaries of the Zigzag River.

Still Creek, the Lower Salmon River and the Zigzag River are considered primary habitat for native winter steelhead in the basin. The NMFS Willamette/Lower Columbia Technical Recovery Team (NMFS WLC-TRT) classified the winter run as a "core" population in its recovery planning efforts. This designation means the population (1) historically was abundant and productive, and (2) it currently offers one of the most likely paths to recovery in the Lower Columbia Steelhead ESU (McElhany et al., 2003, as found in SRBP, 2005). The Lower Columbia Fish Recovery Board designates the priority for contribution of this stock to recovery goals in the ESU as "Primary." This classification means the Sandy River winter steelhead stock would be targeted for recovery in the Cascade "stratum" to achieve viable population levels with greater than 95 percent probability of persistence (negligible extinction risk) within 100 years (LCFRB, 2004; McElhany et al., 2003; McElhany et al., 2004, as found in SRBP, 2005).

Lower Columbia River Chinook Salmon

Lower Columbia River Chinook salmon are found throughout the Sandy River including several of its 5th field watersheds. This ESU is made up of both spring and fall run components. Both runs have been influenced by historic hatchery operations associated with the Willamette ESU but there is evidence that naturally reproducing spring Chinook in the upper Sandy River have retained at least "a low level of genetic differentiation from upper Willamette River stock propagated in the Clackamas Hatchery (Bentzen, 1998, as found in SRBP 2005)."

The fall Chinook population is comprised of two stocks: an earlier returning non-native "tule" stock and a later returning wild stock known as the "late bright" stock (Murtaugh et al. 1997, as found in SRBP 2007). The late bright fall Chinook population is one of only two remaining wild populations in the Lower Columbia Evolutionarily Significant Unit (ESU) (SRBP 2007).

Spring Run Chinook: Spring run Chinook salmon are indigenous to the Sandy River Basin, and historic returns may have once numbered 15,000 adults (City of Portland 2004). Today, the average native run size is around 2,000 (PGE, 2002). The majority of spring Chinook present in the basin today are of hatchery origin. Sandy River spring Chinook enter the Sandy River delta as early as February, but more commonly in April and May (SRBP 2005). Peak migration into the upper Basin (above the former Marmot Dam site) occurs in June, with a smaller peak occurring in September (SRBP 2005). Spawning occurs primarily in August through October, with peak spawning in September. Fry emergence typically occurs in middle to late winter, followed by a downstream migration to larger mainstem areas for rearing (SRBP 2005). Juvenile spring Chinook rearing distribution is not well documented in the lower Sandy River Basin (ODFW 1997, as found in SRBP 2005)." The majority of smolts migrate to the ocean in the spring of their second year (at age 1+ as stream type fish); however, a significant portion may out-migrate in the fall as sub-yearlings (SRBP 2005).

ODFW and USFS have conducted spring Chinook spawning surveys in the upper Sandy River basin since the early 1990s (Grimes et al. 1996, Lindsay et al. 1997, Schroeder et al. 1998, 1999, 2002, 2003, Schroeder and Kenaston 2004, 2005, 2006-2008, Arendt 2003, Hanna 2009, 2010), excluding run years 2000-01, and designed the surveys to document the geographic distribution, timing, and abundance of naturally spawning spring Chinook (SRBP 2005, Hanna 2009). Principal spawning areas are focused in the Salmon River with the highest redd densities occurring in the four mile reach below Final Falls (RM 10-14) (~ 20 miles below the Action Area) with the next highest densities occurring in Still Creek (from RM 0 to RM 3). The balance is unevenly distributed throughout the Zigzag River, mainstem Sandy River, Camp Creek, and

Lost Creek (Schroeder et al 2008, Hanna 2009). Thus, the Salmon River and Still Creek provide the majority of critical spawning and juvenile rearing habitat for LCR spring Chinook, and consequently play a critical role in the recovery of that ESU (SRBP 2005, City of Portland 2004).

As previously described, there are several main-stem falls in the Salmon River which prevent anadromous fish passage into the upper watershed. Based on the presence of these barriers and the absence of sightings during surveys, LCR spring Chinook salmon are not expected to occur within the Action Area that includes the West Fork Salmon River (USDA 2004, Jones & Stokes 2004).

While there are no anadromous fish barriers in Still Creek, spring Chinook have only been observed in the lower 7 miles of the stream (~ 8 miles below the Action Area). Above RM 7.0, Still Creek becomes narrow and more entrenched with steep gradients and a series of pool drops which probably act as natural deterrents to spring Chinook migration and juvenile rearing. Potential habitat exists within the Action Area as well as downstream. However, surveys conducted in Still Creek within the study area and downstream did not find any presence of Chinook salmon (Jones & Stokes 2004, USDA 2004). Based on the lack of historic and current distribution of spring Chinook in upper Still Creek, LCR Chinook salmon are not expected to occur within the Action Area that includes Still Creek.

LCR spring Chinook are also present in the Zigzag River Watershed up to Little Zigzag Falls which prevents anadromous fish passage into the upper watershed (~5 miles below the Action Area). As such, LCR spring Chinook are not known to occur within either the Glade or Sand Canyon tributaries of the Zigzag River and therefore are not present within the Action Area that includes those tributaries.

Fall Chinook: The fall Chinook population is comprised of two stocks: “an earlier returning non-native “tule” stock and a later returning wild stock known as the “late bright” stock (Murtaugh et al. 1997, as found in SRBP 2005).” The late bright fall Chinook population is one of only two remaining wild populations in the Lower Columbia ESU.

While historic population estimates of the native “late bright” stock (LRW) are not available, most agree that the stock is depressed (SRBP 2005). “The minimum average annual run estimate for returns to the Sandy River in 1984-1994 was 1,503 (ODFW 2002). Another estimate for 1984 to 2001, as determined by Cooney et al. (2003), was only 504 individuals. Spawning escapement in 2000 reached a record low of only 88 individuals (ODFW 2003a). More recently, Mobrand Biometrics (City of Portland, 2004) summarized Sandy LRW fall Chinook stocks estimates for 1990 to 2000 from several sources. “The winter subcomponent appears to be severely depressed based on declining spawner counts at index sites in Gordon and Trout creeks (ODFW 1997). In most years, only a handful of these fish are observed or caught by anglers in the Sandy River (as found in SRBP 2005).”

“Adult fall Chinook are present in the Sandy River Basin from August through February. Peak spawning occurs from October through December, and spawning distribution appears to be controlled by flow conditions in the basin (ODFW 1997, as found in SRBP 2005).” “Size, age, and run timing of adult fall Chinook vary by stock. The first, the early maturing tule, is also referred to as the Lower River Hatchery (LRH) stock. The second, the late maturing Lower River Wild (LRW) stock, shows run timing and genetic characteristics similar to the late wild stock in the Lewis River in Washington (Cooney et al., 2003, as found in SRBP 2005)." "The early maturing tule fall Chinook are believed to be a mix of: (1) naturally produced fish that originated from hatchery releases made in the Sandy River prior to 1977; (2) the progeny of successful spawning stray hatchery fall Chinook; and to a lesser extent (3) stray hatchery fall Chinook adults originating from hatcheries in both Washington and Oregon (ODFW 1997, as found in SRBP 2005)."

"Tule fall Chinook begin entering the Sandy River in August, and spawning occurs from late September through mid-October. The late maturing LRW stock is indigenous and typically enters the Sandy River in October, with spawning occurring late October through December. Though most spawning of fall Chinook now occurs in the main-stem and tributaries of the lower basin near Oxbow Park, historic spawning distribution occurred both in the Bull Run River and above Marmot Dam in the lower Salmon River and Sixes Creek (a Salmon River tributary stream) (ODFW 2002, as found in SRBP 2005)."

"The NMFS Fisheries Willamette and Lower Columbia Technical Recovery Team (WLC-TRT 2003a) has classified the late run Sandy River brights (LRW stock) as both a "core" and a "genetic integrity" population in their recovery planning efforts (as found in SRBP 2005)." "These designations mean (1) the population historically was abundant and productive, (2) the current population resembles the historic life histories and genetic types in the Sandy River Basin, and (3) it currently offers one of the most likely paths to recovery in the Lower Columbia Chinook ESU (McElhany et al. 2003, as found in SRBP 2005)."

The Lower Columbia Fish Recovery Board (LCFRB) also looked at this stock and designated it as "Primary" in regard to its priority for contribution to recovery goals in the ESU. This classification means the Sandy River late fall Chinook stock would be targeted for recovery to achieve viable population levels with a greater than 95 percent probability of persistence (i.e., negligible extinction risk) within 100 years (LCFRB 2004; McElhany et al. 2003; McElhany et al. 2004). The early fall run tule stock (LRH) did not receive a similar designation as either a "core" or "genetic integrity" population. The Lower Columbia Fish Recovery Board designated the priority for contribution of this stock to recovery goals as "stabilizing," which focuses on maintaining the current population structure of this stock (LCFRB 2004).

ODFW has conducted spawning surveys for fall Chinook in the Sandy River since 1952 (Fulop 2003). Since 1984, ODFW has conducted annual surveys of tule and late-bright wild stocks on a 10-mile index reach on the main-stem Sandy River between the confluence of Gordon Creek and Lewis and Clark State Park. ODFW has also surveyed the late bright fall Chinook stock along two 0.2-mile long index reaches on Trout and Gordon creeks irregularly from 1952 to 1997, and annually in run years 1989-2009.

Principal spawning areas are similar for both tule and late-bright Chinook and are generally located near Oxbow Park. "But due to their run timing, late-brights usually have more available tributary and side channel habitat. Gordon and Trout creeks are important lower basin tributaries used by fall Chinook when flows increase (ODFW, 2002, as found in SRBP 2005)." Based on both historic and current distribution of fall Chinook well below Mt. Hood National Forest boundaries, the LCR Chinook salmon does not occur within the Action Area.

Lower Columbia River Coho Salmon

The Lower Columbia River/Southwest Washington Coast ESU is sustained primarily by hatchery production. “The only two known self-sustaining populations are in the Sandy and Clackamas rivers in Oregon (Iwamoto et al., 2003, as found in SRBP 2005).” “Weitkamp et al. (1995) hypothesized that the only known remaining natural population of coho in the Lower Columbia River/ Southwest Washington Coast ESU is the Clackamas late-run stock. However, since 1999, only natural origin coho have been allowed to pass over Marmot Dam and a naturally spawning population appears to exist (as found in SRBP 2005).” “Currently, the Sandy River Basin supports both an early hatchery run of coho, with peak presence occurring in September and October, and a late wild run generally peaking from September through November (ODFW, 1997, as found in SRBP 2005).”

“Historically, the late wild Sandy coho were thought to have been present in the basin primarily from October through February, with peak spawning occurring in November through February (ODFW 2002, as found in SRBP 2005).” “ODFW (1997) lists two possible factors for the possible shift in run timing of wild coho in the Sandy River Basin: (1) inconsistent flow regimes at Marmot Dam throughout the late summer and early fall from the early 1900s through the early 1970s; and (2) possible genetic introgression with early returning hatchery fish escaping to spawning grounds upstream of Marmot Dam (as found in SRBP 2005).” Peak spawning activity in the Sandy River Basin occurs in late October through November, with very few fish observed on the spawning grounds after December (ODFW 1997).

Fry emergence primarily occurs from February through April and peaks in March (PGE, 2002). Following emergence, juvenile coho typically seek stream margin habitats and backwater pools for initial rearing (ODFW 1997). As they continue to grow in size, juveniles seek low velocity pool and off-channel habitats for summer and winter rearing. Juvenile coho rely heavily on slack water habitats with complex large woody debris for protection from winter freshets. Juvenile coho in the Sandy River typically emigrate to the ocean as 1+ smolts at about 12 to 14 months of age (ODFW 1997). The timing of juvenile coho outmigration is usually late March through June, peaking in April and May (ODFW 1990). Coho salmon in the Lower Columbia River/Southwest Washington Coast ESU typically rear in the ocean for two summers and return as 3-year-olds, the primary exception are “jacks,” which are sexually mature males that return to freshwater after spending one summer in the ocean (Iwamoto et al. 2003).

“Historically, Sandy River Basin coho salmon probably spawned and reared in the majority of the basin and its tributaries accessible to anadromy. Much like today, the major clear water tributaries above Marmot Dam (Salmon River, Boulder Creek, Clear Creek, Camp Creek, Lost Creek, Still Creek, and the Clear Fork of the Sandy River) were probably important coho producers, as were tributaries downstream of Marmot Dam (as found in SRBP 2005).”

Though natural reproduction continues to occur in the lower sub-basin below the former Marmot Dam site, primary spawning and rearing areas are currently located in the clear-water tributaries above Marmot Dam, with principal spawning and rearing habitat occurring in the Salmon River, Still Creek, and Clear Creek (USFS 2005, 2008, 2009).

Surveys conducted within Still Creek in 1978, 1984, and 1992 found presence of coho salmon up to RM 12.15 which is just below the Action Area (USFS 1992, USFS 1996). However, those fish were assumed to be planted hatchery juveniles and no coho have been observed that high in the basin since the late 1990's. More recent surveys have documented coho presence up to approximately RM 9.0 where steep gradients, and confined channels appear to naturally limit preferred rearing habitat and may also inhibit upstream migration (Mt. Hood National Forest, unpublished data 2004, 2006).However, the first true physical barrier occurs at the Highway 26 road crossing (RM 14) and then shortly thereafter two natural fish barriers occur at RM 14.4 and 15.1. Surveys conducted within the Action Area did not find any presence of LCR coho salmon in Still Creek (SE Group 2004, Jones & Stokes 2004). Suitable habitat exists within the Action Area and downstream in Still Creek.

LCR coho are also present in the Zigzag River Watershed up to Little Zigzag Falls which prevents anadromous fish passage into the upper watershed (~5 miles below the Action Area). As such, LCR coho are not known to occur within either the Glade or Sand Canyon tributaries of the Zigzag River and therefore are not present within the Action Area.

" Lower Columbia Fish Recovery Board designated the priority for contribution of this stock to meet recovery objectives in the ESU as "Primary." This classification means the Sandy River coho stock would be targeted to achieve viable population levels with greater than 95 percent probability of persistence negligible extinction risk within 100 years (as found in LCFRB, 2004)."

Columbia River Bull Trout

Bull trout are believed to be a glacial relict whose distribution has expanded and contracted with natural climate changes. Bull trout often occur upstream from barriers in many drainages, an indication of early colonization (Meehan et al. 1991). Bull trout live in a variety of habitats including small streams, large rivers, and lakes or reservoirs. In some drainages, the fish spend their lives in cold headwater streams. Basic rearing habitat requirements for juvenile bull trout include cold summer water temperatures (<15°C (59°F)) with sufficient surface and shallow groundwater flows. High sediment levels and embeddedness can result in decreased rearing densities. Adult bull trout would reside in the main-stem and larger tributaries until their spawning period during mid-August through September, at which time they would migrate upstream to smaller tributaries to spawn.

Bull trout spawn in the fall, and require clean gravel and very cold water temperatures for spawning and egg incubation. Bull trout fry utilize side channels, stream margins, and other low velocity areas. Adults require large pools with abundant cover in rivers. Presumably, the various forms of bull trout interbreed, which helps to maintain viable populations throughout their range.

The only known population of bull trout in the Forest is found in the Hood River watershed. Historic presence of bull trout in the Sandy River Basin is uncertain, although there have been at least three occasions since 1999 where adult bull trout were documented in the lower Sandy

River. The first was caught (and photo-documented) by an angler in the Lower Sandy in November of 1999. In April 2000, ODFW fish survey crews identified an 18-inch bull trout caught in the trap at Marmot Dam. And finally, in January 2002 a bull trout was caught and released by an angler in the lower Sandy River below Oxbow Park (Muck, J. personal communication).

Potential suitable habitat exists within the Action Area in both the West Fork Salmon River and Still Creek sub-watersheds. However, no bull trout have ever been observed in presence/absence surveys conducted in those sub-watersheds since the early 1990s (USDA 1992; USDA 1996; Jeff Uebal, David Saiget, personal communication). Surveys conducted within the Project Area in Still Creek and the West Fork Salmon River did not find any presence of bull trout (SE Group 2004, Jones & Stokes 2004). The Zigzag Watershed Analysis does not document the existence of bull trout in the 6th field Still Creek sub-watershed (USDA 1995b). The Salmon River Watershed Analysis mentions historic reports of bull trout in the Salmon River drainage as well as suitable habitat and isolation, but its presence within the watershed has not been confirmed (USDA 1995a). Based on the lack of historical evidence of bull trout presence in the Upper Sandy Basin and lack of sightings by survey crews, bull trout are not expected to be present within the Action Area.

Pacific Eulachon (Smelt)

“Eulachon are endemic to the eastern Pacific Ocean, ranging from northern California to southwest Alaska and into the southeastern Bering Sea. In the continental United States, most eulachon originate in the Columbia River Basin. Other areas in the United States where eulachon have been documented include the Sacramento River, Russian River, Humboldt Bay and several nearby smaller coastal rivers (e.g., Mad River), and the Klamath River in California; the Rogue River and Umpqua Rivers in Oregon; and infrequently in coastal rivers and tributaries to Puget Sound, Washington (NMFS,2011).”

“Eulachon abundance exhibits considerable year-to-year variability. However, nearly all spawning runs from California to southeastern Alaska have declined in the past 20 years, especially since the mid 1990s. From 1938 to 1992, the median commercial catch of eulachon in the Columbia River was approximately 2 million pounds (900,000 kg) but from 1993 to 2006, the median catch had declined to approximately 43,000 pounds (19,500 kg), representing a nearly 98 percent reduction in catch from the prior period. Eulachon returns in the Fraser River and other British Columbia rivers similarly suffered severe declines in the mid-1990s and, despite increased returns during 2001 to 2003, presently remain at very low levels. The populations in the Klamath River, Mad River, Redwood Creek, and Sacramento River are likely extirpated or nearly so. (NMFS 2011).”

“Habitat loss and degradation threaten eulachon, particularly in the Columbia River basin. Hydroelectric dams block access to historical eulachon spawning grounds and affect the quality of spawning substrates through flow management, altered delivery of coarse sediments, and siltation. The release of fine sediments from behind a U.S. Army Corps of Engineers sediment retention structure on the Toutle River has been negatively correlated with Cowlitz River eulachon returns 3 to 4 years later and is thus implicated in harming eulachon in this river system, though the exact cause of the effect is undetermined. Dredging activities in the Cowlitz and Columbia rivers during spawning runs may entrain and kill fish or otherwise result in decreased spawning success (NMFS 2011)."

"Eulachon have been shown to carry high levels of chemical pollutants, and although it has not been demonstrated that high contaminant loads in eulachon result in increased mortality or reduced reproductive success, such effects have been shown in other fish species. Eulachon harvest has been curtailed significantly in response to population declines. However, existing regulatory mechanisms may be inadequate to recover eulachon stocks (NMFS 2011)."

There is no known suitable habitat for eulachon in the Action Area nor are they known to occur anywhere in the basin except in the lower Sandy River therefore they are not found in the Action Area.

US Forest Service, Region 6 Regional Forester's Special Status Sensitive Species

As part of the National Environmental Policy Act process the Forest Service reviews programs and activities to determine their potential effect on sensitive species. Species on the Mt. Hood National Forest included in the January 2008 Regional Forester's Special Status Species List are described below.

Redband Trout: Redband/inland rainbow trout (redband trout) occur in the White River and Fifteenmile Watersheds and are suspected in the Upper Sandy River Watershed but definitive genetic analysis has not been conducted. For this analysis, their presence is assumed within the fifth-field and local watershed scale. Spawning occurs in the spring. Fry emergence from the gravel normally occurs by the middle of July, but depends on water temperature and exact time of spawning. Redband trout prefer water temperatures from 50 to 57 ^{o}F, but have been found actively feeding at temperatures up to 77 ^{o}F in high desert streams of Oregon and have survived in waters up to 82 ^{o}F. Suitable habitat for Redband trout is present within the Project Area and the Action Area.

Scott's Apatanian Caddisfly: (*Allomyia scotti)* may be a truly rare species (Wissman,2010). So far it has only been collected from the West Fork Salmon River drainage and the White River (Iron Creek) drainage on Mount Hood at elevations ranging from 3800 to about 5000'. The species is present in both the Project Area and Action Area which includes the majority of its known habitat range in Oregon. Habitat for this species occurs in both Still Creek and West Fork Salmon although in the most recent surveys, this caddisfly was only observed in the West Fork Salmon. In the locations it was found, the water was clear and cold, originating from springs supplied by permanent snowfields around the summit of Mt. Hood. Rocks in the stream bear dense growths of a wiry moss. It does not appear there is suitable habitat for this caddisfly in Glade or Sand Canyon.

The larva with its' horned head is so distinctive that it can't be missed (Wissman, 2010). Female Limnephilidae deposit their egg masses above the water in a gelatinous material on various objects (Usinger 1968). Newly hatched larvae drop or migrate into the water nearby. Larvae and pupae inhabit small, cold mountain streams, often at high elevations. The larvae occur at the base of moss fronds and pupal cases are attached to moss (Wigginis 1973). Larvae are shredders, chewing plant material, probably mosses (Merritt and Cummins 1984). Two years are required to complete the life cycle. Prepupae occur as early as June and are still present in September, but have changed to pupae by the following April. Based on gut content analysis of larvae in this genus, the diet is apparently consistent with the interpretation that *Allomyia* larvae scrape the upper surface of rocks and plants.

This species of caddisfly has been documented within the Action Area both historically and during surveys conduction in the summer of 2010 and the results of that survey are attached in Appendix B (Wissman, 2010). "The results of this survey, i.e. presence of the species only in the West Fork Salmon River tributaries, and not in the Still Creek headwater tributaries, suggest that the habitat requirements for this species is very narrow. Perhaps it formerly occurred in the Still Creek tributaries. It seems evident that these Still Creek tributaries have already experienced a much greater level of human impact than seen in the West Fork Salmon River tributaries (Wissman, 2010)."

"Unknown is how widely distributed Scott's apatanian caddisfly is in the Mount Hood area. Collectors have always targeted the easily accessible stream crossings afforded by Highways 26 and 35, the Old and New Timberline Lodge Roads, and access at campgrounds like the Still Creek Campground. Other than these convenient stream crossings, little, if any, collecting or surveys have occurred to my knowledge in the 4000-5500' elevation band around Mount Hood (Wissman, 2010)."

Columbia Duskysnail: This species of aquatic mollusk has been found across the Forest during surveys conducted over the past several years (Mt. Hood National Forest, unpublished data). Habitat requirements for this species are fairly specific: cold, well oxygenated springs, seeps, and small streams, preferring areas without aquatic macrophytes (Furnish and Monthey 1998). Individuals have not been found in larger streams and rivers, or glacial streams.

Surveys for the Columbia duskysnail have been conducted at sites across the Forest for a wide range of projects. This aquatic mollusk species has been found in many locations across the Forest and it is therefore presumed to be present in seeps, springs, and smaller streams within the Action Area.

Purple-lipped Juga: The Purple-lipped Juga snail is endemic to Oregon. It is found in large streams at low elevations. These snails prefer riffle habitat with stable gravel substrates, in cold well oxygenated water. It is more tolerant of silt and slack water than other Juga subspecies. The known range of the species is the Lower Deschutes River drainage, below Pelton Dam, and the Warm Springs River in Wasco and Sherman counties, Oregon. Sites where the species are known to occur are located on the Warm Springs Reservation and Prineville BLM in the Deschutes Wild and Scenic River Area. There are few locations on the Forest that match the above preferred habitat description. These locations are in larger rivers likely near the Forest boundary. Streams within or near the Action Area do not meet the above habitat description and thus it is assumed that this snail is not present in these locations although surveys have not been conducted.

Barren Juga: This species of aquatic mollusk is found in freshwater habitats in small to medium sized highly oxygenated cold water streams at low elevations. The species prefers streams that have moderate velocity level bottoms with stable gravel substrates. The known range of this species is the Columbia River Gorge in Oregon and Washington. They have been found in the Mt. Hood National Forest and the Columbia River Gorge National Scenic Area. They are also suspected to occur in the Gifford Pinchot National Forest. Since these species prefers low elevation habitat, it is assumed that the species in not present within or near the Action Area although surveys have not been conducted.

Basalt Juga*:* The Basalt Juga is not a sensitive species but it is on the Region 6 Regional Forester's Special Status Species list. It is a rare and uncommon species as outlined in the Northwest Forest Plan. Their habitat requirements appear similar to the Columbia duskysnail's (Furnish and Monthey 1998). These small snails have only been found in one survey on the Forest in North Fork Mill Creek. They have not been found in any other stream or water body surveyed since Forest personnel began surveying in 1998. They are not believed to reside in watersheds other than those that drain into the Columbia River near The Dalles, Oregon. Since these species appears to be present only on the east side of the mountain, it is assumed that the species in not present within or near the Action Area although surveys have not been conducted.

Other Important Management Indicator Species (MIS)

During the preparation of the Mt Hood National Forest Land and Resource Management Plan (USDA LRMP 1994), a group of fish and wildlife species were identified as Management Indicator Species (MIS). Because of their relative sensitivity to change, salmonids were selected as "an indicator species group" for aquatic habitats (Table 2). This group of species is especially important for their commercial and game values and because they occupy the whole spectrum of aquatic habitats on the Forest. These requirements are restricted enough that it is reasonable to assume that if the life history needs of salmonids are met, the rest of other fish species found on the Forest will be met (see FEIS, III-58). Since other sections of this document discuss the location, trends, and project related impacts to all salmonid species present within the Action Area, the following discussion will focus solely on resident and sea-run cutthroat trout. The current status of the species is presented below.

Coastal cutthroat trout: Cutthroat trout residing in waters of the Forest are composed of two native stocks: an anadromous (sea run) form and resident stock. These fish are a Management Indicator Species (MIS) on the Forest and are present within the Actin Area.

Life History: The life history of coastal cutthroat trout may be one of the most complex of any Pacific salmonid (FWS 2010). Three general life-history forms of coastal cutthroat trout have been recognized and all are present within the Action Area.

> *Non-migratory coastal cutthroat trout*. This life history form includes fish generally found in small streams and headwater tributaries. These non-migratory coastal cutthroat trout, in general, appear to grow more slowly than other life-history forms of trout, are smaller at maturity, and generally do not live as long as migratory forms (FWS 2010).

> *Freshwater-migratory coastal cutthroat trout.* This freshwater, or potamodromous, life

history form includes fish that migrate entirely within fresh water. This includes populations that migrate from large tributaries to small tributaries to spawn (fluvial-adfluvial), populations that inhabit lakes and migrate upstream to spawn in the lake's tributaries (lacustrine-adfluvial), and populations that live in lakes and migrate downstream to spawn in the lake outlet (allucustrine). These freshwater-migratory populations are best documented in rivers and lakes with physical barriers to anadromous fish, such as above waterfalls (FWS 2010).

Saltwater-migratory coastal cutthroat trout. In most areas, this is the most familiar life history form of coastal cutthroat trout. The juvenile fish migrate from freshwater natal areas in the late winter and spring to feed in marine environments (estuarine or nearshore) during the summer. They then enter fresh water in the winter to feed, seek refuge, or spawn, sometimes returning to seawater in the spring (FWS 2010).

Cutthroat trout typically spawn from December through June, with peak spawning in February. Eggs begin to hatch within six to seven weeks of spawning, depending on temperature; alevins emerge as fry between March and June, with peak emergence in mid-April (FWS 2010).

Habitat: Coastal cutthroat trout use a large variety of habitat types, including lower and upper reaches of both large and small river systems, estuaries, sloughs, ponds, lakes, and nearshore ocean waters. They spend more time in the freshwater environment than do most other anadromous Pacific salmonids. In freshwater habitat these fish prefer deeper pool habitat and cover, such as that formed by woody debris. Unlike other anadromous salmonids, the saltwater migratory form of coastal cutthroat trout does not overwinter in the ocean and only rarely makes extended migrations across large bodies of water. Their migrations in the marine environment are usually within 10 kilometers (6 miles) of land. These anadromous fish typically spend two to five years rearing in fresh water before making their initial seaward migration. Generally, anadromous coastal cutthroat trout spend only brief periods offshore during summer months and return to estuaries and fresh water by fall or winter (FWS 2010).

Reasons for Decline & Population Trends: The following activities or types of land use have the potential to affect coastal cutthroat trout habitat, including forest management, agriculture and livestock management, dams and barriers, urban and industrial development, mining, and estuary degradation. Of these, only forest management and estuary degradation were described as principal factors for declines across the range of coastal cutthroat trout in the subspecies-wide review in the Columbia River Basin (FWS 2010).

However, despite the long term, widespread impacts to aquatic and riparian conditions, resident coastal cutthroat trout are widespread throughout much of the Mt. Hood National Forest and apparently remain at densities comparable to healthy-sized populations elsewhere, indicating that they are capable of surviving long periods under these conditions. Saltwater migratory forms of cutthroat trout appear to be in greater decline on the Forest than the resident form. Consistent indicators in abundance trends for most populations of either resident or sea run cutthroat trout do not exist. Resident cutthroat trout have been documented within the Action Area in both Still Creek and the West Fork Salmon River (USFS, 2005) and due to the lack of any physical barriers, sea-run cutthroat are assumed to be present within the Action Area in Still Creek below Highway 26.

There are approximately 1,290 miles of stream habitat used by resident trout (including cutthroat) on the Mt. Hood National Forest. The total miles of stream occupied by resident trout within the Action Area is approximately 7 miles; a fraction of 1 percent of available habitat on the Mt. Hood. The existing conditions within the Action Area and the relation to forest-scale conditions are described in Section VI below.

Critical Habitat

NMFS designated critical habitat for LCR Chinook and steelhead on September 2, 2005 (70 FR 52630) and critical habitat for LCR coho and southern eulachon is pending. Essential features of designated critical habitat include aspects of substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space, and safe passage that are associated with viability for the ESUs. Detailed maps of specific critical habitat boundaries for each ESU are provided in the Federal Register notice. Much of the discussion concerning critical habitat, including effects analyses, will center on the primary constituent elements (PCE) described below for each species.

Steelhead trout and Chinook salmon Critical Habitat

Critical habitat for steelhead is present in both the Project Area and Action Area, as well as throughout the Salmon and Zigzag 5th field watersheds. Critical habitat for LCR spring Chinook is present within the Salmon and Zigzag 5th field watersheds, but below the Action Area.

Primary constituent elements for steelhead and Chinook are sites and habitat components that support one or more life stages. The first three, listed below, refer to freshwater habitat components, whereas the last three relate to estuarine or marine habitat components. Nothing in the proposed project would have an effect on estuarine or marine habitat components, thus they are not discussed.

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.
2. Freshwater rearing sites with:
    a. Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
    b. Water quality and forage supporting juvenile development; and
    c. Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
3. Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions, and natural cover, such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

Bull Trout Critical Habitat

There is no designated critical habitat for bull trout in the Sandy River Watershed.

ESA listed fish and Regional Forester's Special Status Species presence/absence, as well as designated critical habitat and essential fish habitat within the Action Area is described in **Error! eference source not found.**24. Species and or suitable habitat found within the Action Area are designated with a "Y" in the table. The table is intended to give the reader a basic idea of where various aquatic fauna are located in relation to the proposed project.

Table 24 - Presence of ESA Listed Fish, Regional Forester's Special Status Species, Designated Critical Habitat, and Essential Fish Habitat within the Action Area

Species/Habitat	Glade Creek (Zigzag)	Sand Canyon (Zigzag)	Still Creek	W. Fork Salmon
Bull Trout	N[1]	N[1]	N[1]	N[1]
Steelhead Trout (LCR)	N	N	**Y**	N
Chinook Salmon (LCR)	N	N	N	N
Coho Salmon (LCR)	N	N	N	N
Redband/ Inland Rainbow Trout	N	N	Unk	**Y**
Columbia duskysnail	**Y**	**Y**	**Y**	**Y**
Barren Juga	Unk	Unk	Unk	Unk
Purple-lipped Juga	Unk2	Unk2	Unk2	Unk2
Scott's Apatanian Caddisfly	Unk2	Unk2	**Y**	**Y**
Basalt Juga (Rare & Uncommon)	N	N	N	**Y**
Coastal Cutthroat Trout (MIS)	N	N	**Y**	**Y**
Bull Trout Critical Habitat	N	N	N	N
Steelhead Critical Habitat	N	N	**Y**	N
Chinook Critical Habitat	N	N	N	N
Coho Critical Habitat	--	--	--	--
Essential Fish Habitat	N	N	N	N

N – species/habitat not present
Y – species/habitat known to be present
Unk – species presence unknown but suspected either due to nearby surveys or presence of suitable habitat.
Unk2 – species presence unknown but not suspected due to habitat preferences (large, low elevation streams).
MIS – Mt. Hood National Forest Management Indicator Species

3.4.3 Environmental Consequences

This section summarizes the effect of the No Action and the Proposed Action alternatives on the aquatic resources, based on the analysis provided in the Biological Assessment.

No Action

Under the No Action Alternative, RLK would not construct or operate a mountain bike park within the SUP area, nor would watershed restoration take place. Consequently, the sediment regime, riparian conditions, and current extension of the stream network in the ski area would remain as described for the existing condition (See Section 3.2), and the downstream effects to aquatic resources would remain unchanged from the existing condition.

Proposed Action

The following discussion summarizes effects to ESA listed fish, their critical habitat, Regional Forester's Sensitive aquatic species, and Essential Fish Habitat under the Proposed Action (see Table 25). A brief rationale is given for each.

Federally Listed Species & Designated Critical Habitat (NMFS)

Suitable habitat for Lower Columbia River (LCR) steelhead trout exists within and downstream of the Project and Action Area in Still Creek. Suitable habitat for (LCR) Chinook and LCR coho salmon does not exist within the Action Area but is present downstream in the Salmon River and Zigzag River Watershed. Sediment, stream drainage network increases, and disturbance of riparian reserves would be the most likely avenue of potential effects. For this reason the proposed action **"May Affect, Not Likely to Adversely Affect"** LCR steelhead trout and designated crticial habitat, and would have **"No Effect"** to LCR coho salmon, LCR Chinook salmon and associated designated critical habitat.

Federally Listed Species (USFWS)

Although bull trout have been found in neighboring basins (Willamette River and Hood River) and isolated occurrences of adult bull trout have been reported in the lower Sandy River basin, there is no substantiated historical or present evidence that bull trout populations reside in the Upper Sandy River Watershed. For this reason, the proposed action would have **"No Effect"** on bull trout or its critical habitat.

MIS Cutthroat Trout

On the Zigzag Ranger District, both resident and anadromous cutthroat trout are present within the Analysis Area in Still Creek and resident cutthroat are present in the West Fork Salmon River. Sediment, stream drainage network increases, and disturbance of riparian reserves would be the most likely avenue of potential effects. Project elements and design criteria are in place that would greatly minimize, if not eliminate, effects to habitat or individuals in each of the three sub-watersheds. Because this project impacts a fraction of 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects woould result in a **small negative trend** of habitat (increase in disturbance). The loss of habitat (increase in disturbance) would be insignificant at the scale of the Forest. The project is consistent with the Forest Plan, and thus continued viability of cutthroat trout and other salmonid MIS species is expected on the Mt. Hood National Forest.

Table 25 - Effects Determination Summary for the Proposed Action

	Date of Listing & Critical Habitat	**Critical Habitat Present**	**Species Present**	**Effects of Actions**
Endangered Species Act Listing by ESU/DPS ***Threatened***				
Lower Columbia River steelhead & CH (*Oncorhynchus mykiss*)	1/06 9/05	Y	Y	NLAA
Lower Columbia River Chinook & CH *(Oncorhynchus tshawytscha)*	6/05 9/05	N	N	NE
Columbia River Bull Trout (*Salvelinus confluentus*)	6/98	N	N	NE
Lower Columbia River coho *(Oncorhynchus kisutch)*	6/05	N/A	N	NE
Southern DPS Smelt (*Th. Pacificus*)	3/10	N	N	NE
Regional Forester's Special Status Species List				
Interior Redband Trout *(Oncorhynchus mykiss spp.)*	7/04	Y*	Y	MIIH
Columbia duskysnail *(Colligyrus sp.)*	1/08	Y*	Y	MIIH
Barren Juga *(Juga hemphilli hemphilli)*	1/08	N	Unk	NI
Purple-lipped Juga *(Juga hemphilli maupinensis)*****	1/08	N	Unk	NI
Scott's Apatanian Caddisfly *(Allomyia scotti)*	1/08	Y*	Y	MIIH
MIS Cutthroat Trout (O. *clarkii*)	NA	NA	Y	Small negative impact
Essential Fish Habitat				
Essential Fish Habitat		N/A	N	NAA

*Suitable habitat exists within the Action Area for this species.

Endangered Species Act Abbreviations/ Acronyms:		Essential Fish Habitat Abbreviations/ Acronyms:	
NE	No Effect	NAA	Not Adversely Affected
NLAA	May Affect, Not Likely to Adversely Affect	AE	Adverse Effects
LAA	May Affect, Likely to Adversely Affect		
Regional Forester's Sensitive Species List Abbreviations/ Acronyms:			
Unk	Species presence unknown but suspected		
NI	No Impact		
MIIH	May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species		

Forest Service Region 6 Regional Forester's Special Status Species

Redband Trout

On the Zigzag Ranger District, Redband trout are suspected to be present in the Upper Sandy River Watershed. Habitat may exist for Redband trout at some of the projects sites on small-medium sized streams. Silted water and disturbance would be the most likely avenue of potential effects. Project elements and design criteria are in place that would greatly minimize, if not eliminate, effects to habitat or individuals in each of the four sub-watersheds. Thus, this project "**May Impact Individuals or Habitat"** but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Columbia Dusky Snail

Suitable habitat for the Columbia Dusky Snail is present in the Action Area and therefore this snail is assumed to be present. Silted water and disturbance would be the most likely avenue of potential effects. Project elements and design criteria are in place that would greatly minimize, if not eliminate, effects to habitat or individuals in each of the four sub-watersheds. Thus, this project "**May Impact Individuals or Habitat"** but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Barren Juga

Habitat for the Barren Juga is low elevation; cold, pure, well-oxygenated water in springs and small-medium streams and therefore, this snail species is not expected to be present in the Action Area. Thus, this project will have "**No Impact"** for individuals or habitat of the Columbia Dusky Snail.

Purple-lipped Juga

Habitat for the Purple-lipped Juga is low elevation; cold, pure, well-oxygenated water in large streams and therefore, this snail species is not expected to be present in the Action Area. Thus, this project would have "**No Impact"** for individuals or habitat of the Columbia Dusky Snail.

Scott's Apatanian Caddisfly

Surveys for the rare and uncommon Scotts appatanian caddisfly were conducted as part of this project as their only known location in Oregon is in streams near Timberline Lodge. This species was found at sampling sites within the project area in the West Fork Salmon River but was not observed in adjacent sampling sites in Still Creek. Project elements and design criteria are in place that would greatly minimize, if not eliminate, effects to habitat or individuals in each of the four sub-watersheds. Therefore, the proposed actions "**May Impact Individuals or Habitat"** Scott's appatanian caddisfly.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those salmon species regulated under a Federal fisheries management plan. The Pacific Fisheries Managedment Council (PFMC) has recommended an EFH designation for Pacific salmon fishery that would include those waters and substate necessary to ensure the production needed to support a long-term sustainable fishery.

Salmon fishery EFH includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to the three salmonid species identified under the MSA, coho salmon, Chinook and Puget Sound pink salmon in Washington, Oregon, Idaho, and California, except above impassable barriers identified by PFMC (PFMC 1999). Salmon EFH excludes areas upstream of longstanding naturally impassable barriers (i.e. natural waterfalls in existence for several hundred years).

EFH is commensurate with critical fish habitat where designated. If critical habitat has not been designated then the action agency defines the extent of EFH based on known or suspected fish distribution. There is no EFH in any of the streams within the Action Area as coho and Chinook are not present.

Cumulative Effects

Endangered Species Act cumulative effects are the future effects of state, tribal, local, and private actions that are reasonably certain to occur within the Action Area associated with the federal action. A full description of cumulative effects for all alternatives is found in Table. Findings relevant to aquatic fauna and habitat are summarized below.

Table 26 - Summary of Cumulative Effects to Aquatic Fauna and Habitat

Project	Potential Effects	Overlap in Time	Overlap in Space	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
Ongoing Road Maintenance (Westleg, Timberline Road, Hwy 26)	Suspended Sediment	Yes	Yes	Not Measurable	An overlap in time and location exists with these road networks and the trails project. There is both short-term introduction of fine sediment that may mix with the fine sediment from the down-hill trail project. Some of the high-risk areas are in Still Creek at the Jeff Flood chair-lift. And at the Highway 26 crossing. Project elements and PDC's have been designed to mitigate effects so they are insignificant or discountable.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Except for culvert replacements and some road reconstruction, mitigation measures reduce the amount of sediment delivered to streams and affecting aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
USFS Trail Ongoing Maintenance (Glade Trail, Alpine Trail, Timberline to Town Trail)	Suspended Sediment	Yes	Yes	Not Measurable	There may be an overlap in timing and location of these projects with the bike park project; these projects have a chance of some short-term introduction of fine sediment that may mix with fine sediment from the bike park project. Some of the high risk areas would be in Still Creek and West Fork Salmon River. Other listed projects have a low risk of cumulative effects due to implementation of mitigation and project design criteria that minimize erosion and sediment input.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
	Trail Equipment Related Chemicals	Yes	Yes	No	No cumulative effects are expected due to mitigation measures and design criteria implementation,	None

Project	Potential Effects	Overlap in Time	Overlap in Space	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
					conformance with existing standards and guidelines on the existing projects.	
New Trail Construction (Timberline to Town)	Suspended Sediment	Yes	Yes	Not Measurable	Some projects are completed so there are no remaining sediment effects due to natural recovery. Other ongoing projects on adjacent private land such as road maintenance and vegetation manipulation have a chance of some short-term introduction of fine sediment that may mix with minor fine sediment from the Bike Park project.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
	Trail Equipment Related Chemicals	Yes	Yes	No	No cumulative effects are expected due to mitigation measures and design criteria implementation, conformance with existing standards and guidelines on the existing projects.	None
Misc. Tree Salvage (Hazard Trees)	Suspended Sediment	Yes	Yes	Not Measurable	There may be an overlap in timing of this project with the bike park project; any minor suspended sediment would not be measurable due to implementation of mitigation measures and design criteria and conformance with existing standards and guidelines in the projects.	Any cumulative effect would be of minor magnitude due to the localized, minor impact of miscellaneous tree salvage when overlapped with effects of the bike park project. Any effects to aquatics would be minor and not be measurable.
	Riparian Habitat loss	Yes	Yes	No	Project elements and PDC's are in place to ensure that riparian reserves are not impacted by either project	None
Ski Area Operations	Suspended Sediment	Yes	Yes	Not Measurable	The loss of riparian buffers, the development of road networks, and the clearing of vegetation for ski slopes has increased	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic

Project	Potential Effects	Overlap in Time	Overlap in Space	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
					both the short and long-term introduction of fine sediment that may mix with fine sediment from the bike park project. The highest risk of this would be in Still Creek and West Fork Salmon as those sub-watersheds are most heavily impacted by the ski area. Long-term restoration of a more natural sediment regime should occur as mitigation measures and design criteria identified in the EA is implemented.	invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
Ongoing maintenance and management of Jeff Flood base area	Suspended Sediment	Yes	Yes	Yes	There may be an overlap in timing and location of these projects with the Bike Park project; these projects have a chance of some short-term introduction of fine sediment that may mix with fine sediment from the Bike Park project. Some of the high risk areas would be in Still Creek and West Fork Salmon River due to their close proximity to this project.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
	Equipment Related Chemicals	Yes	Yes	No	No cumulative effects are expected due to mitigation measures and design criteria implementation, conformance with existing standards and guidelines on the existing projects.	None
Ongoing Operation of Jeff Flood Lift	Suspended Sediment	Yes	Yes	Not measurable	The construction of the Jeff Flood lift resulted in approximately 77 acres of ground disturbance for new ski runs. To date, portions of those runs remain poorly vegetated and contribute sediment to intersecting road and ditch lines which transport the	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of

Project	Potential Effects	Overlap in Time	Overlap in Space	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
					sediment to Still Creek.	sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
ODOT Winter Sand & Plowing	Suspended Sediment	Yes	Yes	Not Measurable	There may be an overlap in timing of this project with the Bike Park project; significant, measurable sediment is resulting both in the short term and long term as a result of winter sanding and plowing throughout the Action Area and is negatively impacting both LCR winter steelhead/critical habitat as well as Region 6 Sensitive macro-invertebrates which are assumed or known to inhabit the Action Area.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.
	Road Equipment Related Chemicals	Yes	Yes	No	No cumulative effects are expected due to mitigation measures and design criteria implementation, conformance with existing standards and guidelines on the existing projects.	None
Timberline Lodge Waterline Replacement	Suspended Sediment	No	Yes	Not Measurable	There may be an overlap in timing of these project effects with the Bike Park project. Any minor suspended sediment may slightly slow the recovery resulting from restoration project implementation, but this would not be measurable due to implementation of mitigation measures and design criteria and conformance with existing standards and guidelines in the projects.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions. Project elements and PDC' reduce the amount of sediment delivered to streams and affected aquatic resources to a level that is not measurable and is insignificant, and have a low risk of cumulative effects.

Project	Potential Effects	Overlap in		Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
		Time	Space			
	Equipment Related Chemicals	Yes	Yes	No	No cumulative effects are expected due to mitigation measures and design criteria implementation, conformance with existing standards and guidelines on the existing projects.	None
East Leg Road Decommission	Suspended Sediment	Yes	Yes	Not Measurable	There may be a spatial and temporal overlap of effects of this project with the Bike Park project. Any minor suspended sediment may slightly slow the recovery resulting from restoration project implementation but this would not be measurable due to implementation of mitigation measures and design criteria and conformance with existing standards and guidelines in all projects on National Forest.	Potential for cumulative effects to fish is expected to be localized with a potential for some sediment avoidance behavior. Aquatic invertebrate species may have low levels of short-term negative stream conditions.

3.5 Wildlife

A review of the Proposed Action was made for the effects of the project on wildlife species. A determination of No Impact for Sensitive Species can be made at any step in the process, at which time the biological evaluation is complete. If the biological evaluation determinations indicate there may be an effect to proposed or listed species, conferencing or informal/formal consultation with USFWS, as outlined in FSM 2673.2, would be initiated.

Currently, threatened, endangered, proposed for listing, and sensitive species are collectively termed *special status* species by the Forest Service. Acronyms such as PETS (proposed, endangered, threatened, and sensitive) and TES (threatened, endangered, and sensitive) are synonymous with the term *special status* species. *Special status* species are those federally listed as threatened or endangered by the USFWS, those proposed for federal listing by the USFWS, and those listed as sensitive on the Regional Forester's Sensitive Species List for Region 6.

This section evaluates the potential effects of the Proposed Action on special status wildlife species in accordance with The National Environmental Policy Act (42 USC 4321 et seq.), the federal Endangered Species Act (16 USC 1531 et seq.), and the National Forest Management Act (16 USC 1604 et seq.). To comply with the above, the Forest Service has set forth guidance in FSM 2670 that is designed to ensure Forest Service actions (1) do not contribute to the loss of viability of any native or desired non-native species or cause a trend toward federal listing for any species; (2) comply with the requirements of the Endangered Species Act; and (3) provide a process and standard that ensure special status species receive full consideration in the decision-making process.

3.5.1 Affected Environment and Existing Condition

The analysis area includes the terrain associated with the proposed mountain bike park and restoration projects, ranging in elevation from 4,800 to 6,000 feet msl. The elevation is an important aspect of this analysis area for several reasons. Many species that are typically analyzed for effects are found below this elevation. There are specialized species that prefer to utilize these high elevations such as Clark's nutcrackers and American marten. There is persistent snow at these elevations for many months making it usable for habitat only during the summer for some species. Also, the summer growing months are very short so restoration efforts can be difficult due to the short growing season.

The analysis area is in the Mixed Montane Conifer Wildlife Habitat. The area is characterized by a mixture of older conifers from Mature to Late Successional interspersed with man-made openings (ski runs) that resemble montane meadow habitat. Some of this area, the Jeff Flood Lift and associated ski trails, was recently cleared for ski runs and is covered in down woody debris left over from the logging of the ski runs and lift line. Because the area has not been part of normal forest management, the remaining forest is similar to natural forest at this elevation. The area is subject to heavy snows that sometimes create open stands of trees and there are some areas with suppression mortality due to overcrowding. The analysis area has several alpine meadows and small wet meadows scattered throughout the forest.

The analysis area is situated within the SUP area for Timberline Ski Area, which operates throughout the SUP area during the winter. Skiing operations take place during the summer in the higher elevation portion of the analysis area, while the remainder of the SUP area receives use by hikers, mountain bikers, sightseers and motorists driving on West Leg Road. This summertime use limits opportunities for use in the area by California Wolverine.

Threatened and Endangered Species

No northern spotted owl habitat is located in the project area. There are no known spotted owls nesting above 4,600 feet elevation. The highest recorded nest site on the Mt. Hood National Forest was at Snow Bunny at approximately 4,400 feet. There is no spotted owl suitable habitat within the project boundary.

The northern flying squirrel is the principle prey of the northern spotted owl. Use of habitat by spotted owls in the western Cascades is heavily tied to flying squirrels. According to Lehmkuhl et al. (2006) the annual survival of northern flying squirrels is negatively associated with snow depth. Flying squirrels are known to thrive in higher elevations but are tied to heavy canopy cover of 60% and greater. Most of the mountain bike project area has heavy snow accumulation and has canopy cover less than 60%. There may be some flying squirrels using the project area but the populations may be low in comparison to lower elevation sites. The combinations of conditions make foraging in the project area less than ideal for spotted owls.

Sensitive and Survey and Manage Species (SMS)

For Region 6 of the Forest Service, Sensitive Species are defined as those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species' existing distribution (FSM 2670.5). Management of sensitive species "must not result in a loss of species viability or create significant trends toward federal listing" (FSM 2670.32). The Regional Forester is responsible for identifying sensitive species and shall coordinate with federal and state agencies and other sources, as appropriate, in order to focus conservation management strategies and to avert the need for Federal or State listing as a result of National Forest management activities. The species suspected or documented to be found on the Zigzag Ranger District were analyzed (Table 26) to determine if habitat for them was present in the proposed project area and if the project would have any impact on the population on the Forest.

The Survey and Manage list of species used by this document for analysis is from Attachment 1 of the Settlement Agreement, Conservation Northwest v. Sherman Case No. 08-CV-1067-JCC (W.D. Wash.) filed 07/06/11. Species that are suspected or documented on the Mt. Hood National Forest on the Zigzag Ranger District were analyzed to determine if habitat is available and if the proposed project would have any impacts to these species. Existing exemptions ordered by the court in Northwest Ecosystem Alliance v. Rey, No. 04-844-MJP (W.D. Wash. Oct 10, 2006) and new exemptions specified by the above referenced settlement agreement filed 07/06/11 were applied to this proposed project.

Table 26 - Sensitive and SMS Species and their presence in the analysis area.

Species	Sensitive	SMS	Suitable Habitat Presence
Johnson's Hairstreak	X		Yes
Mardon Skipper	X		No
Larch Mountain Salamander	X		No
Cope's Giant Salamander	X		Yes
Oregon Spotted Frog	X		No
Great Gray Owl		X	No
Black-backed Woodpecker	X		Yes
Lewis's Woodpecker	X		No
White-Headed Woodpecker	X		No
Bufflehead	X		No
Harlequin Duck	X		No
Bald Eagle	X		No
American Peregrine Falcon	X		No
Red Tree Vole		X	No
Townsend's Big-eared Bat	X		No
Fringed Myotis	X		Yes
California Wolverine	X		Yes
Cascades Axetail Slug	X		Yes
Oregon Megomphix (SMS)	X	X	No
Puget Oregonian (SMS)	X	X	No
Columbia Oregonian (SMS)	X	X	No
Evening Fieldslug (SMS)	X	X	No
Dalles Sideband (SMS)	X	X	No
Crater Lake Tightcoil (SMS)	X	X	No

Johnson's Hairstreak Butterfly

This butterfly is present in areas of dwarf mistletoe and utilizes nearby openings. The project area has some potential for dwarf mistletoe in western hemlock.

Mardon's skipper

Mardon's Skipper has not been found on the MHNF. No habitat is present for this species in the project area.

Larch Mountain Salamander

The Conservation Assessment (Crisafulli, Charles et al 2008) states, "The Larch Mountain salamander occurs in an area of 11,740 km^2 (4,550 mi^2) in the Cascade Range of Washington and Oregon (Figure 1, Crisafulli 1999, Nauman and Olson 1999). It has been found from 50-1280 m (~160-4,200 ft) in elevation." This project is above that elevation. No habitat would be adversely affected by the trails or construction that would affect the persistence at the site. Therefore no surveys were conducted for Larch Mountain salamanders. No salamanders were found while conducting surveys for mollusks.

Copes Giant Salamander

No surveys were done for Cope's giant salamander because there were no anticipated impacts from the trails since they stay more than 10 yards from streams or would have hardened crossings to reduce the impact to stream channels.

Oregon Spotted Frog

Oregon spotted frogs are only known from one location on the Mt. Hood National Forest, that is outside of the project area on the southeast part of the Forest. This species requires larger wetlands than exist in the project area.

Great Gray Owl

There are no natural meadows larger than 10 acres in the project area. All of the larger meadows are manmade ski runs. Therefore, no surveys are necessary for Great Gray Owls. There have been no documented occurrences of great gray owls on the Mt Hood National Forest.

Black-backed Woodpecker / White-headed Woodpecker

The Forest Plan has standards and guidelines for the white-headed woodpecker, black-backed woodpecker, pigmy nuthatch, flammulated owl, Canada lynx and bats. Of these species, the black-backed woodpecker is the only species potentially affected by the project. Habitat for this species is found in mixed conifer and lodgepole pine stands in the higher elevations of the Cascade Range. The Timberline SUP area is west of the potential habitat for the species. A standard and guideline requires an adequate number of large snags and green-tree replacements for future snags be maintained in sufficient numbers to maintain 100 percent potential population levels. The 100 percent population potential for black-backed woodpeckers is 0.12 conifer snags per acre in the hard decay stage. These snags would be at least 17 inches diameter or largest available if 17 inch diameter snags are not available. The black-backed woodpecker also requires beetle infested trees for foraging.

Lewis' Woodpecker

Lewis' Woodpecker is found at elevations below the Timberline SUP area and the project area is west of potential habitat for this species. No Lewis' Woodpecker habitat is present in the project area.

Bufflehead

Bufflehead are found in open water ponds, none of which are present in the Timberline SUP area. No bufflehead habitat is present in the project area.

Harlequin Duck

Harlequin Duck prefer larger, fast-flowing streams than are present in the Timberline SUP area. No Harlequin Duck habitat is present in the project area.

Bald Eagle

Bald Eagle is found along lower elevation, large bodies of water. No habitat for bald eagle is present in the project area.

American Peregrine Falcon

Perigrine Falcon habitat includes cliff sites, none of which are found in the Timberline SUP area. No habitat for American Peregrine Falcon is present in the project area.

Red Tree Vole

Habitat for this species consists of conifer forests containing Douglas-fir, grand fir, Sitka spruce, western hemlock and white fir. Optimal habitat for the species occurs in old-growth Douglas-fir forests. Large, live old-growth trees appear to be the most important habitat component. Although part of the project area does contain mature old-growth stands, the species composition is different than what is preferred by the species. The mature stands in the project area are dominated by primarily mountain hemlock, western hemlock and pacific silver fir; with lesser amounts of Douglas-fir and Engelmann spruce. In addition, the lowest elevation of the project area is 4,500 feet in elevation. Red-tree voles are relatively uncommon in the North Cascades Region, with most records of species located at the lower elevations along the Columbia River and the western foothills of the Cascades. The species appears to be uncommon at elevations above 2,500 feet and extremely rare above 4,260 feet in the Cascades. It is believed that red tree voles are rare in high elevation true fir forests because their arboreal nests do not provide adequate insulation against cold winter temperatures. It is also thought that tree voles find it difficult to forage in high elevation forests during winter, when tree branches are frequently covered with snow and ice for extended periods (Forsman 2004).

The project area occurs in high elevation true fir forests ranging in elevation from 4500 to 6000 feet in elevation. This area has long winters with abundant snow packs. It is on the crest of the

Cascades and has habitat more similar to the east side of the Cascades. There has not been a red tree vole documented in this area. For these reasons it is highly unlikely a red tree vole would be nesting in the project area. Surveys were not conducted due to lack of habitat and the fact that no trees large enough for tree vole nesting would be removed.

Townsend's Big-eared Bat

Townsend's Big-eared Bat habitat includes caves, none of which are present in the Timberline SUP area. There is no Townsend's big-eared Bat habitat in the project area.

Fringed Myotis

There is a potential for Fringed Myotis to utilize the project area for foraging. This species would be affected by tree removal that could alter the forest canopy.

California Wolverine

Wolverines have no real habitat preference but instead appear to seek high elevations for denning and solitude. Wolverines are dependent on carrion for a large part of their diet and key in on big game populations rather than on specific habitats. Historic sightings of wolverines both verified and unverified are within a few miles of the project area. Snow Bunny Snow Park had one verified track sighting in 1990. However, current thinking on wolverine distribution is that individual wolverines may invade the Oregon Cascades on occasion but that there is no breeding population this far south (Aubry 2007). It is unlikely but possible that a wolverine would be present in the project area. There have been no sightings on the Forest since 1994.

Recent field surveys in the project area have not been accomplished. The last time broad-based surveys were conducted over the watershed was during the winter of 1993-1994 and 1994-1995. Some survey efforts have been ongoing centered around Mt. Hood but at this point in time there have been no verifiable sightings of wolverine or sign of presence. A group of volunteers led by Cascadia Wild have performed tracking surveys and some remote camera work for the Forest since 2001. No wolverine tracks or photos have been located anywhere on the Mt. Hood NF during that time. There are also no verified sightings in the Oregon Cascades for the last decade. The last verified sighting of a wolverine in the Oregon Cascades was a wolverine killed on Interstate 84 near Hood River in 1994.

No direct surveys were conducted based on a low potential for detecting species occurrence. No observations were made of wolverine or their tracks during field reconnaissance. The lack of sightings of this species is not a reliable indicator or species presence or absence. The home range of wolverines is documented to be in the hundreds of miles. Therefore, any wolverine that is present in the Cascades of Oregon may potentially travel or forage in the project area.

Populations in the Cascade Mountains are small and scattered. Keith Aubrey, Lead Wildlife Biologist for the Pacific Northwest Research Station, has reviewed wolverine records from the Oregon Cascades. Current records (1995–2005) are limited to north-central Washington, northern and central Idaho, western Montana, and northwestern Wyoming (Aubrey 2007).

Wolverines are usually found in high temperate coniferous forests, from mid-elevation (around 4,000 feet) to moderately high elevation (above timberline), depending on the season. Common tree species are subalpine fir and lodgepole pine. They prefer to feed along rivers and streams and in wet meadows. The den is usually in a rock crevice, cave, or beneath a talus slope. Territories may encompass 10 to 80 square miles. Wolverines are believed to prefer areas of minimal people presence and high levels of solitude and seclusion. They are usually associated with wilderness, chiefly because they are so vulnerable to the activities of humans and their association with persistent snow cover.

Cascades Axetail Slug

The Cascades Axetail Slug is now considered a new species. It was originally considered as part of the salamander slug. The species was recently added to R6 Regional Forester's Sensitive Species List. This slug tends to inhabit Douglas fir-western hemlock stands with a vine maple understory. Areas where down wood retains pockets of moisture and where vine maple leaves form a layer to hold moisture is preferred habitat (T. Young 2009). This species was found almost exclusively in semi-saturated to fully saturated Douglas fir-western hemlock needle litter, between the recent year's needle-duff layer and the compacted needle-duff layers of previous years (approximately 2.5 to 5 cm below the needle-duff layer surface) and where the ground cover was almost exclusively free of a moderate shrub vegetation layer or moss (T. Young 2009). In addition, this species was found exclusively with vine maple present at the micro-site. This species was rarely detected in stands where incense-cedar or western red cedar was the dominant tree species. Limited information suggests that the salamander slug uses a fairly wide range of forest age classes, as slugs detected in surveys were found in stands 30 to 150 years old. This species was not detected in stands where Incense-cedar (*Calocedrus decurrens*) or Western Redcedar (*Thuja plicata*) were the dominate species or where the dominate ground cover was moderate shrub vegetation, such as Western Swordfern, Salal and heavy moss layers. In addition, this species was not detected in stands where a heavy moss layer formed as ground cover or where ground cover species, such as salal and western swordfern, would inhibit a substantial needle-duff layer to form (T. Young 2010). Though it has been found at the margins of small streams, this species is not associated with seeps or wetlands, but rather in areas where water can collect or areas that will become saturated as the rainy season develops. This species has been documented on the Sweet Home Ranger District, Detroit and McKenzie Ranger Districts. It also has been detected on BLM lands and on the Mt. Hood National Forest. Suitable habitat exists in the Timberline Bike Park Planning Area. No surveys were done for this species since it was recently added as a sensitive species

Oregon Megomphix

The Oregon Megomphix occurs at low to moderate elevations, below the zone of seasonally persistent snow pack. Megomphix snails are most often found within the mat of decaying vegetation under sword ferns and bigleaf maple trees and near rotten logs. Most occupied sites are on well-shaded slopes and terraces, and many are near streams. Habitat for this species is not present in the Timberline SUP area due to elevation and persistent snowpack.

Terrestrial Mollusks (Puget Oregonian, Columbia Oregonian, Evening Fieldslug and Crater Lake Tightcoil)

These are the mollusk species with ranges that include the Zigzag Ranger District. The Puget Oregonian and Columbia Oregonian are found at low to mid-elevations in old-growth forests. No known sites for the Puget Oregonian or Evening fieldslug are present on the district. However, several known sites exist for the Columbian Oregonian at elevations ranging from 2600 to 3280 feet in elevation. The project area's elevation ranges from 4,800 to 6,000 feet in elevation and is considered too high an elevation to be potential habitat for the Puget Oregonian, Columbia Oregonian, and Evening fieldslug. In addition, there is no habitat for these species in the project area.

The Crater lake tightcoil is a terrestrial mollusk species with ranges that include the Zigzag Ranger District and is found at higher elevations near streams, seeps and wet meadows. Surveys were completed for this species and no specimens were found in the project area

Dalles Sideband

Dalles sideband is found near streams and wetlands to the east of the project area. No habitat for Dalles sideband is present in the project area.

Snags and Down Wood

Within the Timberline Bike Trail project area, it is apparent that there is a wide variation in the amount and size of snags and down wood. Many of the un-managed, small-diameter, montane mixed conifer stands have been affected by insects and disease and currently have moderate to high levels of large and small-diameter conifer snags and down woody debris. Other stands have had hazard tree removal and have lower levels of snags but a high amount of down wood. The mature stands have medium to high levels of large diameter snags and down wood. The ski runs have varying levels of down wood based on the creation of the run. The newest runs that were built as part of the Timberline Express Lift project have a high degree of down wood in various conditions. Some of the wood is small diameter trees and some is slabs and rounds that are fine for mollusks but not high quality for woodpeckers.

The primary and secondary cavity nesting species for the montane mixed conifer stands are: pileated woodpecker, northern flicker, hairy woodpecker, red-breasted nuthatch, black-backed woodpecker, and northern three-toed woodpecker. The 100% biological potential level is 3.7 snags per acre (Austin 1995).

Many species in the Pacific Northwest evolved to use large snags and logs that were historically abundant in the landscape. The loss of snag and log density from managed stands affects biodiversity and potentially could cause a loss of critical function in the landscape such as control of forest insects.

The Timberline Bike Trail project area is located within the habitat type identified in DecAID advisor[5] as the Montane Mixed Conifer Forest. The vegetation conditions are primarily *large trees stands* with mixtures of *open canopy* and *small trees*. Because of the high elevation high amounts of snow, the stands best fit the *large trees* category. DecAID offers several tolerance levels (30%, 50% and 80%) to give managers a range of options (Figure 24).

For large snags in the Zigzag 5th field watershed, the amount of the stands with 0 or 0-2 snags per acre is higher than the reference condition by about 15.5%. That 15.5% reduction in snags is spread across all of the density classes.   Approximately 50 percent of the watershed would meet the 80% tolerance level for American marten. That is an acceptable amount of the watershed compared to the approximately 70% for the reference condition. Especially since snags are only an indicator of denning sites and not an indication of less population potential for martens.

RLK has indicated that they do not intend to remove trees larger than 6 inches for construction of the Proposed Ation. They have also inicated that they do not intend to remove snags unless absolutely necessary. Therefore, there is no indication that snag resources would be impacted to a degree that would cause concern for snag and cavity users.

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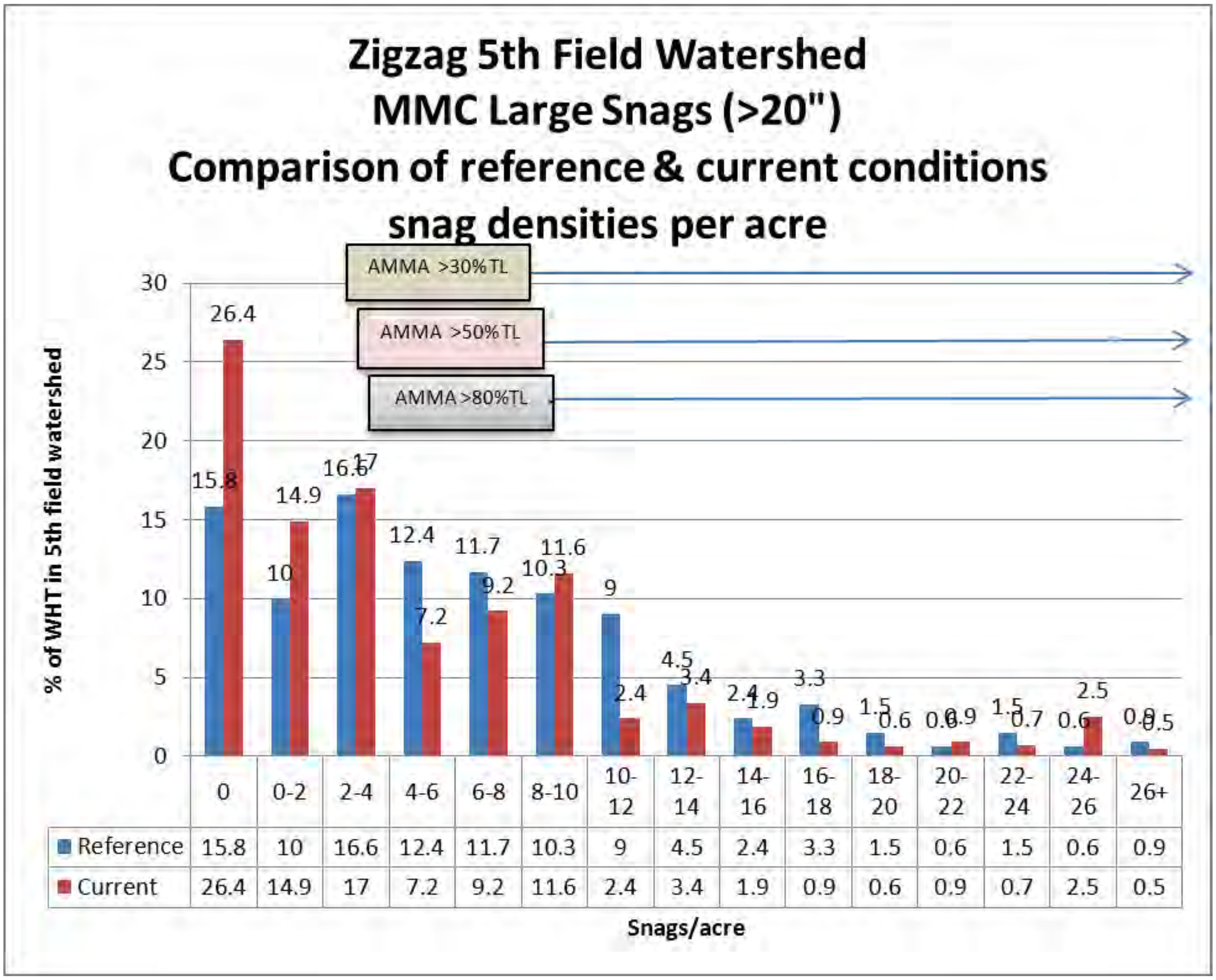
[5] DecAID is a planning tool intended to help advise and guide managers as they conserve and manage snags, partially dead trees and down wood for biodiversity (Mellen 2003). It also can help managers decide on snag and down wood sizes and levels needed to help meet wildlife management objectives. This tool is not a wildlife population simulator nor is it an analysis of wildlife population viability.

Figure 24 – Large Snag Densities on the MHNF



For small snags in the Zigzag watershed, the current condition is 6.1 percent higher for area with 0 to 0-2 snags per acre. That indicates there is about 6 percent less area with snags than the referrence condition would indicate. The chart also indicates that there are some instances of higher than referrence densities in the landscape. This would be good for species such as three-toed woodpeckers that prefer high densities of snags for foraging.

Large log cover analysis shows that the current condition for down wood is higher than the reference condition. This could account for the reason that the snag levels are below reference. Because the Timberline SUP area is not in an area of the Forest where there is any timber harvest, the lack of a higher density of down wood or logs indicates that the snags have merely fallen and become logs. This condition is excellent for woodpecker foraging, small mammals and mollusk habitat. The current condition for down wood is better than the reference condition. This would not change due to this project. There may be some moving of logs and cutting gaps for the trail but there is no anticipation that there would be any removal of downwood. The area would continue to provide above average habitat for species that utilize this resource.

Management Indicator Species

The status and condition of management indicator species are presumed to represent the status and condition of many other species. This EA focuses on the habitat of certain key species and does not specifically address common species except to the extent that they are represented by management indicator species

Deer and Elk

The Forest Plan Standards and Guidelines have minimum requirements for optimal and thermal cover habitat components, but no specific level for forage. During the 1980s and 1990s, wildlife managers considered thermal cover to be important to elk survival and production. Over time, wildlife managers have questioned if elk required thermal cover. Currently, there is not much evidence from the research community in support of the necessity of thermal cover for elk. John Cook indicated at the Elk Modeling Workshop (April 2010) that telemetry data indicated that elk were negatively associated with cover. Cook indicated that openings (early seral habitats) are far more valuable for elk than cover. With the reduction in timber harvest the Mt. Hood National Forest, habitat now far exceeds the standards for optimal and thermal cover but openings are becoming scarce. There are currently 69,226 acres of early seral habitat on the Mt Hood National Forest as indicated by GIS analysis done by Jaimie Bradbury February 28, 2011. The reduction of openings is both intuitive and is evident to any observer on the Forest looking for openings to view elk. As the change in forest management has moved from widespread regeneration harvest to selective thinning, past harvest units have grown a thick stand of young trees that shade out the grasses and forbs used as forage for deer and elk. . This project occurs on 160 acres half of which is early seral habitat, which is only 0.1% of the early seral habitat on the Forest.

Thermal cover is defined as a stand of coniferous trees at least 40 feet tall with an average crown cover of 70 percent or more. Optimal cover is found mainly in multi-storied mature and old-growth stands. Elk herds exhibit a close association with riparian habitat in areas of gentle terrain and low road density. Forage is widely available but is generally of low quality. Cook indicated that inadequate dietary quality during summer and fall may influence populations of free-ranging wild ungulates by reducing fertility of adults, neonatal immunocompetence, juvenile survival and resistance to adverse winter weather and food shortage (Cook et al. 1996). The low quality of the forage, especially in winter range, and the lack of wetlands and permanent low-gradient streams within winter range are considered limiting factors for elk and deer.

The proposed bike trail project areas contain various levels of optimal, thermal, and hiding cover; as well as forage areas. The elk herds residing in the vicinity of the project area during the summer usually spend the winter in lower elevation areas off the Mt. Hood National Forest.

Deer have not been studied intensively on the Forest, but are generally considered to be wider ranging, more tolerant of human disturbance, and less dependent on riparian areas.

Pileated Woodpecker

Pileated woodpeckers use mature and older, closed canopy stands for nesting and roosting, but may use younger (40-70 years), closed-canopy stands for foraging if large snags are available; large snags and decadent trees are critical habitat components for pileated woodpeckers; down logs do not appear to be an important foraging substrate for pileated woodpeckers on the west side of Oregon and Washington (Hartwig et al. 2004, Mellen et al. 1992, Raley and Aubry 2006).

The pileated woodpecker is associated with forest habitats that have large trees, especially large snags (>20 inches diameter) for nesting and foraging. It uses both coniferous and deciduous trees, but tends to be most common in old-growth Douglas-fir forests in western Oregon. They choose foraging habitats that contain high densities of logs and snags, dense canopies, and tall shrub cover. They may forage on small snags but prefer large snags (Schroeder 1982) (Csuti 1997). The pileated woodpecker was chosen as a management indicator species for its association to mature and over mature habitat.

Recent fires on the Forest, cumulative mortality that was documented by the aerial surveys, and creation of snags as compensation for loss from harvest all will assist in getting the Forest closer to the reference condition as we move forward in time. The outlook for cavity nesters and pileated woodpeckers is positive from the data that we have on both the watershed and the Forest level.

There are 405,092 acres of pileated woodpecker habitat on the Mt. Hood National Forest based on GIS query for 80 years and older habitat (Jamie Bradbury, 02/28/2001). By dividing the acres of pileated woodpecker habitat by the average home range with overlap of 970 acres, there are 418 potential home ranges on the Mt Hood National Forest. With an average clutch size of 4 (Marshall, D.B. et al. 2003) it would indicate that the summer population of pileated woodpeckers could be as high as 2508 birds including adults and fledglings on the Mt. Hood National Forest. This project impacts 160 acres of habitat and in a way that has minimal effect on pileated woodpecker habitat.

The current trend for habitat for pileated woodpeckers is an increase in available habitat for the last 10 years.

The project area provides marginal habitat for pileated woodpeckers. Pileated woodpeckers are more likely to be found in the unmanaged stands that have a mature stand structure with abundant snags and down woody debris. The pileated woodpecker prefers stands with a heavy component of Douglas-fir. Although some of the stands have some Douglas-fir, most of them have various other species, such as pacific silver fir, mountain hemlock and lodgepole pine.

Pileated woodpeckers have a high tolerance for human disturbance. Pileated woodpeckers often forage in people's backyards. Although they would flush if approached to closely they continue to use the area. They may however choose not to nest in high traffic areas.

American Marten

The American marten was once known as the pine marten. The older name was used in the Forest Plan and other documents. This species was selected as a management indicator species because of its association with mature and over-mature habitat, and their need for large snags and large amounts of down wood.   Shrinking habitat and trapping pressure led to the concern for marten populations. (USDA 1990a).

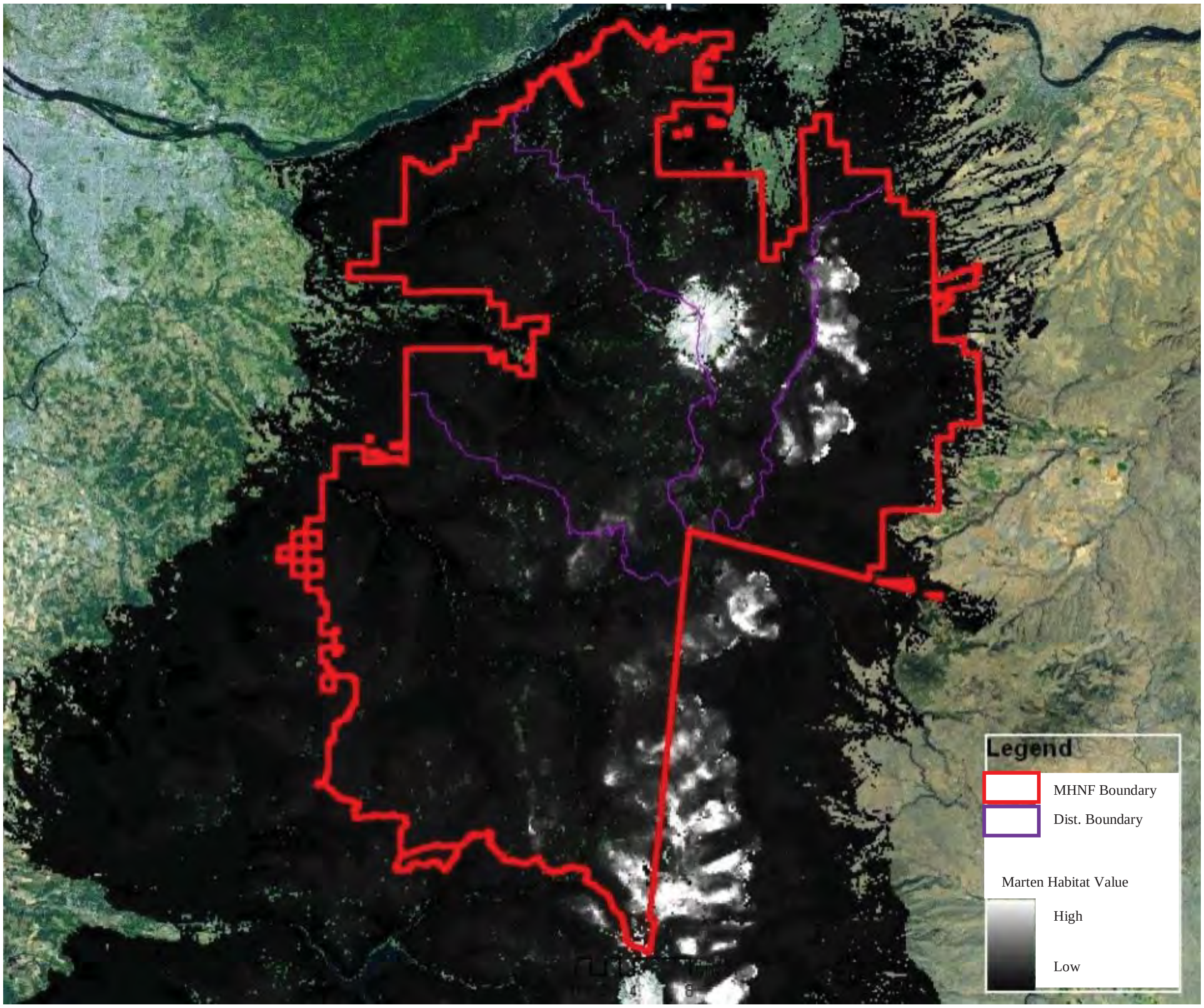
American marten are typically associated with late-seral coniferous forests with closed canopies, large trees, and abundant snags and down woody (Zielinski et al. 2001). On the Forest, martens are closely associated with higher elevation stands. Recent tracking records and remote camera work on the Forest over the past 8 years indicates that this species may not use old-growth habitat on the west side of the Cascades as was previously thought. More research would need to be completed to validate this observation. Based on snow tracking, remote cameras, and observations Martens are typically associated with stands from 3,000 feet to tree line or about 7,500 feet (Alan Dyck, Wildlife Biologist, Personal Observation).

The marten habitat distribution map (Figure 25) was created by Ray Davis (Davis, Ray J. 2008), Umpqua National Forest wildlife biologist, using habitat modeling based on known marten locations. The map below provides a picture of the actual distribution and habitat preference of martens in the Oregon Cascades. The map shows a gradient of habitat from preferred habitat being white to habitat that has less use being in black. Habitat that is depicted in black does not indicate that a marten would never be found there but indicates it is not the preferred habitat and the likelihood of a marten using the habitat is very low.

Using the data from Ray Davis' habitat modeling analysis there are 10,876-21,553 acres of habitat that has a 30-40% or higher probability of supporting American marten on the Forest. The Timberline Mountain Bike Trails Project is between 1.5-2% of the American marten habitat on the Mt. Hood National Forest.

American marten are typically associated with late-seral coniferous forests with closed canopies, large trees, and abundant snags and down woody (Zielinski et al. 2001). Wisdom et al. (2000) list subalpine and montane forests in old multi- and single-story, and unmanaged young multi-story structural stages as providing source habitat for American marten in the Columbia Basin. Lower montane forests are not listed as source habitat. Snags and down logs are identified as special habitat features of source habitat for the marten. Down logs provide habitat for prey and subnivean access points. Down logs and snags provide rest and den sites for marten.

Figure 25 – American Marten Habitat



Martens use a variety of structures for rest and den sites. Resting and denning sites offer protection from predation and thermal stress; thus, availability of quality denning sites likely increases the rates of survival and fecundity in marten (Raphael and Jones 1997).

Raphael and Jones (1997) found that down wood and slash piles were important resting and denning structures in the eastern Cascades of central Oregon. Forests in their study area were dominated by lodgepole pine.

In addition to providing rest and den sites, down wood is an important component of marten habitat because the primary prey of martens is small mammals associated with down wood. These small mammals include voles (*Microtus sp.*) red-backed voles (*Clethrionomys gapperi*), snowshoe hares (*Lepus americanus*) and squirrels in northeast Oregon (Bull and Blumton 1999, Bull 2000). Subnivean (under snow) spaces created by logs provide marten with access to prey during the winter (Bull and Blumton 1999, Buskirk and Ruggiero 1994, Sherburne and Bissonette 1994).

On the MHNF, this habitat is somewhat below the reference condition for both East-side Mixed Conifer habitat (EMC_ECB_L) and for Mixed Montane Conifer Habitat (MMC_L). The habitat is building toward the reference condition through increases in insect, disease and fires. The 30-year cumulative mortality map below shows areas that were mapped by aerial survey over the last year. The density of the dying trees varies greatly. The polygons do not indicate a solid patch of dead tree but instead show a region where dead trees were detected. Ground truthing has shown that the amount of trees that have died on the landscape is underestimated (Keith Sprengel, personal communication, 2011). Indications are that on the east-side of the Cascades there is a three-to-one underestimation of actual versus mapped tree death. The indication is, however, that the landscape is trending toward reference condition.

Migratory Birds

Close to 30 species of migratory birds occur within the project, some of which are likely present within the project area during the breeding season. Some species favor habitat with late-successional characteristics while others favor early-successional habitat with large trees. Some of the species that prefer late-seral habitats are as follows: Hermit/Townsend's warbler complex, pine siskin, hermit thrush, golden-crowned kinglet, Pacific-slope flycatcher, rufous and calliope hummingbirds, olive-sided flycatcher, Hammond's flycatcher, etc. There are no known Important Bird Areas such as nesting, wintering or stop-over areas within the project area.

3.5.2 Direct and Indirect Effects

No Action

Under the No Action Alternative, no mountain bike trails would be constructed or operated, and no restoration projects would be implemented. The effects determination for this project is No Effect to the Northern spotted owl or its habitat from this project. No further analysis for Northern spotted owls is necessary.

Threatened and Endangered Species

There is no spotted owl suitable habitat within the project boundary. With no new mountain bike trails or construction-related activity, there would be no effect on Northern Spotted Owl.

Sensitive and Survey and Manage Species

No new effects to Sensitive and SMS species would occur under the no Action Alternative and habitat conditions would remain as described for the existing condition. No effects to the wolverine would occur if the bike park was not built and restoration projects did not occur. The existing human use of this area would continue to limit opportunities for wolverines to utilize the area. However, the area would continue provide potential habitat for the species for possibly far into the future.

Snags and Down Wood

Under the No Action Alternative, there would continue to be some hazard tree removal for the ski run as under the existing condition. So some reduction in snag levels near the runs would continue.

Management Indicator Species

Deer and Elk

There would be no change in forage utilization since there would be no increase in human presence. Deer and elk would continue to use the area at a moderate density as described for the existing condition.

Pileated Woodpecker

No effects to the pileated woodpecker habitat would occur with the No Action Alternative.

American Marten

American marten would continue to use the Timberline Ski area without disturbance. No changes to the current use patterns would occur.

Migratory Birds

There would be no alteration of habitat for migratory birds under the No Action Alternative.

Proposed Action

General Effects of Mountain Bikes on Wildlife

Mountain bikes can have several adverse effects on a variety of wildlife species. Construction of trails can disturb habitat and remove vegetative structure that could be used for nesting, denning, cover, microhabitat, and forage. But this is a minor effect compared to the effects of disturbance and nesting disruption. One Forest Service publication on the effects of linear routes on wildlife habitat states: "The most common interactions reported in the literature that we reviewed between non-motorized trails and focal wildlife species were displacement and avoidance, which altered habitat use, and disturbance at a specific site during a critical period. The interactions of the focal species and motorized or non-motorized trails were quite similar. Depending on the wildlife species, some were more sensitive to motorized trail use, whereas others were more sensitive to non-motorized trail use. Based on our current understanding, both forms of recreation have effects on wildlife. Motorized trails had a somewhat greater magnitude of effects, such as longer distances in which wildlife were displaced, for a greater number of the focal species we reviewed." (Gaines, William et al. 2003)

Areas that are suitable for mountain biking are often the same areas that wildlife gravitate to because they have more gentle slopes and better soils. This means that some wildlife such as deer and elk may use these same areas as winter range at lower elevations and calving areas at higher elevations. Because the areas preferred by some wildlife species overlaps with areas that would be utilized by mountain bikes, there can be consequences for wildlife productivity. The hypothetical model proposed by Gaines et al (Gaines, William et al. 2003) is that as recreation use increases, wildlife species persistence decreases.

Threatened and Endangered Species

Northern Spotted Owl

There is no spotted owl suitable habitat within the project boundary. Under the Proposed Action, there would be no effects on owl habitat or owls. The effects determination for the Proposed Action is No Effect to the Northern spotted owl or its habitat from this project. No further analysis for northern spotted owls is necessary.

Sensitive and SMS Species

Table 27 summarizes the effects determinations for Sensitive and SMS species from the Biological Evaluation, which is incorporated by reference.

Table 27 - Effects on Sensitive Species and Survey and Manage Species (SMS) with Potential Habitat in the Project Area.

Species	Sensitive	SMS	Suitable Habitat Presence	Effect of Proposed Action
Johnson's Hairstreak	X		Yes	MII-NLFL
Mardon Skipper	X		No	NI
Larch Mountain Salamander	X		No	NI
Cope's Giant Salamander	X		Yes	MII-NLFL
Oregon Spotted Frog	X		No	NI
Great Gray Owl		X	No	NI
Black-backed Woodpecker	X		No	NI
Lewis's Woodpecker	X		No	NI
White-Headed Woodpecker	X		No	NI
Bufflehead	X		No	NI
Harlequin Duck	X		No	NI
Bald Eagle	X		No	NI
American Peregrine Falcon	X		No	NI
Red Tree Vole		X	No	NI
Townsend's Big-eared Bat	X		No	NI
Fringed Myotis	X		Yes	NI
California Wolverine	X		Yes	MII-NLFL
Cascades Axetail Slug	X		Yes	MII-NLFL
Oregon Megomphix (SMS)	X	X	No	NI
Puget Oregonian (SMS)	X	X	No	NI
Columbia Oregonian (SMS)	X	X	No	NI
Evening Fieldslug (SMS)	X	X	No	NI
Dalles Sideband (SMS)	X	X	No	NI
Crater Lake Tightcoil (SMS)	X	X	No	NI

"NI" = No Impact
"MII-NLFL" = May Impact Individuals, but not likely to Cause a Trend to Federal Listing or Loss of Viability to the Species

Effects to the species listed above include changes to habitat as well as potential harm to individuals caused by physical impacts of construction of the trail system and work on the restoration projects.

Johnson's Hairstreak Butterfly

There would be no significant effect to the habitat for this species from the trail construction as no trees greater than 6" dbh would be cut.

Mardon Skiipper

There would be no impact to Mardon's Skipper because no habitat for this species is present in the project area.

Larch Mountain Salamander

No habitat would be adversely affected by the trails or construction that would affect the persistence at the site. Some ground disturbance would take place as part of making these bike trails but the footprint would be narrow and would not affect the persistence at the site if a population appeared above the documented elevation range for this species.

Cope's Giant Salamander

There are no stream crossings that would affect this species if present (PDC WS-1 & 2). No surveys were done for Cope's giant salamander because there were no anticipated impacts from the trails since they stay more than 10 yards from streams or would have hardened crossings to reduce impact.

Oregon Slender Salamander

The bike trail project would add to the habitat for this species by dropping small trees less than 6" dbh. There could be some alteration of the existing down wood to clear for the trail and some individuals could be harmed, but it there would be no effect to the persistence at the site from the proposed treatment. No Oregon slender salamanders were found during mollusk surveys, so there is a small chance that this species is present in the project area. There would be no removal of coarse woody debris. If there are any undetected Oregon slender salamanders, there would be substantial habitat for them following construction of the project.

Oregon Spotted Frog

The Oregon Spotted Frog does not occur in the project area and would therefore not be affected by the Proposed Action.

Great Gray Owl

There are no natural meadows larger than 10 acres in the project area. All of the larger meadows are manmade ski runs. Therefore, no surveys are necessary for great gray Owls. There have been no documented occurrences of great gray owls on the Mt Hood National Forest.

Black-backed Woodpecker / White-headed Woodpecker

With the action alternatives, snags would be removed for a safety to a limited degree. There has already been some hazard tree removal for the ski runs. Some snags would be retained in riparian areas. Within the bike trail project area the snag levels would be within Forest Plan Standards for black-backed woodpecker would be met and there would be an abundance of snags.

Lewis' Woodpecker, Bufflehead, Harlequin Duck, Bald Eagle, American Peregrine Falcon

There would be no impact to these species because habitat is not present in the project area.

Red-Tree Vole

There has not been a red tree vole documented in the project area. For these reasons it is highly unlikely a red tree vole would be nesting in the project area. Surveys were not conducted due to lack of habitat and the fact that no trees large enough for tree vole nesting would be removed as a result of the Proposed Action.

Townsend's Big-eared Bat

There would be no impact to this species because no habitat is present in the project area.

Fringed Myotis

Under the Proposed Action, there would be no substantial impact to the habitat that would alter the use by these bats.

California Wolverine

There is a potential for disturbance and loss of utilization of some of the potential wolverine habitat by implementing the Proposed Action. Increasing human presence in currently unutilized areas would further degrade the habitat for this species if the species, in fact, still exists on the Mt. Hood National Forest.

The restoration of roads, lift areas and decommissioning of roads would have no effect on wolverine habitat. Decommissioning of roads could reduce human use of that part of the project area that may reduce any disturbance of vagrant wolverines that appear in the area.

Cascades Axetail Slug

The wide range of ages for this species indicates that the project may impact individuals of the Cascades axetail slug but will not tend it toward listing.

Oregon Megomphix

There would be no impact to Oregon Megomphix because no habitat for this species is present in the project area.

Terrestrial Mollusks (Puget Oregonian, Columbia Oregonian, Evening Fieldslug, and Crater lake Tightcoil)

The project area's elevation ranges from 4,800 to 6,000 feet in elevation and is considered too high an elevation to be potential habitat for the Puget Oregonian, Columbia Oregonian, Evening Fieldslug and Crater Lake Tightcoil. In addition, there is no habitat for these species in the project area.

Dalles Sideband

There would be no impact to Dalles Sideband because no habitat for this species is present in the project area.

Snags and Down Wood

RLK has indicated that they do not intend to remove trees larger than 6 inches for construction of the Proposed Ation. They have also inicated that they do not intend to remove snags unless absolutely necessary. Therefore, there is no indication that snag resources would be impacted to a degree that would cause concern for snag and cavity users.

Comparing the reference condition to the current condition for small snags in the Zigzag watershed, the current condition is 6.1 percent higher for area with 0 to 0-2 snags per acre. That indicates there are about 6 percent less area with snags than the referrence condition would indicate. The chart also indicates that there are some instances of higher than referrence densities in the landscape. This would be good for species such as three-toed woodpeckers that prefer high densities of snags for foraging. The large log cover analysis shows that the current condition for down wood is higher than the reference condition. This could account for the reason that the snag levels are below reference. Because this area is not in an area of the Forest where there is any timber harvest, the lack of a higher density of down wood or logs indicates that the snags have merely fallen and become logs. This condition is excellent for woodpecker foraging, small mammals and mollusk habitat. The current condition for down wood is better than the reference condition. This would not change due to this project. There may be some moving of logs and cutting gaps for the trail but there is no anticipation that there would be any removal of downwood. The area would continue to provide above average habitat for species that utilize this resource.

The Proposed Action would include very little snag removal. It is not part of the proposal but it is anticipated that some hazard trees would be removed as the need presents itself. The project proponents stated that hazard tree removal is not a large part of this proposal but acknowledge that safety would drive the need to remove snags when necessary. These snags would be left in place and still serve as forage for woodpeckers and down wood for small mammals, mollusk and amphibians. The loss of the snag as habitat for cavity users speeds a natural process where users of down logs would benefit sooner since the down wood would remain on site.

The Proposed Action would not have a great effect on the snag resource. There is a high amount of tree mortality evident in the area from insect and disease and suppression since there is no man made thinning occurring in the project area. The small amount of hazard trees that would be removed as a result of the bike trail construction and maintenance would have a small effect on the resource but the effects would be minor. The DecAid analysis indicates that this watershed is in fairly good shape from a snag and down wood perspective. A high degree of the area is at the 80 percent tolerance level for American marten. The Proposed Action would not affect that relationship.

The current snag and down wood analysis show that the snag levels are, and would continue to be, above the Forest Plan Standard.

The restoration of roads, lift areas and decommissioning of roads would have no effect on snags or down wood. No snags or down wood would be removed.

Management Indicator Species

Deer and Elk

Background information used for effects analysis

Elk herds on the Mt Hood exhibit a close association with riparian habitat in areas of gentle terrain and low road density. A study within the Clackamas River Ranger District from 1987 to 1992 recorded location and habitat type being utilized by radio-collared elk (Fiedler 1994). Seventy percent of all observations on these elk occurred within 100 meters of a stream or wetland. It was also noted that shrub/seedling stage clearcuts received more than twice as much use than they were proportionally available to elk as a habitat type. Also, elk were observed to browse on a wide range of native shrubs, trees, forbs and grasses as well as utilizing non-native grasses (Fiedler 1994). Ski runs mimic the open meadows and wetlands and have similar forage and are utilized by elk in the summer and fall.

The effect of mountain bike trails designed for high levels capacity of users would in effect be much like high traffic roads. Research has shown that high open-road densities lead to harassment of elk herds. Harassed elk move more often than elk left alone and use of habitat decreases as open-road density increases (Witmer 1985). The study mentioned above also reported that elk within or moving through areas of high open-road densities moved longer distances; several miles per day was not uncommon.

In an attempt to understand the comparative effects of different types of use, Taylor & Knight (2003) examined the response of bison (*Bison bison*), mule deer (*Odocoileus hemionus*), and pronghorn antelope (*Antilocapra americana*) to hikers and mountain bikers at Antelope Island State Park, Utah, by comparing alert distance, flight distance, and distance moved. The study did not reveal a significant difference between hikers and mountain bikers with respect to the reaction of any of the three species to their presence. A recent study by Naylor & Wisdom (2009), however, produced contrary results, albeit for a different species. In a controlled experiment, the behavioral changes by 13 female elk (*Cervus elaphus*) were monitored in response to four types of recreational disturbance: all-terrain vehicle riding, mountain biking, hiking, and horseback riding. Compared to control periods when elk spent most of their time feeding and resting, travel time increased in response to all recreational disturbance, but decreasing in the order listed above (i.e. ATV use eliciting the greatest increase in travel time, horseback riding eliciting the least). Both mountain biking and hiking activities were found to significantly reduce resting time for elk.

For this proposal, the following actions have the potential to affect deer and elk (negatively): actions that increase human presence would negatively affect deer and elk populations. Due to the major increase in human use along the proposed trail system during the summer, deer and elk would most likely be displaced from the project area. Unlike some of the studies that state that a small amount of mountain bike traffic was similar to hiking levels the proposed action would substantially increase human presence on a daily basis that would most likely reduce deer and elk use if not eliminate it entirely. Most deer and elk use, if it occurs, would only be nocturnal. There is high-quality forage for these species within the ski runs. So, some use may still occur at night as the animals learn the pattern of use from the mountain bikers. There would be some reduction in forage opportunities at a time when forage is limiting for deer and elk on the Forest.

The proposed action includes heavy human use (estimated at 21,656 per season) within summer range for deer and elk. Elk, and to some degree deer, would shift use away from the project area, and the presence of humans would reduce the amount of time they could forage in the area. Some shift to nocturnal use of the project area might occur to forage when bikers are not using the area. This hypothesis is based on both personal observations and is supported by this statement by Rowland M. et al.(2005) "Shifts in distribution of elk away from roads may occur across a range of temporal and spatial scales. For example, elk at Starkey were generally farther from open roads during daytime, but moved closer to roads during nighttime (Wisdom 1998, Ager et al. 2003)." Naylor L. et al. (2008) states, "Elk may return to areas associated with disturbance within a few hours or days after cessation of human activity (Stehn 1973, Wisdom et al. 2004a)." Night use of the bike park would not be allowed, so the deer and elk would utilize this area during non-operational times. PD WILD-3 (see Table 3 in Chapter 2) was incorporated to reduce impacts to deer and elk by restricting trail use during peak big game forage times at sunrise and sunset. The bike trails travel through the main stand of timber that would be used as hiding cover so animals would have to travel further to access the forage. The stream protection buffers would maintain their forest structure and continue to provide hiding cover to some degree.

Direct and Indirect Effects to Deer and Elk

Under the Proposed Action, the restoration of roads, lift areas and decommissioning of roads would have no effect habitat for deer or elk. No undisturbed habitat would be affected. There could be some disturbance of deer and elk while the restoration projects are being implemented. This would be short term and have a similar effect to the operations and maintenance occurring there now. This would also be similar to the effect of use on the trails following project implementation.

Conclusion

Small negative impact:

There are 69,226 acres of early seral habitat on the Mt. Hood National Forest (GIS query, Jaimie Bradbury, 2/28/2011). Because this project impacts less than 0.1% of forage habitat across the Forest, the overall direct, indirect and cumulative effects would result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) would be insignificant at the scale of the Forest. The Timberline Mountain Bike Trails Project is consistent with the Forest Plan, and thus continued viability of Deer and Elk is expected on the Mt. Hood National Forest.

Pileated Woodpecker

The Proposed Action would have little effect on pileated woodpeckers. The area is marginal habitat for pileated woodpeckers. Higher elevation montane mixed conifer habitat is not the preferred habitat for this species. The impact of human use in the area may shift the areas selected for nesting but would have little overall use of the area by pileated woodpeckers. There is no proposal to remove snags or down wood in the project area. Most snags would be left in place and only a few snags could be removed as danger trees when they pose a threat to a bike trail. These trees would be left on site and would still function as forage habitat.

The restoration of roads, lift areas and decommissioning of roads would have no effect on habitat for pileated woodpeckers. No snags or down wood would be affected. There could be some disturbance of woodpeckers while the restoration projects are being implemented. This would be short term and have a similar effect to the operations and maintenance occurring there now. This would also be similar to the effect of use on the trails following project implementation.

Conclusion

Small negative impact:

Because this project impacts less than 0.001% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects would result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) would be insignificant at the scale of the Forest. The Timberline Mountain Bike Trails Project is consistent with the Forest Plan, and thus continued viability of pileated woodpecker is expected on the Mt. Hood National Forest.

American Marten

The use of the bike trails would have some impact on the use of the area by American marten. The martens may avoid using the area during peak operations. However, American marten have been seen inside Silcox Hut, the Timberline Amphitheater, and in Meadows Ski Area Lodge. They may shy away if approached but they regularly travel through areas where people congregate. They may be attracted to areas of human use where people feed golden mantled ground squirrels since they prey on this species. It is expected that some reduction in use of the area would occur but that they marten would continue to use the area and the bike trails would not be expected to decrease the population of viability of martens in the area but could reduce the use and possibly the number of pairs using the area.

The restoration of roads, lift areas and decommissioning of roads would have no effect on habitat for martens. No undisturbed habitat would be affected. There could be some disturbance of martens while the restoration projects are being implemented. This would be short term and have a similar effect to operations and maintenance occurring there now. This would also be similar to the effect of use on the trails following project implementation.

The current trend for American marten is stable (see Forest-wide analysis for Management Indicator Species). The project would not alter any habitat for the species. The project may cause some disturbance to the species but not at a level that would cause a reduction in population level. This project would not contribute to a negative trend in viability on the Forest for American marten.

Conclusion

Small negative impact:

Because this project impacts less than 1.5-2% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects would result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) would be insignificant at the scale of the Forest. The Timberline Mountain Bike Trails Project is consistent with the Forest Plan, and thus continued viability of American marten is expected on the Mt. Hood National Forest.

Migratory Birds

The proposed action would have little effect on habitat for birds. The greatest impact to birds would be disruption of nesting for ground nesters such as juncos, chipping sparrows, blue and ruffed grouse, and shrub nesting species such as MacGillvary's warbler. The constant traffic of mountain bikes would disrupt nesting of birds within 10 yards of the trail or possibly more. This would reduce nest habitat along the trails. The high elevation at this site would reduce the amount of ground nesting birds utilizing this area due to the large amount of snow that persists into the important part of the nesting season. Due to the high elevation of the project, most birds nesting in the project area nest in trees and shrubs. These birds are more hidden and are less apt to be disturbed by passing bicycles.

Species of Regional importance for the Northern Pacific Rain Forest habitat zone of the Partners in Flight species assessment database that occur in the project area at some point during the year are: Blue grouse, band-tailed pigeon, calliope hummingbird, rufous hummingbird, olive-sided flycatcher, willow flycatcher, hermit warbler, Cooper's hawk, dusky flycatcher, golden-crowned kinglet, purple finch, and red crossbill. There is no habitat disturbance that would affect any of these high priority species. Occasional nest disturbance could occur if nest are built in shrubs or close to the trails. The greatest risk of nest disturbance would be the Cooper's hawks when the potential for them to build their nest before the bikes begin to use the area and then have bikes utilize the area while they are nesting. This would be a rare occurrence but a potential affect of the trails. Other species are not as sensitive to disturbance due to their nest locations high in the canopy or deep inside a shrub.

The most important conservation measure incorporated into the mountain bike park is to reduce habitat removal. Since very few trees or shrubs would be removed for the trail system or restoration projects, the effect to the regionally important bird species is very low and at an acceptable level to meet the intent of the Migratory Bird MOU.

In general, viability of species dependent upon National Forest System lands is considered in determining if a species should be managed as a sensitive species. Current management guidelines are designed to provide for a diversity of habitats. Management direction is not specific to individual bird species, except for those designated as threatened, endangered or sensitive, and management is generally focused on habitats rather than individuals.

The restoration of roads, lift areas and decommissioning of roads would have no effect on habitat for birds. No undisturbed habitat would be affected. There could be some disturbance of land birds while the restoration projects are being implemented. This would be short term and have a similar effect to the operations and maintenance occurring there now. This would also be similar to the effect of use on the trails following project implementation.

3.5.3 Cumulative Effects

Snags and Down Wood

Snags are utilized by species that have medium size home ranges so appropriate size analysis areas using topographic features have been developed to calculate cumulative effects for snags. Approximately one mile would be the action area for snag effects. Table 28 shows past, ongoing and reasonably foreseeable actions that could cumulatively affect snags and down wood when added to the effects of the Proposed Action.

Table 28 - Past, Present and Foreseeable Future Actions – Snags and Down Wood

Project Name	Extent, Size, Type, & Distance	Overlap In Time Or Space	Alteration of snags	Meaning-ful Effect	Rationale For Inclusion Or Exclusion From Analysis
Ski Bowl and Summit Ski Areas and associated ski trails.	Entire ski area	Nearby and within range of woodpecker and marten utilization area	Hazard tree removal and the permanent removal of snags.	Yes	Included due to similar range, scope and effect on woodpeckers and marten
Government camp construction	Throughout woodpecker and marten home range	Yes.	Permanent loss snags and down wood cover	Yes	Include. New buildings in the area reduces snags and down wood cover
Government Camp Land Exchange	Throughout woodpecker and marten home range	Yes.	Loss of snags and down wood cover	Yes	Include. Potential construction in the area would reduce snags and down wood cover
Timberline roads[1]	Throughout Analysis Area	Yes. Roads require maintenance and hazard tree removal on the way to Timberline.	High traffic requires higher than average hazard tree removal.	Yes	Include. Hazard tree removal in the area affects snags.
Mt Hood Hiking trails[1]	Throughout Analysis Area	Yes. Some hazard tree removal reduces snag resources along hiking trails.	Removal for human safety.	Yes	Include. Reduces snag resource to a small degree.
Past – Power Line	Portions of Analysis Area	Yes. Power lines require some snag	A loss of snags in all size classes has	Yes	Include. Some loss to reduce power outages

Project Name	Extent, Size, Type, & Distance	Overlap In Time Or Space	Alteration of snags	Meaning-ful Effect	Rationale For Inclusion Or Exclusion From Analysis
		removal.	occurred.		so snags are removed along the lines.
Jeff Flood Project (Timberline Lift Express EA)	77+ acres of forest removed	Yes. A recent project that has long term effects.	Loss of snags on 77+ acres	Yes	Include. Loss of snags over a large area that would not be allowed to reestablish.
Govt Camp Fuels Reduction	Approx. 100 acres of fuels reduction consulted on in 2005-2006	Yes. A recent project to reduce fuels around Government camp to reduce the effect of wildfire.	Loss of snags on approximately 100 acres	Yes	Include. Loss of snags over a large area that would not be allowed to reestablish.
Ski Area Removal of trees for ski runs	Approx. 103 acres of forest removal since 1952.	Yes. This is forest removal for the ski runs since 1952 to present.	Loss of snags by creating the ski runs and maintaining them as openings.	Yes	Include. Removal of trees for ski runs has removed foraging and nesting areas for cavity users .

The current snag and down wood analysis shows that the snag levels are and would continue to be above the 100 percent biological potential.

Management Indicator Species

Deer and Elk

Analysis areas for deer and elk were established using subwatershed boundaries and the winter/summer boundary. The effects of disturbance to a variety of elk and deer is approximately 0.5 miles so this is the action area for trails and roads for use in determining the extent of the disturbance issues for the bike trails. Table 29 shows past, ongoing and reasonably foreseeable actions that could cumulatively affect deer and elk when added to the effects of the Proposed Action.

Table 29 - Past, Present and Foreseeable Future Actions – Deer and Elk

Project Name	Extent, Size, Type, & Distance	Overlap In Time Or Space	Type Of Potential Effect	Measurable Effect?	Rationale For Inclusion Or Exclusion From Analysis
Ski Bowl summer operations	Entire ski area	Nearby and inside the range of the elk utilization area	Human disturbance	Yes	Included due to similar range, scope and effect on deer and elk
Government camp construction	Throughout Elk Range Analysis Area	Yes.	Permanent loss forage, cover, and increase in human disturbance	Yes	Include. New buildings in the area reduces forage and cover for deer and elk.
Government Camp Land Exchange	Nearby in elk forage and adjacent to other	Yes.	Loss of forage and cover	Yes	Include. Potential construction in the area would reduce

Project Name	Extent, Size, Type, & Distance	Overlap In Time Or Space	Type Of Potential Effect	Measurable Effect?	Rationale For Inclusion Or Exclusion From Analysis
	ski runs.				deer and elk forage and would disrupt use of the area.
Timberline Lodge Visitors	Throughout Analysis Area	Yes. Constant use by vehicles and human disturbance	High quantity of human disturbance	Yes	Include. Constant traffic and people using the upper part of the trail area reduces elk and deer forage opportunities.
Timberline roads[1]	Throughout Analysis Area	Yes. Roads require maintenance and hazard tree removal on the way to Timberline.	High traffic requires higher than average hazard tree removal.	Yes	Include. Hazard tree removal in the area affects snags.
Mt Hood Hiking trails[1]	Throughout Analysis Area	Yes. Constant use during summer and fall utilization times.	High quantity of human disturbance	Yes	Include. Constant use by hikers reduces elk and deer forage opportunities.
Past – Power Line	Portions of Analysis Area	Yes. Power lines require some snag removal.	The area maintained provide continuous forage opportunites.	Yes	Include. Forage that would be permanently maintained and would improve with time.
Jeff Flood Project (Timberline Lift Express EA)	77+ acres of forest removed	Yes. A recent project that has long term effects.	Addition of 77+ acres of forage area	Yes	Include. Increase in the amount of forage that would be permanently maintained and would improve with time.
Govt Camp Fuels Reduction	Approx. 100 acres of fuels reduction consulted on in 2005-2006	Yes. A recent project to reduce fuels around Government camp to reduce the effect of wildfire.	Increase in forage of approximately 100 acres	Yes	Include. Increase in forage near the project area due to opening the canopy.

The tables above describe the different amounts of human disturbance and habitat manipulation occurring within the area that elk from the project area would be affected. Increased use by people and reductions in habitat from construction of buildings would reduce the quantity and quality of forage in the area. It might also cause deer and elk to move more causing an increase in the expenditure of energy. In years with heavy snowfall, this could result in a condition where fewer animals survive the winter. This would vary from year to year.

The current trend for deer and elk is stable (see /Forest-wide analysis for Management Indicator Species). This project would not contribute to a negative trend in viability on the Forest for deer or elk.

Pileated Woodpecker

There would be no appreciable affects to pileated woodpeckers from this proposal. There could be a shift in the actual location of some nest site due to increased human presence but there would be no loss of snag or downwood habitat from this project. Since there are no effects anticipated there should be no cumulative effects for this project.

The current trend for pileated woodpecker is increasing (see Forest-wide analysis for Management Indicator Species). The thinning units do not contain any mature forest. This project would not contribute to a negative trend in viability on the Forest for pileated woodpecker..

American Marten

Table 30 shows past, ongoing and reasonably foreseeable actions that could cumulatively affect American marten when added to the effects of the Proposed Action.

Table 30 - Past, Present and Foreseeable Future Actions – Deer and Elk

Project Name	Extent, Size, Type, & Distance	Overlap In Time Or Space	Type Of Potential Effect	Measurable Effect?	Rationale For Inclusion Or Exclusion From Analysis Below
Ski Bowl summer operations	Entire ski area	Nearby and inside the range of the marten utilization area	Human disturbance	Yes	Included due to similar range, scope and effect on marten
Government camp construction	Throughout Marten Range Analysis Area	Yes.	Permanent loss down wood, cover, and increase in human disturbance	Yes	Include. New buildings in the area reduces snags, down wood and cover for marten.
Government Camp Land Exchange	Nearby in marten snags, down wood and cover and adjacent to other ski runs.	Yes.	Loss of cover and down wood for martens	Yes	Include. Potential construction in the area would reduce snags, down wood and marten cover and would disrupt use of the area.
Timberline Lodge Visitors	Throughout Analysis Area	Yes. Constant use by vehicles and human disturbance	High quantity of human disturbance	Yes	Include. Constant traffic and people using the upper part of the trail area increases marten disturbance.

Project Name	Extent, Size, Type, & Distance	Overlap In Time Or Space	Type Of Potential Effect	Measurable Effect?	Rationale For Inclusion Or Exclusion From Analysis Below
Timberline roads[1]	Throughout Analysis Area	Yes. Roads require maintenance and hazard tree removal on the way to Timberline.	High traffic requires higher than average hazard tree removal. Loss of individuals by vehicle collision.	Yes	Include. Hazard tree removal in the area affects snags.
Mt Hood Hiking trails[1]	Throughout Analysis Area	Yes. Constant use during summer and fall utilization times.	High quantity of human disturbance	Yes	Include. Constant use by hikers increases marten disturbance.
Past – Power Line	Portions of Analysis Area	Yes. Power lines require some snag removal.	Loss of cover and down wood for martens.	Yes	Include. Forage that would be permanently maintained and would improve with time.
Jeff Flood Project (Timberline Lift Express EA)	77+ acres of forest removed	Yes. A recent project that has long term effects.	Loss of cover and down wood for martens	Yes	Include. Decreases the amount of forest cover and down wood.
Govt Camp Fuels Reduction	Approx. 100 acres of fuels reduction consulted on in 2005-2006	Yes. A recent project to reduce fuels around Government camp to reduce the effect of wildfire.	Loss of cover and down wood for martens	Yes	Include. Decreases the amount of forest cover and down wood.

The increase in human presence in the area could reduce the use of the area by martens. Although martens do not totally avoid a area used by people they do try to avoid people to a degree. The increase in use could create a cumulative effect for the other activities in the vicinity resulting in a decrease in total pairs in the project area vicinity.

The current trend for American marten is stable (see Forest-wide analysis for Management Indicator Species). The project would not alter any habitat for the species. The project may cause some disturbance to the species but not at a level that would cause a reduction in population level. This project would not contribute to a negative trend in viability on the Forest for American marten.

3.6 Botany

Field surveys were completed for rare vascular plants, bryophytes, lichens, and fungi on the Regional Forester's Special Status Species list, which includes federally listed threatened and endangered, federally proposed, sensitive, and strategic species. Collectively, these species are referred to as"special status species." ("Strategic" species are not considered sensitive and do not need to be addressed in biological evaluations.) Field surveys were also completed for vascular plants, bryophytes, lichens, and fungi on the ROD 2001 Survey & Manage list, as modified by the 2011 Settlement Agreement. Surveys for Survey & Manage species are required for habitat-disturbing activities in old-growth forest. The majority (roughly ¾) of the proposed project area is old-growth (over 180 years old) mountain hemlock (*Tsuga mertensiana*) forest based on tree ring and stand structure data collected in 2010. "Equivalent-effort" surveys are required for Survey & Manage Category B fungi for all habitat-disturbing projects in old-growth forest. Equivalent-effort surveys are defined as "pre-disturbance surveys for species whose characteristics, such as small size or irregular fruiting, prevent it from being consistently located during site-specific surveys" (p. 75, Standards and Guidelines, 2001 ROD). The protocol for equivalent-effort surveys for Category B fungi is two years of surveys with two surveys each fall and two surveys each spring.

No federally listed threatened or endangered botanical species, or botanical species proposed for federal listing, are *documented* (known) to occur on the MHNF. One federally listed threatened species, water howellia (*Howellia aquatilis*), is *suspected* to occur on the MHNF but has never been found. There are, however, 63 sensitive species *documented* as occurring and another 50 sensitive species *suspected* to occur on the MHNF (43 vascular plants, 36 bryophytes, 8 lichens, and 26 fungi). And there are at least 116 Survey & Manage species known to occur on the MHNF (6 vascular plants, 9 bryophytes, 28 lichens, and 73 fungi).

3.6.1 Affected Environment and Existing Condition

Management proposals are investigated to determine if potential habitat for species may exist within or adjacent to the project area. Sources include the MHNF TES plant database, the Natural Resources Inventory System (NRIS) TES Plants database, species habitat and range information, scientific literature, technical manuals, species fact sheets, plant atlases, herbarium records, topographic maps, aerial photos, and knowledge provided by individuals familiar with the project area. Special status species that are known or suspected to occur on the MHNF and that may have potential habitat in areas open to special forest products use/harvest are displayed in Table 31.

Table 31 – Botanical Species on the Regional Forester's Special Status Species List Documented or Suspected on the MHNF

Species	Common Name	Documented or Suspected	Habitat in Proposed Project Area?
Vacscular Plants			
Agoseris elata	tall agoseris	Documented	No
Arabis sparsiflora var. *atrorubens*	sicklepod rockcress	Documented	No
Astragalus tyghensis	Tygh Valley milkvetch	Documented	No
Botrychium lunaria	common moonwort	Suspected	**Yes**
Botrychium montanum	mountain grape fern	Documented	**Yes**
Calamagrostis breweri	Brewer's reedgrass	Documented	**Yes**
Carex capitata	capitate sedge	Suspected	**Yes**
Carex diandra	lesser panicled sedge	Suspected	**Yes**
Carex lasiocarpa var. *americana*	slender sedge	Documented	No
Carex livida	pale sedge	Documented	No
Carex retrorsa	retrorse sedge	Suspected	**Yes**
Carex vernacula	native sedge	Documented	**Yes**
Castilleja thompsonii	Thompson's paintbrush	Documented	No
Coptis trifolia	three-leaf goldthread	Documented	No
Corydalis aquae-gelidae	coldwater corydalis	Documented	No
Delphinium nuttallii	Nutall's larkspur	Documented	**Yes**
Diphasiastrum (=Lycopodium) complanatum	ground cedar	Documented	**Yes**
Elatine brachysperma	short-seeded waterwort	Suspected	**Yes**
Erigeron howellii	Howell's daisy	Documented	**Yes**
Eucephalus gormanii	Gorman's aster	Documented	**Yes**

Species	Common Name	Documented or Suspected	Habitat in Proposed Project Area?
Fritillaria camschatcensis	black lily	Documented	**Yes**
Howellia aquatilis var *howellia*	howellia	Suspected	No
Lewisia columbiana var. *columbiana*	Columbia lewisia	Suspected	**Yes**
Lomatium watsonii	Wastson's desert parsley	Documented	No
Luzula arcuata ssp. *unalaschcensis*	Alaska curved woodrush	Documented	**Yes**
Lycopodiella inundata	bog clubmoss	Documented	No
Ophioglossum pusillum	adder's-tongue	Documented	**Yes**
Phlox hendersonii	Henderson's phlox	Documented	**Yes**
Pinus albicaulis	whitebark pine	Documented	**Yes**
Potentilla villosa	villous cinquefoil	Documented	**Yes**
Ranunculus triternatus (=R. reconditus)	Dallas Mt. buttercup	Suspected	No
Romanzoffia thompsonii	Thompson's mistmaiden	Suspected	No
Rorippa columbiae	Columbia cress	Suspected	**Yes**
Rotala ramosior	lowland toothcup	Suspected	No
Scheuchzeria palustris var. *americana*	scheuchzeria	Documented	**Yes**
Sisyrinchium sarmentosum	pale blue-eyed grass	Documented	**Yes**
Streptopus streptopoides	kruhsea, small twistedstalk	Documented	**Yes**
Suksdorfia violacea	violet suksdorfia	Documented	No
Sullivantia oregana	Oregon sullivantia	Suspected	No
Tauschia stricklandii	Strickland's tauschia	Documented	**Yes**
Utricularia minor	lesser bladderwort	Documented	No
Utricularia ochroleuca	northern bladderwort	Documented	No
Wolffia borealis	dotted water-meal	Suspected	No

Species	Common Name	Documented or Suspected	Habitat in Proposed Project Area?
Wolffia columbiana	Columbia water-meal	Documented	No
Bryophytes			
Anastrophyllum minutum	tiny notchwort (liverwort)	Documented	**Yes**
Andreaea schofieldiana	broad-leaved lantern moss	Suspected	**Yes**
Anthelia julacea	alpine silverwort (liverwort)	Documented	**Yes**
Barbilophozia lycopodioides	giant fourpoint, maple liverwort	Suspected	No
Blepharostoma arachnoideum	spidery threadwort (liverwort)	Suspected	**Yes**
Brachydontium olympicum	Olympic brachydontium moss	Documented	**Yes**
Bryum calobryoides	beautiful bryum	Suspected	**Yes**
Calypogeia sphagnicola	bog pouchwort	Documented	No
Cephaloziella spinigera	spiny threadwort (liverwort)	Suspected	No
Chiloscyphus gemmiparus	alpine waterwort	Suspected	**Yes**
Conostomum tetragonum	ribbed mountain moss, helmet moss	Documented	**Yes**
Encalypta brevicollis	extinguisher moss	Suspected	No
Encalypta brevipes	candle snuffer moss, stubby extinguisher moss	Suspected	No
Entosthodon fascicularis	banded cord-moss	Suspected	No
Gymnomitrion concinnatum	braided frostwort, pointy whiteworm	Documented	**Yes**
Haplomitrium hookeri	Hooker's flapwort (liverwort)	Suspected	**Yes**
Harpanthus flotovianus	great mountain flapwort (liverwort)	Suspected	No
Helodium blandowii	Blandow/s feather moss	Suspected	No
Herbertus aduncus	common scissorleaf	Suspected	**Yes**
Lophozia gillmanii	Gillman's pawwort (liverwort)	Suspected	No
Lophozia laxa	bog palewort	Suspected	No

Species	Common Name	Documented or Suspected	Habitat in Proposed Project Area?
Marsupella condensata	compact rustwort (liverwort)	Documented	**Yes**
Marsupella emarginata var. *aquatica*	stream ladderwort, robust rustwort	Suspected	No
Marsupella sparsifolia	sharp ladderwort, rounded rustwort	Documented	**Yes**
Nardia japonica	Pacific spikewort, Japanese flapwort	Documented	**Yes**
Polytrichum sphaerothecium	dwarf rock haircap	Documented	**Yes**
Preissia quadrata	blister ribbon, narrow mushroom-headed	Suspected	No
Rhytidium rugosum	crumpled leaf moss, pipecleaner moss	Suspected	**Yes**
Schistidium cinclidodonteum	schistidium moss	Suspected	**Yes**
Schistostega pennata	green goblin moss	Documented	**Yes**
Schofieldia monticola	alpine masterwort (liverwort)	Suspected	**Yes**
Splachnum ampullaceum	purple-vased stink moss, small capsule dung moss	Suspected	No
Tetraphis geniculata	four-tooth bent knee moss	Documented	No
Trematodon asanoi (= *T. boasii*)	Asano's trematodon moss	Suspected	**Yes**
Tritomaria exsectiformis	little brownwort	Suspected	No
Lichens			
Chaenotheca subroscida	lemondrop whiskers (pin lichen)	Suspected	**Yes**
Leptogium burnetiae	jellyskin lichen	Suspected	**Yes**
Leptogium cyanescens	blue jellyskin lichen	Suspected	**Yes**
Lobaria linita	cabbage lungwort	Suspected	**Yes**
Pilophorus nigricaulis	matchstick lichen	Suspected	No
Ramalina pollinaria	chalky ramalina	Suspected	No
Stereocaulon spathuliferum	chalk foam, snow lichen	Suspected	No
Tholurna dissimilis	urn lichen	Documented	**Yes**

Species	Common Name	Documented or Suspected	Habitat in Proposed Project Area?
Fungi			
Albatrellus avellaneus		Documented	No
Alpova alexsmithii		Documented	**Yes**
Bridgeoporus nobilissmus	noble polypore	Documented	**Yes**
Choiromyces venosus		Suspected	**Yes**
Chroogomphus loculatus		Suspected	**Yes**
Cortinarius barlowensis		Documented	No
Cystangium idahoensis		Suspected	**Yes**
Gastroboletus imbellus		Suspected	**Yes**
Gomphus kauffmanii		Documented	**Yes**
Helvella crassitunicata		Documented	**Yes**
Hygrophorus caeruleus		Suspected	**Yes**
Macowanites mollis		Documented	**Yes**
Mythicomyces corneipes		Documented	**Yes**
Octaviania macrospora		Documented	**Yes**
Otidea smithii		Documented	**Yes**
Phaeocollybia californica		Documented	**Yes**
Phaeocollybia oregonensis		Documented	**Yes**
Phaeocollybia pseudofestiva		Documented	No
Pseudorhizina (=Gyromitra) californica		Documented	**Yes**
Ramaria amyloidea		Documented	**Yes**
Ramaria gelatiniaurantia		Documented	**Yes**
Ramaria spinulosa var. *diminutiva*		Suspected	**Yes**

Species	Common Name	Documented or Suspected	Habitat in Proposed Project Area?
Rhizopogon ellipsosporus		Documented	**Yes**
Rhizopogon exiguus		Suspected	**Yes**
Rhizopogon inquinatus		Suspected	**Yes**
Stagnicola perplexa		Documented	**Yes**

In August 2010, following snowmelt in July, the MHNF botanist began surveying the proposed mountain bike trails (marked with pin flags) for rare vascular plants, bryophytes, lichens, and fungi. Rare species include those on the most current Regional Forester's Special Status Species list (Dec. 2011) and those on the ROD 2001 Survey & Manage list (2011 Settlement Agreement Categories). The proposed mountain bike trails meander through open subalpine forest, meadows, old-growth mountain hemlock forest, mature Pacific silver fir forest, ski runs, and chairlift corridors. Surveys are required for Survey & Manage species in old-growth forest (ROD 2001). The survey protocol for fungi calls for two surveys in the fall and two in the spring for two years. Two field surveys were done in the fall of 2010 (September-October), two in August 2011 (spring surveys), and two in the fall of 2011 (September-October) for fungi, and two in the spring of 2012 (June 25 to Aug. 21, 2012). The spring surveys for 2011 could not be done until August because snow persisted in most of the area until late July and, at higher elevations, even into the first week or two of August. Substrates surveyed for fungi included the forest floor, downed branches, large downed logs, and snags.

A minimum of two years of surveys is needed because fungi do not produce mushrooms each year. In fact, fruiting body production is variable and unpredictable from year to year for all fungi (Vogt et al. 1992), so a one-time survey cannot reliably determine a species' presence or absence. Surveys are more likely to detect epigeous (aboveground fruiting) fungi than hypogeous (belowground fruiting) fungi because to find hypogeous fungi (truffles and false truffles) requires removing soil, duff, and litter by digging in the ground or raking the ground. Because of these and other challenges associated with surveys for fungi, surveys for many special-status fungi are considered to be impractical. Presence of a sensitive or Survey & Manage fungus is assumed if there is a documented site or if suitable habitat for a species was found in the proposed project area.

Survey Results

Special Status Species

Howellia aquatilis is the only botanical species suspected to occur on the MHNF that is federally listed as threatened by the USFWS. *H. aquatilis* is generally confined to palustrine wetlands. There are no documented sites for it on the MHNF. There are no federally listed endangered botanical species suspected or known to occur on the MHNF.

No vascular plants, bryophytes, lichens, or fungi on the Regional Forester's Special Status Species list were found. Three former sensitive species (the moss Rhizomnium nudum and the coral fungi Ramaria araiospora and Ramaria aurantiisiccescens) were found. Although no longer on the sensitive list, all three remain Survey & Manage species.

Bridgeoporus nobilissimus is both a sensitive species and a Survey & Manage Category A species. Because *Bridgeoporus nobilissimus* conks (sporocarps) are perennial and, therefore, detectable year-round, surveys for this species are practical and required in areas with suitable habitat for this species. *Bridgeoporus nobilissimus* is known from several sites on the Zigzag Ranger District (Larch Mountain, Wildcat Mountain, the Bull Run watershed), the far west side of the Clackamas River Ranger District (Goat Mountain, South Fork Mountain, and in the vicinity of Memaloose Lake and Williams Lake), and on nearby Salem District BLM-administered lands. There are 12 known sites on the MHNF (NRIS 2010). It is certain that the perennial conk of *B. nobilissimus* is present elsewhere on the Clackamas River and Zigzag Ranger Districts in forests and within road prisms wherever large-diameter noble fir or Pacific silver fir stumps, snags, and live trees are present. This conk is present year-round, growing at the base of large-diameter noble fir or Pacific silver fir stumps, snags, and, occasionally, live trees—and sometimes out of the ground. No *B. nobilissimus* conks were found in the proposed project area during field surveys.

The following twenty-three sensitive fungi have a reasonable likelihood of occurring in the proposed project area. Surveys for these species are not considered practical so they are simply assumed to be present in the proposed project area. A brief discussion is included below for each species. The proposed action may have an impact on individuals or their habitat, but neither the construction of mountain bike trails nor mountain bike traffic along trails are expected to lead to a trend toward federal listing of any of these species of fungi.

1. ***Alpova alexsmithii***, in the false truffle group, forms fruiting bodies beneath the soil surface and is associated with conifer trees in the Pinaceae family, particularly western hemlock and mountain hemlock, from 1,200 to 3,200 meters in elevation. There are only four known sites on the Mt. Hood National Forest (NRIS 2010).

2. Choiromyces venosus, in the true truffle group, forms fruiting bodies beneath the soil surface under Douglas-fir and western hemlock at low elevations. Only two known sites were reported for this species in the Northwest Forest Plan area in 1999 (Castellano et al.). No known sites are documented on the Mt. Hood National Forest (NRIS 2010), but the species is suspected to occur on the Forest.

3. ***Chroogomphus loculatus*** is endemic to Oregon and forms fruiting bodies beneath the soil surface. This species is associated with various conifers in the Pinaceae family, particularly mountain hemlock, at mid-elevations. No known sites are documented on the Mt. Hood National Forest (NRIS 2010), but the species is suspected to occur on the Forest.

4. ***Cystangium idahoensis*** (formerly *Martellia idahoensis*) forms fruiting bodies beneath the soil surface and is associated with the roots of Pacific silver fir, subalpine fir, noble fir, Engelmann spruce, and mountain hemlock from 1,200 to 1,650 meters in elevation. No known sites are documented on the Mt. Hood National Forest (NRIS 2010), but the species is suspected to occur on the Forest.

5. *Gastroboletus imbellus* is endemic to Oregon and only one site was reported for this species (on the Willamette National Forest) in 1999 (Castellano et al.). No known sites are documented on the Mt. Hood National Forest (NRIS 2010), but the species is suspected to occur on the Forest. This species forms fruiting bodies beneath the soil surface and is associated with the roots of grand fir, subalpine fir, and mountain hemlock at higher (5,000 ft. or more) elevations.

6. *Gomphus kauffmanii* is endemic to western North America and found in California, Oregon, and Washington along the Pacific coast or in the Cascade Range. There are six known sites for this mushroom on the Mt. Hood National Forest. Host trees for *G. kauffmanii* include true firs and pines. *G. kauffmanii* forms symbiotic associations with the fine-root systems of plants.

7. *Helvella crassitunicata* is endemic to Oregon and Washington and grows scattered to gregarious on soil, especially along trails, in montane regions with Pacific silver fir, noble fir, grand fir, and subalpine fir. There are only two known sites documented on the Mt. Hood National Forest (NRIS 2010).

8. *Hygrophorus caeruleus* is endemic to Oregon and Washington and occurs in soil with roots of conifer trees near melting snowbanks. The species epithet *caeruleus* refers to the blue-tinged color of the mushroom and its blue-green waxy gills. No known sites are documented on the Mt. Hood National Forest (NRIS 2010), but the species is suspected to occur on the Forest.

9. *Macowanites mollis* is endemic to Oregon and Washington. There is only one known site on the Mt. Hood National Forest (Larch Mountain). This mushroom looks like a disfigured specimen of *Russula* or *Lactarius* and is found in association with the roots of grand fir, Douglas-fir, and western hemlock above 1,000 meters elevation.

10. *Mythicomyces corneipes* is widespread across western North America and northern Europe and was reported on the Mt. Hood National Forest (Castellano et al. 2003); however, no known sites are documented on the Mt. Hood National Forest in the NRIS database (2010). This species is in the Cortinariaceae family, is solitary to gregarious in habit, and grows along margins of bogs among mosses or on wet soil under conifers and alder species.

11. *Octaviania macrospora*, a false truffle, is endemic to Oregon and found in association with the roots of western hemlock. One known site for the entire Northwest Forest Plan area is reported for the Mt. Hood National Forest (Twin Bridges Campground) by Castellano et al. (1999); however, no known sites are documented on the Mt. Hood National Forest in NRIS (2010).

12. *Otidea smithii* is endemic to the Pacific Northwest, known from 10 scattered sites in western Washington, western Oregon, and northern California. It is also known from Idaho. One location is known on the Mt. Hood National Forest (Clackamas River Ranger District). *O. smithii* grows in soil, duff, or moss under Douglas-fir, western hemlock, and cottonwood.

13. *Phaeocollybia californica* is endemic to the Pacific Northwest with 34 sites known from western Washington, western Oregon, and northern California. There is one known site on the Mt. Hood National Forest (Larch Mountain) recorded in NRIS (2010). *P. californica* is terrestrial (mycorrhizal), fasciculate (growing in close bundles) to gregarious (growing in arcs) in habit, and occurs in humic soils of moist coniferous (true fir, hemlock, Douglas-fir) forest and mixed (true fir, Pacific madrone, oak, Douglas-fir, and hemlock) coastal and coastal montane forests.

14. *Phaeocollybia oregonensis* is endemic to the Pacific Northwest with 10 sites known from the Oregon Coast Range and the western Cascade Range. There are five known sites documented on the Mt. Hood National Forest (NRIS 2010). This mushroom species is terrestrial (mycorrhizal), occurring solitary to gregarious, and associated with the roots of true fir, western hemlock, and Douglas-fir.

15. *Phaeocollybia pseudofestiva* is endemic to the Pacific Northwest, known from British Columbia south through western Washington and western Oregon to California. There are 38 known sites in Washington, Oregon, and California. Only two sites are documented on the Mt. Hood National Forest (NRIS 2010). The species is terrestrial (mycorrhizal) and occurs solitary to densely gregarious in coniferous (spruce, fir, hemlock, and Douglas-fir) forest.

16. *Pseudorhizina (=Gyromitra) californica* is found from British Columbia south to northern California and east to Colorado, Montana, and Nevada. It is known in Washington, Oregon, and northern California from 35 sites, one of which is on the Mt. Hood National Forest (Hood River Ranger District). *G. californica* grows on well-rotted stumps and logs of conifers or in soil with rotted wood.

17. *Ramaria amyloidea* is endemic to the Pacific Northwest with 16 sites known from western Washington to northern California. There is one known site on the Mt. Hood National Forest (NRIS 2010). Habitat for the species is soil in coniferous forest.

18. *Ramaria gelatiniaurantia* is endemic to the Pacific Northwest with 24 sites known from western Washington to northern California. Three sites are reported by Castellano et al. (1999) for the Mt. Hood National Forest (Eagle Creek, junction of FSroads 4610 and 150, and Fish Creek Road); however, no known sites are documented in NRIS (2010). Habitat for the species is humus or soil in coniferous (true fir, Douglas-fir, and western hemlock) forest.

19. *Ramaria spinulosa* var. *diminutiva* has not been reported for the Mt. Hood National Forest, but it is suspected to occur here. Castellano et al. (1999) reported a site in Mendocino County (northern California) and a site on the Mt. Baker-Snoqualmie National Forest (Glacier Peak Wilderness). Habitat for the species is humus or soil in coniferous (true fir, Douglas-fir, and western hemlock) forest.

20. *Rhizopogon ellispsosporus* is a false truffle endemic to Oregon with three reported sites: the Bureau of Land Management Medford District, the Siskiyou National Forest, and the Mt. Hood National Forest. The species has been found in association with the roots of *Pseudotsuga menziesii* and scattered *Pinus lambertiana* at 850 m elevation. It fruits in October.

21. *Rhizopogon exiguus*, a false truffle, is endemic to Oregon with known sites from the Mt. Baker-Snoqualmie, Siuslaw, and Siskiyou National Forests. There are no known sites on the Mt. Hood National Forest although the species is suspected to occur here. This species is associated with the roots of Douglas-fir and western hemlock.

22. *Rhizopogon inquinatus*, a false truffle, is found in association with the roots of Douglas-fir and western hemlock from 500 to 1,400 meters elevation. There are no known sites on the Mt. Hood National Forest although the species is suspected to occur on the Forest. Castellano et al. (1999) report two sites on the Willamette National Forest.

23. *Stagnicola perplexa*, in the Cortinariaceae family, grows in groups on rotten wood, occasionally buried deeply enough to appear “rooting” in wet (or recently) dried-up depressions in coniferous forest.

One known site is reported for the Mt. Hood National Forest (middle fork of the Salmon River) by Castellano et al. (2003); however no known sites are listed in NRIS (2010) for the Forest.

Survey & Manage Species

No Survey & Manage vascular plants or lichens were found.

Bryophytes

Populations of the Survey & Manage moss *Rhizomnium nudum* (a Category B species) were found in the proposed project area in the riparian/wetland complex associated with Still Creek and its tributaries adjacent to and above the Jeff Flood chairlift terminal. These populations were found during survey work for the Timberline Express EIS (2005). The botanist did not attempt to refind these populations during surveys for the proposed mountain bike park because the proposed bike trails lie outside the riparian/wetland complex where the populations are located. The botanist did find a population of *R. nudum* along the toe of the streambank for Still Creek about 50 ft. north of an originally proposed mountain bike trail (see Figure 6 in Chapter 2). However, this proposed trail was later removed from the Proposed Action by RLK. Management direction for Category B species is to manage all known sites; so all *R. nudum* sites are required to be protected.

Fungi

Two Survey & Manage Category B fungi, *Ramaria araiospora* and *Ramaria aurantiisiccesens*, were found within proposed mountain bike trails.

Ramaria araiospora is a mycorrhizal coral fungus endemic to the Pacific Northwest with 78 known sites documented on national forest lands in Region 6, two of them on the Mt. Hood National Forest (NRIS TESP database, 2011). Habitat for the species is humus or soil in coniferous forests.

Ramaria aurantiisiccescens is a mycorrhizal coral fungus endemic to the Pacific Northwest with sites known from western Washington to northern California. Only nine known sites are now documented on national forest lands in Region 6, six of them on the Mt. Hood National Forest (NRIS 2010). Habitat for the species is humus or soil in coniferous (true fir, Douglas-fir, and western hemlock) forest.

Management direction for Category B species is to manage all known sites; so all *R. araiospora* and *R. aurantiisiccescens* sites are required to be protected.

3.6.2 Direct and Indirect Effects

No Action

If the proposed project was not implemented, there would be no new direct or indirect effects to vegetation in the project area.

Proposed Action

Vegetation

No forest would be cut down for the proposed mountain bike trails, and trails would be laid out to avoid cutting any trees greater than 6 inches DBH during trail construction. Larger and older trees would not be impacted. As seen from a bird's-eye view, the proposed trails would be comparable to narrow corridors threading their way across the landscape. Direct impacts from trail construction and subsequent mountain bike traffic on vegetation, soils, and soil biota (including mycorrhizal fungi that benefit trees and other plants) would be confined to trails, so long as mountain bike riders remain on designated trails and do not widen them. The following is a discussion of predicted effects to due to the proposed action.

Disturbance to Forested Stands and Meadows

The SUP area proposed for mountain bike trail construction encompasses closed-canopy forest, open forest, and natural as well as artificial openings (e.g., subalpine and montane meadows, ski runs, and chairlift corridors). Trails wind their way downhill through all of these habitats. Trails would degrade all natural habitats to some degree; one issue is effects to natural meadows. Snowpack in the area protects the vegetation in meadows from human impact during the ski season, and they currently receive few human visitors during the summer months. The construction of trails would fragment meadows and mountain bike traffic would trample vegetation along the shoulders of trails, widening them. Riders riding off designated trails or creating shortcuts between designated trails would further impact forest and meadows. Meadows are special habitats that the Forest Service is striving to conserve (Lippert et al. 2010). The construction and recreational use of mountain bike trails in subalpine habitat (meadows and openings) and high montane forest in the proposed project area would add another layer of disturbance to these habitats following on the heels of a network of downhill ski runs (79 acres) cleared in the special-use permit area in 2006-2007. Trail construction and bike traffic would remove subalpine and high montane vegetation.

Alteration of Forest Structure

Removal of snags or hazard trees (leaning trees or those with substantial root or stem decay) that could potentially fall on riders along proposed trails would negatively alter forest structure in the proposed project area if quite a number of them are removed over time. There are many snags along the proposed trail system. Snags are an important forest component, a source of coarse woody debris providing a diverse array of ecosystem/ecological functions (e.g., organic matter input, nutrient cycling, water storage, and habitat for soil biota and wildlife). Construction of ski runs in the special-use permit area has already fragmented formerly contiguous forest into remnant patches. Removal of a large number of snags or hazard trees, over time, would further fragment these already fragmented forest stands.

Damage to Tree Roots

Soils can be compacted and tree roots abraded along trails, leading to increased tree mortality. Armoring of trails with rocks and construction of boardwalks and bridges can help to protect the root systems of trees. Without such protective measures mountain bike traffic would compact soils and root zones (*rhizospheres*) and abrade roots, making trees more susceptible to disease. The routing of some proposed downill mountain bike trail segments through “stringers” (narrow bands of residual forest), particularly in the upper third of the proposed project area, puts the long-term persistence of these stringers at risk. Mountain bike traffic would compact the root zones of these residual trees, damaging their roots and thereby making trees more susceptible to disease (wood decay pathogens), leading to increased tree mortality in these remnant patches of forest. These forest sringers function as important refugia for plants and wildlife, greatly reduce wind fetch (velocity and force) and thereby windthrow, and reduce soil erosion caused by wind.

Risk of Introducing Invasive Non-Native Plants or Plant Pathogens

Mountain bikers can transport invasive non-native plants and seed on their bikes, shoes, or clothes, greatly increasing the risk of introducing invasive plants in the special-use permit area. Presently, there are only a few invasive non-native plant species (bird’s-foot trefoil, oxeye daisy, prostrate knotweed, white clover) in the proposed project area, all in areas that have been disturbed (ski runs, roadsides, trailsides, building perimeters). Populations of bird’s-foot trefoil (*Lotus corniculatus*) and oxeye daisy (*Leucanthemum vulgare*) can be found along the perimeter of Wy’East Lodge. Populations of prostrate knotweed (*Polygonum aviculare*) and white clover (*Trifolium repens*) are scattered among wood strand (wood fiber mulch) in the Timberline Express ski runs, evidently introduced in the wood strand or the seed mix that was applied to these areas in 2007. Nearby Mt. Hood (west of the SUP area) are populations of orange and yellow hawkweed. Orange and yellow hawkweed are ecosystem-altering, invasive species that can overrun meadows. Populations of spotted and diffuse knapweed are scattered along Highway 26 from Welches to the Highway 26/Highway 35 interchange. Highway 35 and areas on the Hood River Ranger District are infested with spotted and diffuse knapweed. Garlic mustard, an ecosystem-altering species capable of overrunning forest understories, is on the increase in the nearby Columbia River Gorge with a recent sighting of the species in the nearby community of Welches. Mountain biking would very likely introduce more invasive non-native plant species into the proposed project area.

Disturbance of vegetation and soils from mountain biking, as with hiking and horse riding, is likely to introduce invasive non-native plants (weeds) although little scientific research exists investigating the potential of mountain biking to introduce and spread invasive plants. Despite a considerable amount of scientific literature documenting the presence of invasive plants along roads and trails, there is a lack of experimental studies assessing the direct and indirect role of hikers, horse riders, and mountain bikers, respectively, in their introduction and spread; further research is required into the potential of mountain bikes, horses, and people to act as vectors for weed seeds and to cause environmental disturbance that favors weeds (Pickering et al. 2010). Mountain bike trails as vectors for the spread of invasive plants have been identified as a concern, but little empirical work is available to draw any conclusions beyond the knowledge that exists for other similar hiking and horse trails (Quinn & Chernoff 2010). That said, however, there is an ample body of scientific literature in the field of weed ecology documenting that invasive plants are able exploiters of disturbed ground and increase at sites that have been disturbed (e.g., Pickering & Mount 2010). It is also well-established that people and animals are weed vectors.

Special Status Species

The federally listed threatened vascular plant *H. aquatilis* is generally confined to palustrine wetlands. There are no documented sites for it on the MHNF. Wetlands are excluded from the proposed project; therefore, the proposed action would have **NO EFFECT** on this threatened species. There are no federally listed endangered botanical species suspected or known to occur on the MHNF.

Table 32 summarizes the effect of the proposed project on sensitive species that are present or have potential habitat in the proposed project area. Individuals or the habitat of some sensitive species may be impacted (MIIH rating). A no effect/impact (NI) rating is given for species whose habitat is not present in the proposed project area. It is assumed there would be no effect on species whose habitats are not present in the proposed project area.

Table 32. Biological Evaluation Summary

	Prefield Review	Field Reconn.	Conflict Determination
Species	Habitat present?	Species present?	Effect
Vascular Plants			
Agoseris elata	No	No	No Impact
Arabis sparsiflora var. *atrorubens*	No	No	No Impact
Astragalus tyghensis	No	No	No Impact
Botrychium lunaria	**Yes**	No	MIIH
Botrychium montanum	**Yes**	No	MIIH
Calamagrostis breweri	**Yes**	No	MIIH
Carex capitata	**Yes**	No	MIIH
Carex diandra	**Yes**	No	MIIH
Carex lasiocarpa var. *americana*	No	No	No Impact
Carex livida	No	No	No Impact
Carex retorsa	**Yes**	No	MIIH

Species	Prefield Review	Field Reconn.	Conflict Determination
	Habitat present?	Species present?	Effect
Carex vernacula	**Yes**	No	MIIH
Castilleja thompsonii	**Yes**	No	MIIH
Coptis trifolia	No	No	No Impact
Corydalis aquae-gelidae	No	No	No Impact
Delphinium nuttallii	**Yes**	No	MIIH
Diphasiastrum complanatum	**Yes**	No	MIIH
Elatine brachysperma	**Yes**	No	MIIH
Erigeron howellii	**Yes**	No	MIIH
Eucephalus (=*Aster*) *gormanii*	**Yes**	No	MIIH
Fritillaria camschatcensis	**Yes**	No	MIIH
Lewisia columbiana var. *columbiana*	**Yes**	No	MIIH
Lomatium watsonii	No	No	No Impact
Luzula arcuata ssp. *unalaschcensis*	Yes	No	MIIH
Lycopodiella inundata	No	No	No Impact
Ophioglossum pusillum	**Yes**	No	MIIH
Phlox hendersonii	**Yes**	No	MIIH
Pinus albicaulis	**Yes**	Yes	MIIH
Potentilla villosa	**Yes**	No	MIIH
Ranunculus triternatus (=R.	No	No	No Impact
Romanzoffia thompsonii	No	No	No Impact
Rorippa columbiae	**Yes**	No	MIIH
Rotala ramosior	No	No	No Impact

Species	Prefield Review Habitat present?	Field Reconn. Species present?	Conflict Determination Effect
Scheuchzeria palustris	**Yes**	No	MIIH
Sisyrinchium sarmentosum	**Yes**	No	MIIH
Streptopus streptopoides	**Yes**	No	MIIH
Sullivantia oregana	No	No	No Impact
Suksdorfia violacea	No	No	No Impact
Taushia stricklandii	**Yes**	No	MIIH
Utricularia minor	No	No	No Impact
Utricularia ochroleuca	No	No	No Impact
Wolfia boralis	No	No	No Impact
Wolfia columbiana	No	No	No Impact
Bryophytes			
Anastrophyllum minutum	**Yes**	No	MIIH
Andreaea schofieldiana	**Yes**	No	MIIH
Anthelia julacea	**Yes**	No	MIIH
Barbilophozia lycopodioides	**Yes**	No	MIIH
Blepharostoma arachnoideum	**Yes**	No	MIIH
Brachydontium olympicum	**Yes**	No	MIIH
Bryum calobryoides	**Yes**	No	MIIH
Calypogeia sphagnicola	**Yes**	No	MIIH
Cephaloziella spinigera	No	No	No Impact
Chiloscyphus gemmiparus	**Yes**	No	MIIH
Conostomum tetragonum	**Yes**	No	MIIH

Species	Prefield Review Habitat present?	Field Reconn. Species present?	Conflict Determination Effect
Encalypta brevicollis	**Yes**	No	MIIH
Entosthodon fascicularis	No	No	No Impact
Gymnomitrion concinnatum	**Yes**	No	MIIH
Haplomitrium hookeri	**Yes**	No	MIIH
Harpanthus flotovianus	**Yes**	No	MIIH
Helodium blandowii	**Yes**	No	MIIH
Herbertus aduncus	**Yes**	No	MIIH
Lophozia gillmanii	No	No	No Impact
Lophozia laxa	No	No	No Impact
Marsupella condensata	**Yes**	No	MIIH
Marsupella emarginata	No	No	No Impact
Marsupella sparsifolia	**Yes**	No	MIIH
Nardia japonica	**Yes**	No	MIIH
Polytrichum sphaerothecium	**Yes**	No	MIIH
Preissia quadrata	No	No	No Impact
Rhytidium rugosum	**Yes**	No	MIIH
Schistidium cinclidodonteum	**Yes**	No	MIIH
Schistostega pennata	**Yes**	No	MIIH
Schofieldia monticola	**Yes**	No	MIIH
Scouleria marginata	**Yes**	No	MIIH
Splachnum ampullaceum	No	No	No Impact
Tetraphis geniculata	**Yes**	No	MIIH

Species	Prefield Review Habitat present?	Field Reconn. Species present?	Conflict Determination Effect
Trematodon asanoi (= T. boasii)	**Yes**	No	MIIH
Tritomaria exsectiformis	No	No	No Impact
Lichens			
Chaenotheca subroscida	**Yes**	No	MIIH
Leptogium burnetiae	**Yes**	No	MIIH
Leptogium cyanescens	**Yes**	No	MIIH
Lobaria linita	**Yes**	No	MIIH
Pilophorus nigricaulis	No	No	No Impact
Ramalina pollinaria	No	No	No Impact
Stereocaulon spathuliferum	No	No	No Impact
Tholurna dissimilis	**Yes**	No	MIIH
Fungi			
Abatrellus avellaneus	No	No	No Impact
Alpova alexsmithii	**Yes**	No	No Impact
Bridgeoporus nobilissmus	**Yes**	Assumed	MIIH
Choiromyces venosus	**Yes**	Assumed	MIIH
Chroogomphus loculatus	**Yes**	Assumed	MIIH
Cortinarius barlowensis	**Yes**	Assumed	MIIH
Cystangium idahoensis	**Yes**	Assumed	MIIH
Gastroboletus imbellus	**Yes**	Assumed	MIIH
Gomphus kauffmanii	**Yes**	Assumed	MIIH
Helvella crassitunicata	**Yes**	Assumed	MIIH

Species	Prefield Review	Field Reconn.	Conflict Determination
	Habitat present?	Species present?	Effect
Hygrophorus caeruleus	**Yes**	Assumed	MIIH
Macowanites mollis	**Yes**	Assumed	MIIH
Mythicomyces corneipes	**Yes**	Assumed	MIIH
Octaviania macrospora	**Yes**	Assumed	MIIH
Otidea smithii	**Yes**	Assumed	MIIH
Phaeocollybia californica	**Yes**	Assumed	MIIH
Phaeocollybia oregonensis	**Yes**	Assumed	MIIH
Phaeocollybia pseudofestiva	**Yes**	Assumed	MIIH
Pseudorhizina (=*Gyromitra*) *californica)*	**Yes**	Assumed	MIIH
Ramaria amyloidea	**Yes**	Assumed	MIIH
Ramaria gelatiniaurantia	**Yes**	Assumed	MIIH
Ramaria spinulosa var. *diminutiva*	**Yes**	Assumed	MIIH
Rhizopogon ellipsosporus	**Yes**	Assumed	MIIH
Rhizopogon exiguus	**Yes**	Assumed	MIIH
Rhizopogon inquinatus	**Yes**	Assumed	MIIH
Stagnicola perplexa	**Yes**	Assumed	MIIH

No Impact = A project or activity will have *no* environmental impacts on habitat, individuals, a population, or a species because the habitats where these species occur are closed to special forest products use/harvest. MIIH = May impact individuals or habitat, but will ***not*** likely contribute to a trend towards federal listing or loss of viability to the population or species.

3.5.6 Cumulative Effects to Vegetation

Viewed in the larger context of both past and future disturbances, a Timberline downhill mountain bike park would add another layer of disturbance to high-montane and subalpine forests and meadows in the SUP area. Past disturbance (construction of ski runs, chairlifts, and service roads, including those recently constructed for the Timberline Express project in 2006-2007) as well as four existing mountain bike trails already in the area have removed vegetation and disturbed soils in the SUP area. A 1952 aerial photo shows roughly 593 acres of forest in the SUP area at that time. Since then, roughly 103 acres of forest have been removed for ski runs, a 17 percent reduction in forest habitat, leaving roughly 490 acres of forest remaining.

Ecologically, the cumulative disturbance to forests and meadows in the SUP area reduces their resiliency to future environmental stresses (e.g., climate change, summer drought, disease, insect attack, invasion by non-native plants). Structural fragmentation of residual forest and trail incursion in meadows lower the environmental quality and health of these habitats and devalue their aesthetic quality for the general visitor. High-montane and subalpine forest and meadows (particularly in the upper half of the proposed project area) grow on shallow, volcanically derived soils low in organic matter and nutrients, which slow tree establishment and growth. Cumulative disturbance (e.g., forest and meadow incursion, forest and meadow fragmentation, soil disturbance, removal of vegetation) adds up over time with successive projects, affecting forest and meadow resilience and affecting the ecosystem services and values they provide.

3.5.7 Climate Change

During the life time of the proposed mountain bike park, climate change effects on the botanical resources, including forests and meadows in the SUP area, are highly uncertain and highly speculative. Nearly all of the future climate scenarios for the Pacific Northwest predicted by climate change models include warmer temperatures and wetter winters (more rain but less snow) with only small changes in absolute summer precipitation, resulting in only a modest net increase in annual precipitation (Mote et al. 2003). An increase in summer precipitation projected by some models is small with no fundamental change to the dry summer months (July-September) that are typical of the Pacific Northwest; nor does the increase ameliorate the increased drying of the soil column caused by higher temperatures (Hamlet & Lettenmaier 1999). Widespread loss of moderate-elevation snowpack and loss of snow over substantial areas at low elevations are projected with a warmer climate (Mote et al. 2003). Winter streamflow increases because there is more winter precipitation and because more of it falls as rain; summer flow decreases because there is less snowpack and because snow melts earlier in the spring (Mote et al. 2003).

Warmer winter and spring temperatures are expected to reduce winter snowpack accumulations, shift the winter snowline to higher elevations, and melt snow earlier in the spring (Mote et al. 2003). Tree establishment and growth at high elevations are limited by typically late snowmelt and short growing seasons (Franklin et al. 1971, Peterson & Peterson 2001). At high-elevation sites, under a warmer climate scenario, earlier snowmelt may promote higher rates of tree seedling establishment in subalpine and alpine meadows and increase subalpine forest productivity by extending the growing season (Peterson 1998, Peterson & Peterson 2001). Because reduced snowpack is favorable for seedling establishment in many subalpine meadows, treelines may expand upward (Franklin et al. 1971, Little et al. 1994). The upper treeline could rise considerably at some sites, with increased dominance of species such as subalpine fir that tolerate lower soil moisture during the summer (Zolbrod & Peterson 1999).

Decadal variations in climate appear to be important because they allow trees to become established in stressful habitats such as subalpine and alpine environments (Mote et al. 2003). Once established, trees are better able to endure these stresses. Warmer summer temperatures may increase evapotranspiration and water stress in plants, which may or may not be offset by higher winter and spring precipitation (Mote et al. 2003). At drier high-elevation sites, the longer growing season may allow summer soil moisture deficits to develop as trees deplete soil moisture earlier (Mote et al. 2003). At lower elevations, reductions in snowpack may decrease the amount of winter precipitation that is stored for soil water recharge in the spring and may increase the severity and duration of summer soil moisture deficits, reducing plant growth and increasing the risk of wildfire (Mote et al. 1999).

Throughout the region, warmer summers without substantially higher summer rainfall may increase summer soil moisture deficits and tree stress, and reduce net photosynthesis, tree growth, and seedling survival for many tree species (Hamlet & Lettenmaier 1999, Mote et al. 2003). Forests rely on deep soil water throughout the summer when surface soils are dry. Increased winter precipitation could increase soil recharge at some sites, but additional winter precipitation may be lost as runoff on forest soils below snowline in the Cascade Range that are already fully recharged by winter rains (Harr 1977, Jones & Grant 2001). Or, with warmer temperatures, forests may begin growing earlier in the spring and benefit from increased soil water availability and reduced evaporative loss during the growing season (Mote et al. 2003). Elevated CO_2 concentration may mitigate productivity losses during the summer drought months by increasing tree water-use efficiency through increased photosynthetic efficiency or reduced stomatal conductance (Bazzaz et al. 1996). McKenzie et al. (2001) found significant increased growth since 1850 in conifers at high-elevation sites and low-elevation, maritime sites in North America. The increase in growth appears to be related not to temperature but, rather, correlated with the rate of atmospheric CO_2 increase (Mote et al. 2003).

The response of forests to climate-driven environmental changes will not only vary spatially across topographic and climatic gradients, but vary temporally with continued annual and decadal climatic variability and vary among species due to their different physiological traits (Mote et al. 2003). The largest effects of future climatic variability or change on Pacific Northwest forests are likely to arise from changes in fire frequency and severity (Mote et al. 2003). Changes in disturbances such as wind, insects, and disease may occur under climate change, although what effects these may entail are not well understood (Mote et al. 2003). Warming may encourage the northward expansion of southern insects, and longer growing seasons may allow more insect generations per season (Mote et al. 2003). Moisture-stressed forests are more susceptible to attack by insects such as bark beetles and spruce budworm, but the timing and magnitude of effects may vary greatly (Thomson et al. 1984, Swetnam & Lynch 1993). Interactions among multiple disturbances (e.g., between insects and fire) will be especially important under projected climate change (Mote et al. 2003). The vulnerability of an ecosystem to climatic variations and change is determined both by its *sensitivity* to climatic variations and by its *adaptability* or resilience (Mote et al. 2003).

In the Timberline SUP area, warmer temperatures are predicted to result in less winter snow but more rain, resulting in more snow-free days, could mean a longer growing season for plants at higher elevations. Forbs and graminoids may respond by moving up in elevation and occupy presently sparsely vegetated or bare subalpine and alpine areas near and above Timberline Lodge. Correspondingly, timberline on Mt. Hood could rise in elevation with tree species like subalpine fir, mountain hemlock, whitebark pine, and Pacific silver fir migrating upward. Whitebark pine is a sensitive species on the Regional Forester's Special Status list that is adapted to cold timberline environments. The rate of climate change (warmer temperatures, earlier snowmelt, more snow-free days, and drier soils) at timberline on Mt. Hood may exceed the ability of whitebark pine to migrate upslope to colder environments, resulting in the extinction of individuals or populations. The upward migration of vegetation in subalpine and alpine environments may be constrained by the young soils on Mt. Hood, which are derived from pyroclastic flows and ash from past volcanic eruptions and, therefore, are low in soil organic matter and nutrients, as well as by low soil moisture during the summer months, offsetting any water surplus in soils resulting from wetter winters. On the other hand, plant species in timberline environments are adapted to nutrient-poor soils and summer drought and may only be negligibly affected by less soil moisture during the summer months. It may take considerable time for plants to pioneer nutrient-poor soils and build up soil organic matter that would then, in turn, facilitate the colonization of other plant species. Nitrogen-fixing plants at timberline, such as broadleaf lupine (*Lupinus latifolius*) and alpine lupine (*Lupinus lepidus*), could readily colonize nutrient-poor soils because they fix their own nitrogen from the atmosphere and are not limited by low nitrogen levels in soils. Rare plants on Mt. Hood such as *Phlox hendersonii* and *Potentilla villosa*, which grow on dry subalpine ridges and scree, presumably would migrate upward in elevation, but eventually could get pushed out by a warmer climate. These high-elevation specialists are adapted to cold environments and can only move upward, not downward, in elevation. Taking advantage of the warmer climate and longer growing season, opportunistic invasive plants (e.g., orange and yellow hawkweed, garlic mustard, knapweeds, Canada thistle, herb Robert, shining geranium, oxeye daisy, Scotch broom, St. John's-wort, tansy ragwort), some of which previously may have been limited from colonizing higher elevations by a colder climate and shorter growing season, may more readily move into the special-use permit area.

A longer growing season (warmer temperatures, earlier snowmelt in the spring, and more snow-free days) may translate into a shorter ski season but a longer mountain biking season with a concomitant increase in mountain bike traffic on the Timberline downhill mountain bike trails. More traffic on trails, resulting in increased use and disturbance, may require more trail maintenance and ecological restoration of disturbed sites.

No rare bryophytes or lichens were found during field surveys along the proposed downhill mountain bike trails; however, two rare coral fungi (*Ramaria araiospora* and *Ramaria aurantiisiccescens*) were found. Climate change may result in the local expansion of fungi, including the two rare *Ramaria* species, on the south flank of Mt. Hood because, as plant species migrate upward in elevation and colonize formerly sparsely vegetated or bare areas, there may be more plants for mycorrhizal fungi to form symbioses with and more plant material (cellulose and/or lignin) and soil organic matter for saprobic fungi to decompose. The Survey & Manage moss *Rhizomnium nudum* was found along streambanks in the riparian/wetland complex associated with Still Creek and its tributaries adjacent to and above the Jeff Flood chairlift terminal; however, *R. nudum* was not found in any proposed downhill mountain bike trails.

3.7 Heritage

The area of potential effect for the heritage resources study includes all proposed bike trails, the skills park, and West Leg Road (Forest Road 2645) between the uppermost and lowermost crossings of the road.

3.7.1 West Leg Road

The historic West Leg Road is a National Register-eligible resource in the project area. The one-lane road originally known as the Timber Line Auto Trail was constructed between 1930 -1931 to provide vehicle access to the recreation areas on the south slope of Mt. Hood. The road has also been referred to as the Timberline Road and the Mt. Hood Hotel Road before the name West Leg Timberline Road was adopted in 1937. The road was first constructed for the use of hikers and mountain climbers, with a public camp near the upper end (McNeil 1990:149). Due to increased visitor use, between 1936 and 1938, the road was widened and extended to the site of Timberline Lodge. In 1934, construction of an east leg road commenced to provide a continuous one-way loop route to and from Timberline. Nelson (2003) provides a summary of the history and significance of the West Leg Road in the Oregon Inventory of Historic Properties Section 106 Documentation Form, filed with the Oregon SHPO in July 2004.

The road has been in use since it opened in 1931, and was completed along its current alignment in 1938. Numerous masonry culverts and catch basins were constructed with local volcanic stone; 46 were recorded between the upper end of the road and about 4,600 ft. elevation in 2003 (Nelson, 2004).

Effects Determination for West Leg Road

The proposed project would not have an adverse effect to the qualities that make the Historic West Leg Road eligible to the NRHP. The project would not alter the physical characteristics of the road or its alignment. Historic culverts would be avoided; no trails would be placed adjacent to culvert locations. Culverts and other historic features of the road would not be damaged by project construction.

There would be a total of six West Leg Road crossings. There would be no new manmade created clearings or openings along the road. The six trail crossings would be placed along naturally occurring openings or those previously created for ski area activities.

3.7.2 Tribal Use Areas

The proposed project may have some impacts to vegetation in the project area and may affect existing plant-gathering uses. Trails would be routed to avoid these resources when possible. If removal is necessary, the establishment of new huckleberry (*Vaccinium* sp.) shrubs would occur outside the bike trails.

Most of the proposed project area lies within previously disturbed sections due to ski run construction and chairlift installation and operations.

Effects Determination for Tribal Use Areas

Archaeological properties are not likely to be adversely affected by the proposed project. The survey conducted for the Timberline Mountain Bike Trail and Skills Park did not reveal any new archaeological properties. A review of ethnographic material did not revealed cultural use areas within the proposed project area.

As always, if any employee of R.L.K. and Company, one of their contractors, or anyone employed by their contractors discovers any prehistoric or historic cultural remains, work within that area must stop and an archaeologist or cultural resource technician from the district must be notified immediately.

3.7.3 Historic Property

Historic Property Description

The proposed project is situated within the vicinity of Timberline Lodge, located at an elevation of 6,000 feet at timberline on the southern slopes of Mt. Hood. Timberline Lodge was constructed by the Works Progress Administration (WPA) for the Forest Service as part of the Depression-era New Deal work-relief programs of President Franklin D. Roosevelt. Construction of the Lodge was completed in 1938.

Timberline Lodge was nominated to the National Register of Historic Places by Warren B. Olney, a Resource Assistant with the Forest Service here at the Zigzag Ranger District. The use for the building at the time was listed as; commercial, educational, entertainment, museum, Resort and a Ski Area Lodge. The lodge was nominated for its areas of significance in agriculture, architecture, and art. Timberline Lodge was listed in the National Register of Historic Places in 1973.

The Lodge is divided into 49 spatial zones and five areas of significance (labeled A thru E) in consideration of their use, design, access, and historic integrity. Each zone was assigned one of five preservation strategies dependent on its historic significance. This zoning provides a framework for the historic treatment, operation, and maintenance of the Lodge.

The Lodge's immediate environs are categorized under zone 46 and significance B under the Historic Building Preservation Plan (HBPP). Significance B has less richness or concentration of historic qualities, and consists of areas that have been altered since the historic period. They reflect areas of the Lodge where projects could be implemented that would restore significant historic and architectural qualities. The strategy is to make every effort to maintain and preserve the historic character and qualities of the space while recognizing that minor alterations may be necessary for the efficient and contemporary use of the Lodge. Opportunities should be recognized and implemented that would restore lost historic character or fabric.

There is no physical boundary of zone 46. It is defined functionally as including the immediate environs of the Lodge that by their physical proximity contribute to the historic character of the Lodge. Specifically the zone includes areas that possess, or have the potential to possess, qualities of historic setting and association. It does not include architectural elements that are attached to the Lodge such as the exterior terraces, the swimming pool, the amphitheater, or the C.S. Price Wing. It does include the designed landscape surrounding the Lodge and the parking area directly in front of the Lodge.

Direct and Indirect Effects

It is necessary to understand the property's historic significance and integrity in order to evaluate the project's effects on Timberline Lodge's eligibility for listing as a National Historic Landmark. Timberline Lodge was nominated to both the National Register of Historic Places and Received National Historic Landmark Status with the designation of three areas of significance: Architecture, Art, and Recreation. The proposed project would have no impact to the architecture of the building, nor would it negatively impact its celebrated art collection.

The proposed Timberline Mountain Bike Project and Skills Park does not represent any direct impact to the historic Lodge through physical alteration to, destruction of, or damage to all or part of the building. This undertaking would not adversely affect the buildings' characteristics that qualify it for inclusion as a National Historic Landmark.

The views from the Lodge are not primary contributing elements from which this resource derives its significance. The Proposed Mountain Bike Trail system and Skills Park would not result in detraction from the overall historic character of the Lodge or potentially eligible properties.

The physical changes to the landscape would not adversely affect the historic resources' location, design, setting, materials, workmanship, feeling, or association (see Section 3.8 - Sense of Place). In fact, no Skills Park features and activities would be visible from the Lodge (see Appendix D). These features are compatible in the sense that they would not detract from the resource's ability to convey the integrity of the property's significant historic features.

Therefore, Timberline Lodge would not be physically altered or damaged in such a manner that would ultimately diminish the integrity of their location, design, setting, materials, workmanship, feeling, and association.

The introduction of new trails and a skills park would introduce new visual elements within the Timberline Permit Ski Area. These visual changes would be subtle and compatible with the historic recreational setting and feeling. They would not visually alter or damage any historic properties in such a manner that would diminish the integrity of their location, design, setting, materials, workmanship, feeling, and association. The nearest trails to the Lodge, other than the egress and ingress to the skills park, would be trails number 4 and 1 (see Figure 6 in Chapter 2). These two bike trails are situated northwest of the Lodge and have no potential to be visible from the Lodge. The geography of the terrain, distance, and forested setting reduce the opportunity for these trails to be visible.

In regards to the historic Lodge, the small scale of the features and associated activity at the Skills Park is negligible in diminishing the existing visual aesthetics from Timberline Lodge, as they are hidden from sight when at the Lodge. These new elements would not adversely affect the historic characteristics of Timberline Lodge. The Trail elements and features proposed would not be detrimental to the setting of the historic Lodge for it would still retain the association between its contributing properties and the recreational surroundings.

The Skills Park is not proposed to be located in an area that would cause audible effects to visitors at the Lodge. If any audible effects could be heard, they would be similar to having skiers congregating by the Day Lodge and Bruno’s Lift in the winter time. Distance, geography, and building location are all effective in diminishing any substantial audible effects to visitors at the Lodge.

Two trails may be visible from Timberline Lodge— the ingress and egress trails to the Skills Park. The nature and small scale of these two trails are within a forested and vegetated setting for the most part, and are not incompatible, out of scale, or in great contrast to the surroundings. The current land use is for recreational purposes and the current project would be consistent with that same land utilization.

The varying combination of geographic locations of trails, topography, vegetation, and other environmental factors decrease the likelihood of this project having physical, visual, and auditory effects on the historic Lodge within normal everyday conditions.

The proposed undertaking would not alter a property that is not consistent with the Secretary of Interior's Standards for treatment of historic properties (36 CFR 68) and applicable guidelines. Furthermore, the undertaking would not remove any property from its historic location, neglect a property resulting in its deterioration or destruction; or result in the transfer, lease, or sale of Timberline Lodge.

The currently proposed project would have no impact to the architecture of the building, nor would it negatively impact its celebrated art collection. The trails and skills park would not introduce adverse visual effects that diminish the property’s integrity, and thus would not negatively affect its historic significance nor its eligibility for listing as a National Historic Landmark.

Effects Determination for Historic Property

In consideration of the Lodge’s immediate environs, Zone 46 significance B strategy, is not clearly delineated on the ground and has no set boundaries. The zone clearly excludes all architectural elements surrounding the Lodge, including the Wy’East Day Lodge, the pool and the C.S. Price Wing, while claiming the surrounding landscape and upper parking lot. Drawing from this description, this project is outside the immediate environs of Zone 46. The Skills Park and associated trails are not in close proximity to the landscaping or upper parking area adjacent to Timberline Lodge due to the combination of geographic location, topography, and the Wy’East Day Lodge. The proposed project would not have an adverse effect on the qualities that made Timberline Lodge eligible to the National Register of Historic Places or its Historic Landmark status. Potential effects are primarily visual and are consistent with the existing developed character of the Lodge environs. The Skills Park would not be visible from Timberline Lodge.

3.7.4 Project Design Criteria

To ensure adequate protection of historic values and to reduce cumulative visual effects of Timberline Ski Area developments during the proposed project, a series of design criteria are included in the environmental assessment (see Table 3 in Chapter 2).

3.7.5 Conclusion

In compliance with Section 106 of the National Historic Preservation Act, the agency has conducted an assessment of adverse effects (36CFR 800.5) and determined that the proposed project would have “No Adverse Effect” to the historic property pending implementation of the proposed design criteria, and is subject to stipulation III.B.12 and III.B.19 of the 2004 Programmatic Agreement.

3.8 Visuals

3.8.1 Background

Visual Management System

The goal of landscape management on all National Forest System Lands (NFSL) is to manage for the highest possible visual quality, commensurate with other appropriate public uses, costs, and benefits. Since the mid-1970s, the Forest Service has operated under the guidance of the Visual Management System (VMS), AH-462, National Forest Landscape Management, Volume 2, Chapter 1, issued April 1974, for inventorying, evaluating, and managing scenic resources on NFSL. The VMS provides a system for measuring the inherent scenic quality of any forest area as well as a measurement of the degree of alteration for use in inventory and management. Visual Quality Objectives (VQOs), as defined within the VMS, are based on the physical characteristics of the land and the sensitivity of the landscape setting as viewed by humans. VQOs define how the landscape will be managed; the level of acceptable changes to the landscape character permitted in the area, and under what circumstances management activities or recreational development may be allowed. Different VQOs may apply to different distance zones. The foreground is defined as being within 0.5 mile of the viewer; middleground is the area between 0.5 and 3 miles from the viewer and the background is the area beyond 3 miles from the observer. Applicable VQOs are based on land allocations established by the Forest LRMP.

Scenery Management System

In 1995 an updated landscape management system, the Scenery Management System (SMS), was introduced by the Forest Service. The SMS was developed to eventually replace the VMS; its principles and premises are based not only on research findings but on over 20 years of experience with implementing the VMS. In October 1996, Landscape Aesthetics: A Handbook for Scenery Management (USDA, 1995) was released to begin the transition to the SMS. This handbook supersedes the VMS. SMS terminology differs from the VMS, and updated research findings are incorporated. Conceptually, the SMS differs from the VMS in that it increases the role of constituents throughout the inventory and planning process and borrows from, and is integrated with, the basic concepts of ecosystem management. The SMS pertains primarily to the social/cultural dimension of ecosystem management, but also has links to the biological and physical. Scenic Integrity Level (SIL) is used to describe the existing state of integrity of a scene.

Full adoption of the SMS is to occur as each National Forest revises its Forest Plan. Direction for scenery management is contained within forest plan goals, objectives, standards, and guidelines. For Forests not currently undergoing the forest plan revision process, or for those requiring extensive time for revision, application of the SMS may occur at the sub-forest or project level. At the time of this EA, the MHNF Forest Plan has not been updated. For this analysis, both the VMS and SMS will be used to describe the existing landscape and evaluate the effects on the landscape. Table 33 provides a comparison of SILs to VQOs.

Table 33 - Comparison of Scenic Integrity Levels to Visual Quality Objectives

Scenic Integrity Level	Visual Quality Objective
Very High	Preservation
High	Retention
Moderate	Partial Retention
Low	Modification
Very Low	Maximum Modification

A description of each SIL/VQO is provided below:

Very High (Similar to VQO of Preservation)

This refers to landscapes where the valued landscape character “is” intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.

High (Similar to VQO of Retention)

This refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat form, line, color, texture and pattern common to the character so completely that they are not evident.

Moderate (Similar to VQO of Partial Retention)

This refers to landscapes where the valued landscape character "appears slightly altered.” Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low (Similar to VQO of Modification)

This refers to landscapes where the valued landscape character "appears moderately altered.” Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, and vegetative type changes outside the landscape being viewed. They should be compatible or complementary to the landscape character.

Very Low (Similar to VQO of Maximum Modification)

This refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the landscape character. They may not be appropriate in shape, edge effect, or patterns. However, deviations must be shaped and blended with landforms so that elements such as unnatural edges or landings do not dominate the composition.

3.8.2 Affected Environment and Existing Condition

The Record of Decision for the Timberline Express (USDA, 2005) amended the Forest Plan to include revised VQO (and therefore SIL):

> I am amending the *1990 Mount Hood National Forest Land and Resource Management Plan* (Forest Plan) to change the Visual Quality Objective (VQO) standard and guidelines (A11-017 and A11-020) from *Partial Retention* to *Modification* in the foreground as viewed from Timberline Trail, Timberline Hwy (Hwy 173), West Leg Road (Rd 2645), Timberline Road, and riparian areas within the Timberline SUP area.
>
> Rationale for amending standard A11-017 and A11-020:
>
> Forest Plan VQO's were developed with a focus on the degree of vegetative alteration of natural landscapes on National Forests. A VQO of partial retention means activities must be visually subordinate to the natural characteristic of the landscape. Ski area developments introduce urban scale facilities into an otherwise natural setting. The nature of ski facilities, particularly the high-tech materials and modern lift towers and terminals are unlikely to appear subordinate to the natural landscape when viewed in the foreground no matter how they are designed or what mitigation measures are employed. Our present Forest Plan standards do not focus on these more urban elements or provide a basis for resolution of design issues for ski facilities.
>
> Forest Plan standards and guidelines are intended to help guide the achievement of management goals and desired future conditions in the Forest Plan. The management goals for this area include downhill skiing and the desired future condition includes ski lodges and chairlifts (Forest Plan, Four-190,191). A VQO of partial retention in the foreground does not help achieve these management goals and theoretically could even preclude facilities such as ski lodges and chairlifts. Therefore Forest Plan Standards A11-017 and A11-020 need to be amended to more accurately reflect the visual characteristics of developed ski areas. In recognition of the unrealistic standard of achieving a VQO of partial retention in the foreground I am amending this standard to a VQO of modification in the foreground as viewed from Timberline Trail, Hwy 173, West Leg Road, Timberline Road, and riparian areas within the timberline SUP areas. A VQO of modification means that man's activity may dominate the character of the landscape but at the same time, utilize the natural established form, line, color and texture. The Timberline Ski Area presently meets a VQO of modification in the foreground and will continue to meet a VQO of modification with the implementation of Alternative 3.

The area surrounding Timberline is dominated by large volcanic features including Mount Hood. Irregular rock forms and outcrops are evident in foreground views of the mountain. Developed conditions consist primarily of Timberline Lodge, skier service buildings, maintenance facilities, and chairlift terminals and towers.

From distant views Timberline appears as a natural feature with slight alterations. Visual deviation from the natural landscape includes the machine groomed Palmer snowfield, chairlift towers and upper/lower terminal buildings and Timberline Lodge. Ski trail clearings are evident but blend well into the surrounding environment as seen from distant views.

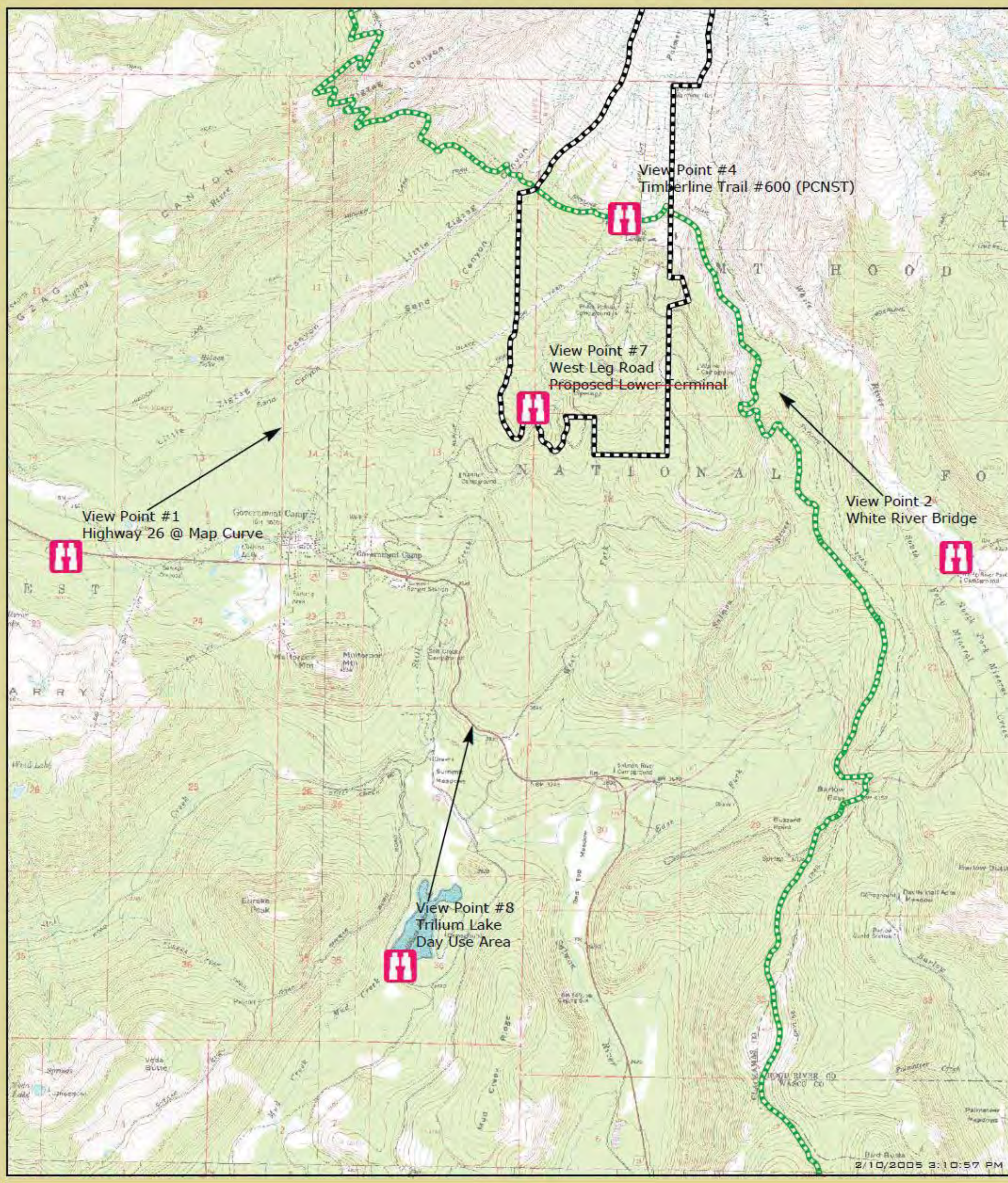
Critical Viewpoints

In order to analyze potential visual impacts associated with proposed mountain bike park on NFSL, eight critical viewpoints have been identified by the USFS interdisciplinary team (refer to Figure 26 – Critical Viewpoints). These viewpoints are intended to represent the most commonly traveled and used viewpoints from which development may affect the scenic quality and integrity of the area.

Visual impacts to Timberline Lodge are analyzed from two viewpoints in this EA – the main entrance and rear patio.

View Point #1 – Highway 26 at Map Curve

Development associated with Timberline is considered part of middle/background views as viewed from Highway 26 at Map Curve (refer to Illustration 1). Lift towers associated with the *Palmer* chairlift and Palmer snowfield are discernible from this vantage point, however facilities are visually subordinate to the dramatic surrounding landscape and are not noticeable to the casual observer. Topography and vegetation screen lower development associated with Timberline from this viewpoint. Existing development at Timberline meets the prescribed VQO of Partial Retention (SIL of Moderate) as viewed from View Point #1.



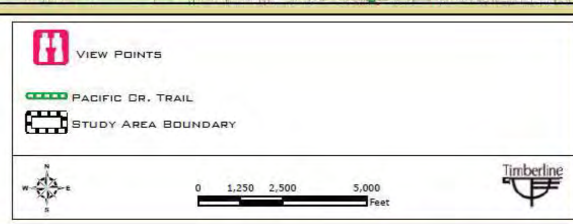


Figure 26
Critical Viewpoints

Illustration 1 - View Point #1 – Highway 26 at Map Curve

View Point #2 – Highway 35 at the White River Bridge

Development associated with Timberline Lodge represents middleground views as viewed from the White River Bridge along Highway 35 (refer to Illustration 2). Ski area facilities observable with the naked eye include the lift line and upper terminal of the *Magic Mile* chairlift, the upper terminal of the *Jeff Flood* Express chairlift, the *Palmer* chairlift and associated terminals as well as the Palmer snowfield. Facilities and structures are visually subordinate to the dramatic surrounding landscape and are not noticeable to the casual observer. Existing development at Timberline meets the prescribed VQO of Partial Retention (SIL of Moderate) for middleground views as viewed from View Point #2.

Illustration 2 - View Point #2 – Highway 35 at the White River Bridge

View Point #3 – Timberline Road at the Entrance to the Lodge and Ski Area

Foreground views along Timberline Road at the entrance to Timberline Lodge and the ski area are dominated by development, including parking lots, Timberline Lodge and ski area facilities (refer to Illustration 3). Development comprising foreground views obscures middleground and background views. Timberline Lodge and the bottom terminal of the *Magic Mile* chairlift incorporate the Cascadian Architecture style and generally follow the color, form and line of the surrounding landscape. The skier service building, upper terminal of the *Pucci* chairlift, and maintenance facility do not incorporate the Cascadian Architecture style. The facilities at Timberline are characteristic of what one may expect to see when traveling to a developed ski area. Facilities in foreground views meet the prescribed VOQ of Modification (SIL of Low).

Illustration 3 - View Point #3 – Timberline Road at the Entrance to the Lodge and Ski Area

View Point #4 – Timberline Trail #600 (aka Pacific Crest National Scenic Trail)

Timberline Trail #600 is a popular trail at Timberline for day-hikers and backpackers. The trail offers background views of the foothills around Mt. Hood and distant mountain peaks including Mt. Jefferson and the Central Oregon Cascade range. Timberline Trail is located upslope of Timberline Lodge. The prescribed VQO for the Timberline Trail within an A-11 allocation is Modification (SIL of Low). Foreground views are dominated by ski area development including Timberline Lodge, the amphitheater, the *Magic Mile and Jeff Flood* chairlifts, and communications and radio tower facility (refer to Illustration 4).

The communications and radio tower facility and, to a lesser degree, the *Jeff Flood* top terminal are obscured by islands of trees and are not as apparent as the *Magic Mile* chairlift and base area facilities, including Timberline Lodge. Timberline Trail traverses beneath the *Magic Mile and Jeff Flood* chairlifts and the facilities at Timberline are characteristic of what one may expect to see when traveling to a developed ski area. Ski lift facilities in near foreground and far distance zones meet the prescribed VQO of Modification (SIL of Low) as viewed from Timberline Trail.

Illustration 4 - View Point #4 – Timberline Trail #600

View Point #5 – Timberline Lodge Front Entrance

Foreground views, as viewed from the entrance of Timberline Lodge are dominated by development, including parking lots and ski area facilities (refer to Illustration 5). The skier ramp leading from the upper terminal of the *Pucci* chairlift and bottom terminal of the *Magic Mile* chairlift are visible from the Lodge. Timberline Lodge and the bottom terminal of the *Magic Mile* chairlift incorporate the Cascadian Architecture style and generally follow the color, form and line of the surrounding landscape. Facilities are located in a manner that does not obstruct the background views of the foothills around Mt. Hood and distant mountain peaks including Mt. Jefferson and the Central Oregon Cascade range. The skier service building does not incorporate the Cascadian Architecture style, but is set low to the ground and is visually subordinate to the surrounding environment. The facilities at Timberline are characteristic of what one may expect to see when traveling to a developed ski area and meet the prescribed VQO of Modification SIL of Low).

Illustration 5 - View Point #5 – Timberline Lodge Front Entrance

View Point #6 – Timberline Lodge Rear Patio

Middle ground views, as viewed from the rear patio of Timberline Lodge are dominated by Mt. Hood's summit (refer to Illustration 3.15-6). The Palmer Snowfield, *Magic Mile* and *Palmer* chairlifts and Silcox Hut are visible to the casual observer. Facilities remain visually subordinate to the surrounding environment of Mt. Hood. The communication and radio facilities, as well as the *Jeff Flood* chairlift are obscured by vegetation and topography. Middleground and foreground views meet or exceed the prescribed VQO of Modification (SIL of Low) as viewed from View Point #6.

Illustration 6 - View Point #6 – Timberline Lodge Rear Patio

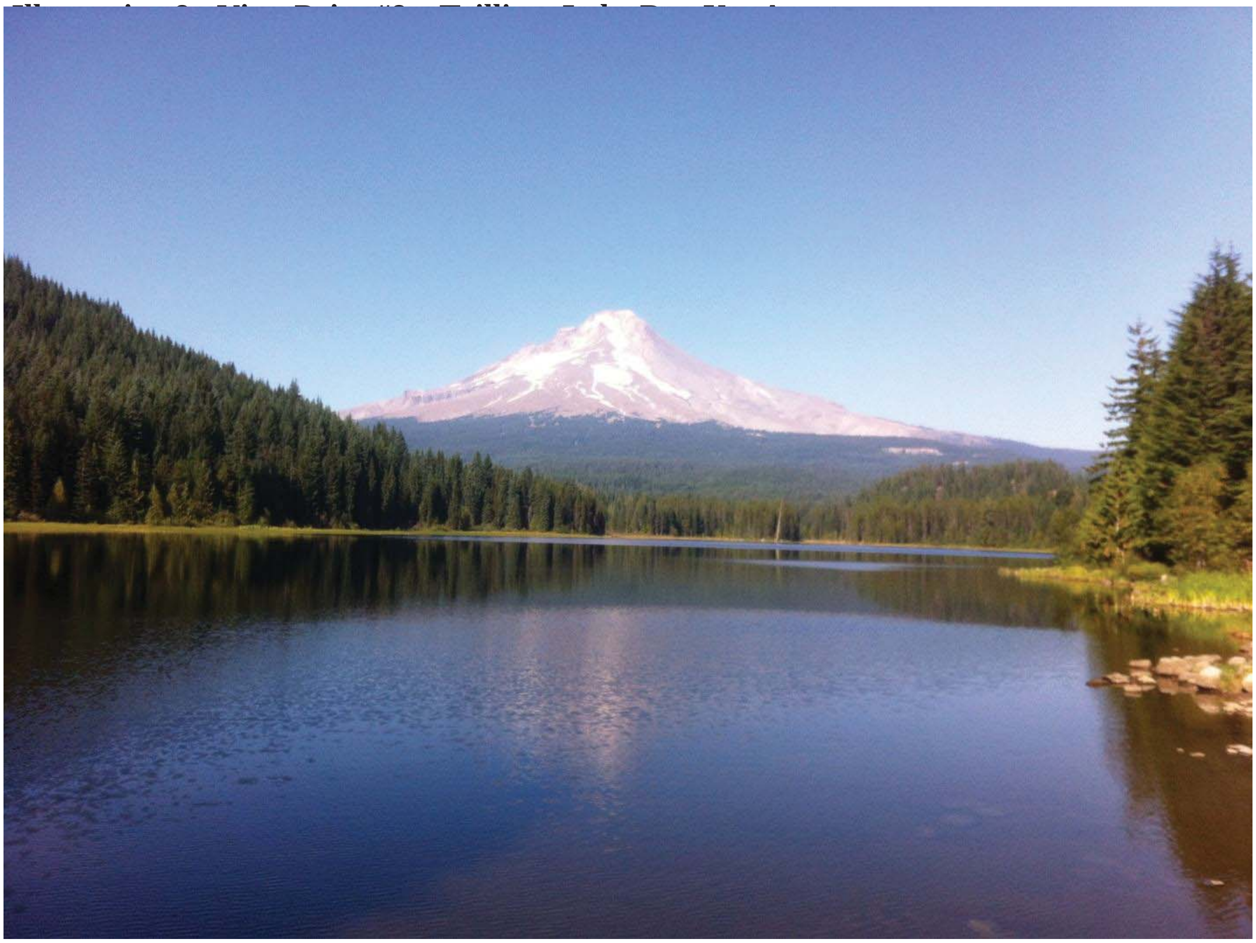
View Point #7 – West Leg Road Adjacent to the Proposed Action Lower Terminal Location

Foreground views are dominated by the presence of the forest, West Leg Road, bottom terminal of the *Jeff Flood Express* lift, and ski trail clearings. As such, existing development near the proposed lower chairlift terminal meets the prescribed VQO of Modification (SIL of Low) for foreground views as viewed from View Point #7.

Illustration 7 - View Point #7 – West Leg Road at the Jeff Flood Express Bottom Terminal

View Point #8 – Trillium Lake Day Use Area

Development associated with Timberline represents middle/background views as viewed from the Trillium Lake Day Use Area (refer to Illustration 3.15-8). Mt. Hood can be viewed in its entirety from this viewpoint. Development associated with Timberline that is discernible with the naked eye from Trillium Lake includes clearing associated with *Alpine Trail*, the *Palmer* chairlift and Palmer Snowfield. Clearings associated with the *Jeff Flood*, *Molly's* and *Pucci* chairlifts appear as natural openings/glades. Clearing for trails below approximate 5,400 feet elevation are not visible due to lower slope gradients and canopy cover, as compared to elevations above 5,400 feet. Development associated with Timberline meets the prescribed VQO of Partial Retention for middle/background views as viewed from View Point #8.



3.8.3 Direct and Indirect Effects

No Action

Under the No Action alternative, visual conditions would remain as described for the Existing Condition.

Proposed Action

The visual effects that would result from the implementation of Proposed Action, as seen from the eight critical viewpoints, is described below and summarized in Table 34.

Table 34 – Visual Effects of the Proposed Action

View point	Location	Existing SIL/VQO	Effect
1	Highway 26 at Map Curve	Moderate/Partial Retention	Scene would continue to meet **Moderate/Partial Retention**
2	Highway 35 at the White River bridge	Moderate/Partial Retention	Scene would continue to meet **Moderate/Partial Retention**
3	Timberline Road at the Entrance to the Lodge and Ski Area	Low/Modification	Scene would continue to meet **Low/Modification**
4	Timberline Trail #600 (Pacific Crest National Scenic Trail)	Low/Modification	Scene would continue to meet **Low/Modification**
5	Timberline Lodge Front Entrance	Low/Modification	Scene would continue to meet **Low/Modification**
6	Timberline Lodge Rear Patio	Low/Modification	Scene would continue to meet **Low/Modification**
7	West Leg Road at Jeff Flood Bottom Terminal	Low/Modification	Scene would continue to meet **Low/Modification**
8	Trillium Lake Day Use Area	Moderate/Partial Retention	Scene would continue to meet **Moderate/Partial Retention**

Changes to scenic quality are generally measured in the degree to which they alter natural form, line, color, or texture. Bike park development and the implementation of restoration projects have the potential to introduce changes to the natural scenic character, including the introduction of new lines (trails crossing the landscape) and openings in the understory for trail construction.

View Point #1 – Highway 26 at Map Curve

Topography and vegetation in the foreground would continue to screen the middle- and background development associated with Timberline, including the bike park and restoration projects. As such, this scene would continue to meet the prescribed SIL of Moderate and VQO of Partial Retention, as viewed from View Point #1.

View Point #2 – Highway 35 at the White River Bridge

Foreground topography and vegetation would continue to screen Timberline, including the bike park and restoration projects. This scene would continue to meet the prescribed SIL of Moderate and VQO of Partial Retention, as viewed from View Point #2.

View Point #3 – Timberline Road at the Entrance to the Lodge and Ski Area

This scene would continue to be dominated by parking lots and Timberline Lodge under the Proposed Action. Topography, vegetation and existing ski area facilities in the foreground would screen bike park facilities and the restoration projects would not be visible from this location. This scene would continue to meet the prescribed SIL of Low and VQO of Modification.

View Point #4 – Timberline Trail #600 (aka Pacific Crest National Scenic Trail)

The proposed bike park trails would emanate from the top terminal of the *Jeff Flood* chairlift and continue either west away from Timberline Lodge or downslope to the south. Several bike trails would be visible from the PCNST and two wooden structures crossing drainages would be visible. The majority of the bike park would not be visible to the PCNST users because the trails would be downhill of the PCNST. The observer would now see the operation of the *Jeff Flood* chairlift in addition to the ongoing, existing operation of the *Magic Mile* chairlift. From this viewpoint and through the existing vegetation, the observer would be able to see mountain bikers exiting the lift and entering the trail system in the middleground. None of the restoration projects would be visible from this viewpoint. This scene would continue to meet the prescribed SIL of Low and VQO of Modification.

View Point #5 – Timberline Lodge Front Entrance

Topography, vegetation and existing ski area facilities would continue to screen the top terminal of the *Jeff Flood* chairlift, and therefore the mountain bikers exiting the chairlift. No bike park trails would be directly visible from this viewpoint, but the movement of bikers on the trails would be discernible through the screening provided by natural vegetation, particularly for riders traversing to the skills park from the top terminal of the lift. Mountain bikers in the vicinity of the lodge, including the skills park, would not be visible from this view point (see also, Appendix D). The restoration projects would not be visible from this viewpoint. This scene would continue to meet the prescribed SIL of Low and VQO of Modification.

View Point #6 – Timberline Lodge Rear Patio

Topography, vegetation and existing ski area facilities in the foreground would continue to screen the top terminal of the *Jeff Flood* chairlift, and mountain bikers off-loading the chairlift as viewed from the rear patio of Timberline Lodge. No bike park trails would be directly visible from this viewpoint, but the movement of bikers on the trails emanating from the top terminal of the lift would be faintly discernible through the screening provided by existing vegetation. None of the restoration projects would be visible from this viewpoint. This scene would continue to meet the SIL of Low and VQO of Modification as viewed from Viewpoint #6.

View Point #7 – West Leg Road at Jeff Flood Bottom Terminal

The mountain bike trails would be faintly visible as openings in the foreground sub-canopy from this viewpoint, but the forest views would continue to be dominated by the presence of trees, ski trails, and the chairlift itself. No restoration projects would be visible form this viewpoint. This scene would meet the prescribed SIL of Low and VQO of Modification.

View Point #8 – Trillium Lake Day Use Area

Development associated with the mountain bike park would occur in middle/background views as viewed from the Trillium Lake Day Use Area. Because the bike park trails would be developed with no removal of trees greater than 6” dbh (Table 3, Veg-1), the bike park would not be discernible. Development associated with the bike park would meet the prescribed SIL of Moderate and VQO of Partial Retention for middle/background views under the Proposed Action.

Cumulative Effects

The urbanized development associated with the Village of Government Camp and the development of the Timberline Lodge Ski Area have contributed to the overall reduction in visual quality in the vicinity of Timberline. No other known ongoing or foreseeable projects would further contribute to the degradation of visual quality in the vicinity of Timberline to levels below the VQOs, as amended.

3.9 Sense of Place

The purpose of this section is to describe the social values and range of variation in sense of place, or place meanings, associated with the proposed Timberline Mountain Bike Park. It also examines if and how the proposed project would affect the social values and sense of place associated with the project site. This sense of place analysis complements the Heritage, Recreation, Social and Economics, and Visual analyses included in the environmental assessment.

The characteristics of sense of place have the following consequences for forest planning and management.

- The multi-faceted and dynamic nature of sense of place means that management decisions potentially can simultaneously have negative, positive, and neutral impacts on the sense of place that individuals or groups associate with the site.
- Sense of place is bound up with emotions and meaning. Therefore any decision to move forward with a management action that affects sense of place is inherently a decision about values rather than facts. Whose values should prevail when irreconcilable value conflicts occur is a matter of law and public policy.
- Sense of place is about individual and cultural meanings, which are difficult to identify and measure. Consequently, qualitative research methods, which are designed for eliciting and understanding meanings, are typically most appropriate for studying sense of place.

3.9.1 Dominant Place Meanings for Timberline Today

The terms “crown jewel” and “iconic” are frequently used to describe Timberline Lodge and its surroundings. The Oxford English Dictionary Online (2011) defines an icon as “a person or thing regarded as a representative symbol of something.” Indeed, a review of the literature on Timberline Lodge, as well as key informant interviews, indicates that general agreement exists that Timberline is a very special place and is imbued with symbolic meaning for many people. However, views about why it is special and what it symbolizes vary from person to person.

Nonetheless, three dominant, somewhat overlapping but also partially conflicting place meanings stand out. Holders of these three dominant place meanings all strongly value the historic and cultural significance of Timberline Lodge and its surroundings, and they all share a “preservation through use” perspective. However, the uses they deem acceptable as part of a preservation strategy reflect the different sense of place members of each group attach to Timberline.

One set of place meanings reflects a very conservative “preservation through use” stance that views the site primarily as a park and history museum and advocates limiting its use to the types of activities taking place at the time of Timberline Lodge’s construction. This view is most clearly and vocally articulated by an alliance of local and regional environmental and outdoor recreation groups.

A second set of place meanings reflects a very dynamic “preservation through use” stance that sees Timberline as a unique work of architecture and a historically and culturally significant site that is also a bustling year-round tourist resort. Holders of this view emphasize the importance of developing new uses and infrastructure that are in sync with societal trends and developments in the sport tourism industry so as to enhance the long-term economic stability of the resort. This view is most strongly articulated by the lodge operator, a summer camp operator, and a representative of a regional mountain biking group, as well as in writings about the evolution of Timberline as a four-season ski resort (see for example, Arthur 1998, Tullis 2007).

The third set of place meanings is associated with a more cautious but still dynamic “preservation through use” stance that foregrounds the restoration and maintenance of the Lodge but welcomes the development of new tourism activities and infrastructure, provided that the new activities either contribute toward or do not undermine the structural integrity of the Lodge itself or its role as a showcase of American craftsmanship from the Depression era. This view is best articulated by the Friends of Timberline, a non-profit organization actively involved in the Lodge’s restoration and maintenance since the 1950s, and a professional historic preservation specialist. It is also a view that is articulated in articles on the architecture and symbolic meaning of Timberline (see for example, Creese 1985, O’Donnell 2007).

Based on these three descriptions of Sense of Place, effects are analyzed to the following three place meanings:

- Timberline as a Park and Museum
- Timberline as a Dynamic Year-Round Resort
- Timberline as a Dynamic Work of Art Rooted in History

3.9.2 Direct and Indirect Effects

No Action

Timberline as a Park and Museum

Under the No Action Alternative, Timberline resort would continue its operations as they are currently occurring. Provided that the resort remains financially viable at current levels and kinds of uses, the no-action alternative would not affect sense of place for those who see Timberline primarily as a park and history museum.

Timberline as a Dynamic Year-Round Resort

Under the No Action Alternative, Timberline resort would not develop a lift-assisted mountain bike facility. The impact of the No-Action Alternative on stakeholders who fall into the "Timberline as a dynamic year-round resort" sense of place category would likely be neutral. For the resort owners, the no-action alternative would decrease their ability to generate revenues in the shoulder season when visitation rates are low; depending on their bottom line, this lack of revenue could hinder the resort's ability to innovate and prosper. For summer camp operators, lack of a lift-assisted mountain bike facility would limit their ability to diversify their skills training programs for youths and adults. For mountain bikers, the No-Action Alternative would require riders based in the Portland area to drive much longer distances to reach comparable facilities (for example, Stevens Pass, Whistler, and potentially in the near future, Mount Bachelor) as the lift-assisted bike trails at Ski Bowl do not accommodate beginner or intermediate riders (MHNF 2011).

Timberline as a Dynamic Work of Art Rooted in History

Under the No Action Alternative, Timberline resort would not develop a lift-assisted mountain bike facility. The impact of the No-Action Alternative on stakeholders who fall into the "Timberline as a dynamic work of art rooted in history" sense of place category would likely be neutral. Under the No-Action Alternative, the resort owners' ability to generate revenues in the shoulder season would remain limited, as would its ability to fund restoration and maintenance on the Lodge

Proposed Action

Timberline as a Park and Museum

For those who see Timberline primarily as a park and museum, to be preserved in its current state (or restored to an earlier state), the construction and operation of a lift-assisted mountain bike park would likely have a negative impact on their sense of place. Their concerns fall into two categories: concerns about how the direct impacts of bike park construction and operation on sense of place and concerns about the potential for the bike park to generate pressure to build other tourist attractions and infrastructure in the vicinity, and thereby modifying sense of place through cumulative effects of development. The first type of concerns is covered in this section; the second is examined in Section 5, Cumulative Effects.

A mountain bike park would affect the physical environment by carving trails into a now-forested landscape and attracting more people into a part of the special use area that presently is relatively quiet during the summer and fall months. The resort operator has developed a trail design that would minimize the visibility of the trail from the Lodge grounds (MHNF 2011). However, the bike trails would still be visible from trails above the Lodge and also from along the trails and the West Leg road that pass through the proposed bike area. Although trail users already are used to seeing skiers on lifts and visitors at the lodge during all seasons, some trail users—and particularly those who choose to avoid the summer crowds by hiking in the fall— are unlikely to experience the addition of another set of users as neutral or an improvement. No baseline social values data exist for the proposed mountain bike park area to assess how many or what specific types of trail or road users would be affected.

The proposed project would also encourage an activity—mountain biking—that did not occur at the site when the Lodge was constructed. Lift-assisted mountain biking would take place partly during a time of the year when the Lodge has relatively few visitors (Kruse 2011), which could lead to a feeling of the area in and around the Lodge being more crowded. Although the park design channels bike park users and bike-related activities toward the day lodge (Kruse 2011), inevitably a percentage of the bikers would wish to visit the main Lodge and its immediate surroundings. The anticipated increase in visitors linked to the presence of the bike park (estimated at 6,000 per year in Year 1 and increasing to 21,656 by Year 6) is a small percentage of the Lodge's 2 million visitors (MHNF 2011). In the summer, many of the bike park users are likely to be participants in the existing summer snowboarding and ski camps, with lift-assisted biking added as a late morning and afternoon activity. During the summer camp season, which coincides with the height of the summer tourist season, the addition of bike park users would likely increase the density of people in the day lodge area during the late morning and afternoons. However, the area is already very active at that time, and the overall impact is unlikely to be great. The additional visitors in the post-Labor Day shoulder season, when the summer camps have shut down and daily tourist visitation rates are at their lowest, would likely be more noticeable.

The Lodge experience could also be negatively affected for people who emphasize its museum qualities if the new users are noticeably louder or more boisterous than present visitors. Fears about mountain bikers changing the social dynamic of the resort are similar to those expressed by skiers during the 1980s when snowboarding was first introduced. Demographic studies of mountain bikers in other areas suggest that they are primarily younger men. For example, Needham et al. (2004) found that 80% of the lift-assisted bike park users at Whistler were males, with an average age of 25.8 years. However, the proposed Timberline mountain bike park differs from Whistler in that it has been designed to emphasize beginning and intermediate skill-level trails. This design is intended to make the park more attractive to family groups and a broader range of age groups that would be analogous in composition to the resort's current winter recreation user population.

Persons whose sense of place falls into the "Timberline as park or museum" category also have expressed concern about potential noise from PA systems and crowding from spectators and participants in bike events should the resort operator decide to sponsor large-scale bike-related events, such as the annual Kokanee Crankworx festival in Whistler. The Timberline operations manager has indicated that the resort management does not plan to hold events of that scale. Rather, they anticipate hosting industry demonstration events or small-scale races, with a potential turnout of between 100-150 participants (based on current turnout for similar biking events held at Ski Bowl). Such events likely would take place primarily on weekends. Noise related to such events would include the emcee on a public announcement system and music during lulls in the events. Such special events are not new to Timberline Resort which already hosts several winter sports events during the year, and the Hood-to-Coast race in the summer; events which are of equivalent or greater scale than the anticipated bike events. Additionally some mountain bike events already take place on the Glade Trail (which will be closed to mountain bikers once the Timberline to Town trail is opened). Events at the proposed bike park scheduled in the post-Labor Day period, a time that has historically been the quiet season, the additional visitors (i.e., event participants and spectators) would likely detract the most from the experience of those who have come to expect Timberline to be less crowded during the fall shoulder season.

Hikers or bikers travelling along West Leg road would encounter 6 bicycle crossings (MHNF 2011). The park plans call for a design that would slow the bikes to a near standstill before they crossed the road to reduce safety risks to both road users and bikers. On days when the bike park is experiencing heavy use, travelers along the road would likely encounter a fairly steady flow of bikers at these crossings. This would likely produce a feeling of crowding and busyness that current users of the road do not experience. Hikers, equestrians, and other users of the trails located within the boundaries of the park would also likely experience a sense of busyness and crowdedness that currently isn't present along those trails. Baseline data on the number and kinds of people who use the West Leg road and the trails within the proposed bike park are lacking.

Other potential impacts that have been identified as a concern to people whose sense of place for Timberline falls into the "park or museum" category include the likely presence of more dust and illegal use of hiking trails by park users (Chaney 2011; Wilson 2011). The resort operator has the intention of minimizing these concerns by putting into place monitoring, enforcement, and educational systems that would reduce the likelihood of their occurrence (Kruse 2011). Whether increased dust and illegal use of hiking trails by bikers becomes a problem would depend largely on the capacity of the resort operators to implement effective control systems.

Timberline as a Dynamic Year-Round Resort

For people who see Timberline primarily as a dynamic year-round world-class tourist resort, adding a mountain bike park would likely enhance their sense of place. A member of Timberline's staff described the potential impacts of the bike park on his sense of place as follows:

> Building the mountain bike park would give us seasonal revenue and addresses the fall shoulder season; it would be more animated in the fall through mid-October. In addition it would let us embrace the trend of mountain biking. We manage risky recreation. We watch the trends, and the trend is that a downhill mountain biking paradigm shift has occurred (Tullis 2011).

His observations indicate his belief that adding a bike park would not only provide more revenue, but would enliven the hotel during the off-season and allow it to embrace the trend within the ski industry of adding lift-assisted mountain biking to their sports offerings. He and other tourist industry stakeholders compare the tension over whether to install a lift-assisted bike program to similar debates that took place in the 1980s when snowboarding emerged as a major winter sport. A lift-assisted bike park at Timberline would also open up free-riding opportunities for people of beginning and intermediate levels. Those who see Timberline as a dynamic four-season resort emphasize that the lift-assisted bike park, which would cater to riders with beginning and intermediate skills, would attract more families in the summer. They stated that Timberline has the potential attract a diverse set of bikers, since it already has the reputation for being a family-oriented ski area and it would be offering easier trails than those available at nearby Ski Bowl. In this respect, the mountain bike park supports Timberline's longstanding tradition of being a place where sports practitioners can learn the skills needed to engage safely in sports, such as downhill skiing and snowboarding, that inherently carry a certain amount of risk to those who engage in them.

Timberline as a Dynamic Work of Art Rooted in History

For those who see Timberline primarily as a dynamic work of art and living hotel of historical and national significance, the impact on sense of place would depend largely on how Lodge use by bike park users is regulated, and also on the extent to which the bike park generates pressure to build other tourist attractions and infrastructure in the vicinity. The first type of concerns is covered in this section; the second is examined in Section 3.8.3 - Cumulative Effects.

The two key informants who fell into the "Timberline as a dynamic work of art" category, had several concerns about how the proposed bike park might affect the ambiance, or sense of place, in and around the Lodge. One concern was that even though the mountain bike activity would be concentrated in the day lodge and bike park just as the skiers and snowboarders currently are, inevitably some bikers would visit the main lodge, and depending on their footwear and other gear, might inadvertently cause damage to the historic lodge.

The majority of freeriders (downhill mountain bikers), use one of two types of clipless biking shoes that attach to the bike pedals. Most freeriders use a type of clipless shoe that is similar to a skate shoe with an inset clip placed below the level of the rubber sole; these shoes are unlikely to damage the floors more than street shoes or hiking boots. The other common type of clipless shoe has a small rounded part that extends above the surface of the shoe's sole. This type of shoe is less likely to damage floors than ski boots, which are worn by some Lodge visitors in both winter and summer.

Additionally, as with the summer skiers and snowboarders, the mountain bike activity would be focused in the day lodge, and only a small percentage of bikers are likely to visit the historic lodge. Both informants stated that provision of adequate and appropriately located storage would address concerns about potential gear-related damage to the main lodge, and stated that they did not anticipate that damages linked to bringing bike gear into the main Lodge would be a problem as the resort operators have successfully dealt with this same issue with skiers and snowboarders.

A second major concern was whether the influx of a new type of recreational user group would generate social conflicts. One key informant stated, "If I have any concern at all, it is that it [lift-assisted mountain biking] is a function, a program that was not there before. It's a clientele; people who weren't there before, with different values and objectives" (Jacqua 2011). However, this same key informant noted that the resort had gone through a similar experience with snowboarding in the 1980s and eventually the new users became accepted as a part of the resort's everyday life.

The issue of crowd control and the likelihood of impacts from the additional people attracted to the resort by the presence of the bike park, as well as the larger crowds likely to be associated with special biking events, was also noted as potentially having a negative impact on the Lodge's ambiance. As noted in section 4.1, the anticipated bike events are likely to be the same or smaller in scale as the types of winter and summer events currently hosted at Timberline. Both of the key informants who fell into the "Timberline as a dynamic work of art" sense of place category stated that viable solutions to these issues would likely be worked out through the Friends of Timberline board meetings, in which the three partners (Mount Hood National Forest, RLK and Company, and Friends of Timberline) have worked on similar issues in the past. The confidence that these stakeholders have in the process working is reflected in the following statement by the key informant from Friends of Timberline:

> I seriously don't see this development as a threat. We have skill sets to come up with solutions. I would like to think that the net result of it will be positive, by allowing the mountain to be enjoyed by more people. The increased crowds with the park are just a fraction of the increase we expect to see in years to come. So I see the bike park as an opportunity for us to start dealing with that issue (Spies 2011).

In summary, the evidence suggests that proponents of this perspective are inclined to believe that the bike park would complement the Lodge's current recreational offerings provided that issues related to gear storage, social conflict, and crowding are resolved. Proponents of this perspective expressed confidence that solutions to their concerns could be worked out through the existing partnership arrangement under which the Timberline resort is managed. Additionally, they emphasized that RLK has purposefully designed the park to operate around the day lodge and away from Timberline Lodge so as to mitigate potential negative impacts to the Lodge and its immediate grounds.

3.9.3 Cumulative Effects

Stakeholders who see Timberline as a dynamic work of art with historical roots expressed considerable concern about cumulative effects of resort development activities on their sense of place. Although not opposed to the bike park, they noted that it is just one example of an infrastructural development that if it proves successful at drawing in the number of visitors intended, potentially could create demands for yet more infrastructure to handle the influx of visitors. One proponent of this view (Jacqua 2011) stated that while it is important to provide extended recreation to the public, at some point we have to recognize that the Lodge is a National Historic Landmark that has to be preserved. In his view, it is time that we start asking, “Is there a tipping point beyond which tourism development and Lodge preservation cease to be compatible?” The question he poses on tipping points has immediate relevance, as it is clear that for stakeholders from the “Timberline as park and museum” sense of place category, the bike park already *has* passed the tipping point where further sports and adventure tourism development are no longer perceived as compatible with preservation (see for example, Chaney 2010).

What Jacqua calls a “tipping point” corresponds with Stedman’s (2003) concept of plausibility as related to sense of place. In terms of Timberline Lodge, when the changes to the Lodge and its environs are so great that the place meanings attached to them are no longer tenable, the sense of place that is produced through those place meanings becomes implausible—in short, the tipping point between development and preservation for that particular sense of place has been reached.

In 2009, RLK and Company (2009) submitted a Timberline Conceptual Master Plan to replace the 1975 Timberline Lodge Master Plan. This plan lays out the resort operator’s vision for future development of the Timberline Ski area within its SUP boundary. Given the tension that has emerged over the proposed bike park (which was included in an amendment to the Master Plan) it is highly likely that equally strong opposition would arise over many of the future developments included in the Master Plan. In the 1970s, when similar tension emerged over RLK and Company’s proposal to build a lift and restaurant on Palmer Glacier, a compromise was arrived at through a multi-stakeholder agreement between conservationists, the U.S. Forest Service, and RLK and Company (Grauer 2007). A similar process might be needed to successfully address concerns that are currently surfacing about the long-term cumulative effects of continued development at Timberline today.

3.10 Recreation

This portion of the analysis explains the effects of the project on recreation, defines the project area, examines pertinent assumptions, and discusses potential changes in recreation use patterns and the quality of the recreational experience as a result of the Action and No Action Alternatives. The recreation effects analysis area defined for the Recreation Analysis covers the area 2 miles north and south on the PCNST from Timberline, south to Government Camp and east to Rhododendron. Primarily, the effects area follows an interconnected web of trails from Timberline Lodge to Government Camp and then Rhododendron.

Direct effects are ways in which the alternatives would create, modify, or remove current recreation opportunities, including user displacement and noise impacts. The direct effects of the mountain bike park would occur predominantly within the proposed project area where existing trails intersect with proposed bike trails or are visible from project area. Trails directly impacted include the Pacific Crest National Scenic Trail (PCNST), the Timberline to Town Trail, the Mountaineer Trail, the Glade Trail, and the Alpine Trail. The area directly affected includes the immediate vicinity of the SUP area and the adjacent Mt. Hood Wilderness.

The indirect effects of the mountain bike park would be secondary effects, including an increase or displacement of recreation opportunities, a potential change in recreation use patterns, or changes in the quality of experiences as a result of the project. Areas indirectly affected include the Mt. Hood Wilderness, the Government Camp trail system, the community of Government Camp, and Timberline Lodge. Uses indirectly affected include summer skiing, hiking, mountain biking, huckleberry picking, tourism, and mountain climbing.

3.10.1 Existing Condition

Mountain Biking

Timberline currently provides no lift service for mountain bikers and there are no trails within the SUP area that are designated specifically for mountain biking. Currently, the Mt. Hood National Forest manages approximately 200 miles of designated mountain bike trails. These trails consist of everything from native-surface logging roads and two-track roads to primitive-style single-track trails and are primarily cross-country trails, where mountain bikers access the trail by biking to them or shuttling via vehicle. Cross- country mountain bikes are designed to be able to ride up and down a trails system or over long distances with rolling terrain. Cross-country bikes are lighter weight and have less durable components for rough terrain. Downhill bikes weigh more than cross-country bikes, and are designed specifically for downhill travel; riders will usually push, or shuttle via chairlifts or motorized vehicles to trails. Downhill mountain bikes differ from the bikes of ten years ago in several key ways - most notably in terms of their more sophisticated braking and suspension systems. Most downhill mountain bikes are equipped with dual hydraulic disc brakes and front and rear suspension with up to 10” of travel. This makes them much more suitable for higher speeds and negotiating loose or rough terrain and obstacles.

Developed Recreation

Timberline

Timberline Lodge and Ski Area is a four-season resort and is the only ski area in North America that is open 12 months of the year. In the wintertime, thousands of people come to enjoy the mountain for alpine skiing, snowboarding, Nordic skiing and snowshoeing[6]. Timberline Lodge has a wide variety of facilities including two lodges, four restaurants, gift shops and seven chairlifts. During the summer Timberline has two chairlifts running to provide skiing on the Palmer Snowfield. The Palmer Express and the Magic Mile Express provide for 670 and 640 skiers-at-one-time, or a total capacity of 1,310 skiers. Racers, ski camps, and locals use this opportunity to ski year round. Timberline offers ski lessons with lodging and fine dining available year round in the historic resort.

Tourists come from all over the world to visit historic Timberline Lodge. In the summer Timberline Lodge offers rides on the Magic Mile chairlift transporting people to 7,000' on Mt. Hood. The summer visitors use the chairlift ride to picnic, hike and photograph the Mt. Hood area.

Timberline currently operates under an approved CCC limit of 4,665 (USDA, 1975, 2004). Although the ski operation is capable of reaching this capacity, the greatest factor limiting Timberline from reaching their actual CCC is limited parking capacity. The existing parking lots accommodate both skiers and non-skiers, thereby limiting the number of skiers and other guests that can park at Timberline. Due to this unique parking situation and available parking for ski guests, Timberline's actual ski area operating capacity CCC is approximately 2,900.

Parking

Timberline currently operates under an approved comfortable carrying capacity (CCC) limit of 4,665 (USDA, 1975, 2004). Although the ski operation is capable of reaching this capacity, the greatest factor limiting Timberline from reaching their actual CCC is limited parking capacity. The existing parking lots accommodate both skiers and non-skiers, thereby limiting the number of skiers and other guests that can park at Timberline. Due to this unique parking situation and available parking for ski guests, Timberline's actual ski area operating capacity CCC is approximately 2,900.

The parking situation in the summer is similar to the winter operation in that the parking provides for both skiers and non-skiing guests. During the summer, the non-skiing guests represent a greater proportion of the visitors. Non-skiing guests tend to stay in the area for a shorter duration than skiers, and thus, the parking spaces taken by these guests witness a greater rate of turnover than those spots taken by skiers. In addition, more parking space is available due to the absence of snow in the summer time. The net effect of this parking situation is that the parking lots may actually accommodate a greater total number of people per day in the

[6] Timberline has averaged approximately 320,000 skier visits per year since the opening of the Jeff Flood Express lift and trails.

summer. On above-capacity summer days, the parking lots at Timberline become parked out and additional visitors to Timberline (both paying and non-paying guests) must be turned away. According to the ODOT traffic counter on the Timberline Road, Timberline already is close to reaching capacity on both summer weekends and busy week days.

Public Safety

As mentioned earlier Timberline Lodge operates a four season resort. The variety of people visiting Timberline includes; climbers, hikers, sightseers, skiers, and snowboarders. Currently, Timberline policies provide public safety for the different user groups with the prevention of accidents before they occur. Timberline posts signs for education, direction, and safety. Additionally, the resort segregates some user groups. One example would be separation of climbers and skiers on the mountain. Timberline provides a groomed climber's trail through their SUP area to avoid conflict between users. Timberline uses radio communication for quick response to accidents and has a full time, year round ski patrol. Ski patrol duties incorporate the prevention of public injury and responding to accidents.

West Leg Road

West Leg Road is the original road to Timberline Lodge. The road is paved and approximately six miles long. West Leg switchbacks at a steady ascent at an average of 6- 10%. The road is open to vehicles and has much less traffic than the Timberline Road. Typical use in the summer is sightseers using an alternative road to visit Timberline Lodge. It is also common to see road bikers climbing up or riding down West Leg Road.

Mountaineering

Thousands of people from all over world climb 11,237-foot Mt. Hood each year. The South Side route, which begins at the Timberline Lodge parking lot (elev. 6,000'), is the shortest and most popular route to the summit of Mt. Hood. As climbers ascend the mountain they will enter the heart of the Mt. Hood Wilderness. It is estimated that 6,500 people a year climb Mt. Hood from the south side route. Climbers come for challenges, scenery and to fulfill a lifelong dream.

Other Ski Areas

Six ski areas operate on the MHNF.   In the vicinity of Timberline, on the south side of Mt. Hood, two other ski areas operate: Ski Bowl and Summit Ski Area.

Ski Bowl

Ski Bowl is approximately 6 miles from Timberline and offers lift-served mountain biking. The trails offered at Ski Bowl are comprised of steep, downhill trails and easier road systems.   Many of the mountain bike trails at Ski Bowl are multi-use and allow hiker and horseback rider traffic, as well. There are a number of trails that allow for uphill and downhill mountain biking. Ski Bowl host several downhill mountain bike events such as the Fluid Ride Downhill Series. Riders at Ski Bowl ride up the Lower and Upper Bowls lifts, which are Riblet, fixed-grip double chairlifts. During the summer Ski Bowl doesn't just offer mountain biking but has a full adventure park, which includes an alpine slide, a bungee tower, a climbing wall, horseback rides, disc golf and much more.

Summit Ski Area

Summit Ski Area is a small, family-friendly ski hill located next to the downtown area of Government Camp. During the winter families can find affordable beginner skiing and a tubing hill at Summit Ski Area. Many skiers shuttle or hitch-hike up to Timberline Lodge and ski down through the Summit Permit Area during the winter months. Summit Ski Area does not operate during the summer, although mountain bikers occasionally ride off-trail and into the ski area, presumably from the Timberline SUP area. The Forest Service has been working with Summit Ski Hill to prevent this unauthorized use and rehab areas that have been affected.

Trails

Pacific Crest National Scenic Trail

The PCNST spans 2,650 miles from Mexico to Canada. Over 100 of these miles pass through the Mt. Hood National Forest. PCNST users utilize the Timberline parking lot as a trailhead for the PCNST. There are a variety of connecting trails that transect the PCNST within the Timberline SUP area boundary.

Implementation of the proposed mountain bike park has the potential to increase the number of summer users at Timberline, and therefore on the PCNST. The proposed mountain bike park may also affect the PCNST user's experience due to increased noise and sight during construction and subsequently, during operation of the park. Currently, Timberline has both winter and summer operations. As a result, PCNST hikers already experience some noise and sights from the current operation of the ski area facilities, as well as the operation and maintenance of the Lodge itself.

Mountain bikes are not allowed on the PCNST. Currently, bike restriction compliance on the PCNST in the vicinity of Timberline Ski Area is good (Jensen, 2011). Estimated visitor use numbers for the PCNST at Timberline Lodge are based on samples taken by the Forest Service (unpublished data, USFS). Records indicate 5,100 northbound hikers used the PCNST Timberline trailhead in 2010. It is estimated that these counts are under-reported because they are collected from registration boxes at the wilderness entry points. There is no visitor count of people hiking south on PCNST from Timberline Lodge, as no registration exists.

Mountaineer Trail

The Mountaineer Trail is a popular, 2.6 mile long trail, and is the highest elevation trail on the south side of Mt. Hood. It leaves from Timberline Lodge next to the Magic Mile Express chairlift and also serves as a connecter to the PCNST. Typical use on the Mountaineer Trail is family day hiking, sightseeing and viewing wildflowers.

Timberline to Town Trail

The Timberline to Town Trail was designed as part of the Government Camp Trails Project in 2005 (MHNF, 2005). The trail is intended to be a low-gradient trail for mountain bikers and hikers to travel between Government Camp and Timberline. Construction began in 2009 and was completed in 2011. The Timberline to Town Trail is approximately 5 miles long.

Glade and Alpine Trails

The Glade and Alpine Trails have been traditionally used as a ski trails from Timberline to Government Camp. The trails have also been used by hikers, mountain bikers, and huckleberry pickers. According to the Government Camp Trails Project Environmental Assessment (MHNF, 2006), the Glade and Alpine Trail will be closed to mountain biking in order to reduce erosion and to increase safety when the Timberline to Town Trail is finished.

Within the SUP area, the Glade Trail is in need of drainage control and surfacing to reduce erosion. This trail is under the management of the Forest Service.

Pioneer Bridle Trail

The Pioneer Bridle Trail follows the historic Barlow Road connecting the villages of Government Camp and Rhododendron. The trail was not originally planned or designed as a mountain bike trail but currently mountain bike use is moderate. (Jensen, 2011) The Pioneer Bridle Trail's designated uses include mountain biking, equestrian, and hikers. The first four western-most miles of trail have a 10% grade or less and the upper, eastern-most section of trail averages 20% or more. Through a network of trails the Pioneer Bridle Trail is interconnected with trails that access Timberline.

Other Trails

The Government trail system is approximately 2 miles from Timberline. There are connecting trails from Timberline that intersect several trails near Government Camp. The Government Camp Trail system connects the east side of Government Camp to the west side. It includes many short loops and connecter trails into Government Camp. The Government Camp Trail system is managed for hikers, mountain bikers and Nordic skiers. The trails included in the Government Camp Trail System are Maggie's, Lucy's, Wally's Tie, Camp Creek Loop, Skiway and Crosstown Trail. There are approximately 6 miles of trails around Government Camp. The trails were designed to allow snow grooming in the winter, so they are not out-sloped and contoured as a mountain bike-specific trail would be.

Wilderness

The Mt. Hood Wilderness encompasses 67,320 acres; the heart of the wilderness is Mt Hood, the highest volcano in Oregon. The Timberline SUP area is surrounded by the Mt. Hood Wilderness to the west, east and north. The fundamental goal of the Mt. Hood Wilderness is "lands designated for preservation and protection in their natural condition" and to provide "outstanding opportunities for solitude" ("Wilderness Act," Public Law 88-577 (16 U.S. C. 1131-1136). The Mt. Hood Wilderness boundary is within 0.6 mile of the top terminal of the existing Stormin' Norman Express chairlift, and less than one-fourth mile from the closest proposed mountain bike trail in the Proposed Action (Figure 2).

Timberline is one of many ski areas on National Forest Service (NFS) lands that are in close proximity to established wilderness areas. Congress recognized the continued existence of uses and activities adjacent to wilderness areas that are similar to those of a ski area in the U.S. Senate's statements in the Congressional Record of October 2, 1984

> "The Congress does not intend that the designation of a wilderness area under this act lead to the creation of protective perimeters or buffer zones around such wilderness areas. The fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness shall not preclude such activities or uses up to the boundary of the wilderness area." (Congressional Record of October 2, 1984, S126622, Section 9 Buffer Zones)

Therefore, activities and operations along the SUP area boundary at Timberline are not expected to serve as a buffer to the wilderness. Instead "buffer zones" exist just inside the wilderness boundary, and a wilderness experience should not be expected at the edge of the wilderness boundary.

At Timberline Lodge, recreationalists access the Mt. Hood Wilderness from the PCNST when traveling both north and south along the PCNST. Climbers also access the Mt. Hood Wilderness by following the popular south-side climbing route from Timberline Lodge. The number of wilderness users accessing the Mt. Hood Wilderness from Timberline Lodge is estimated at approximately 11,000 users per year; this number includes hikers, backpackers and climbers. (unpublished data, USFS) It is estimated that these counts are under-reported because they are collected from registration boxes at the wilderness entry points. The implementation of the mountain bike park at Timberline has the potential to change the number of summer users in the vicinity of the Mt. Hood Wilderness, as well as the quality of their recreation experience (e.g., presence or absence of noise above current levels) during and after construction.

Wild and Scenic Rivers

The Salmon River is located to the South and East of the Timberline Lodge Ski Area SUP Area (see Figure 2). The River at its closest point is approximately 0.5 mile from the mountain bike project area.

The Salmon River was designated by Congress as a Wild and Scenic River in 1988. The River was designated in its entirety from its headwaters on the south slope of Mt. Hood to its confluence with the Sandy River 33.5 miles downstream. The Salmon River Management Plan completed in 1992 provides for the protection and enhancement of the resource values of the River Corridor as well as identification of public uses consistent with the River's designation. The River segment closest to the mountain bike project area (Segment 1) is designated as a Recreational Segment. Recreational River areas are defined by the Wild and Scenic Rivers Act to include:

> "Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

Management of recreational river segments should give primary emphasis to protecting the values, which make it outstandingly remarkable while providing river-related outdoor recreational opportunities in a recreational setting.

Recreation is on one of the Outstandingly Remarkable Values (ORV) for the Salmon River. The Salmon River Management Plan recognized the wide variety of recreational opportunities along the Salmon River including alpine skiing and highly developed resort facilities contributed to recreation being considered as an ORV. The other ORVs for the Salmon River include scenery, fisheries, wildlife, hydrology and botany/ecology.

The Forest Service is responsible to evaluate projects that are above or below a designated river corridor. The agency must ensure that a project will not impact the free flow of the river, degrade water quality, or degrade the ORV's of the River.

Forest Plan Direction

The Forest Plan outlines direction for recreation management of the project area. Guiding principles from the Forest Plan for managing Forest recreation related to this project are to:

> Foster coordination among partners who provide outdoor recreation activities and settings. Be primary advocates and providers of outdoor recreation opportunities that are appropriate to a large natural forest setting. Enable people to learn and grow in their outdoor experience. The trail system shall be developed and designed to disperse recreational use and provide a range of difficulty levels …." (A11-010)

All of the project area is within the A11 Winter Recreation Area. The specific objectives for this area are to "provide areas for high quality winter recreation (and associated summer) opportunities including downhill skiing, Nordic skiing, snowmobiling, and snow play within a natural appearing forest environment." In addition, the desired conditions for this allocation are that "opportunities exist for summer recreation activities such as hiking, mountain bicycling, and horseback riding." A key element of this analysis is that the desired conditions for A-11 include the statement that "Winter recreation improvements may be designed for year round use."

As a part of the Decision on the Timberline Express EIS, the Visual Quality Objective (VQO) was changed from partial retention to modification on the Timberline Trail, which is also the PCNST (see Section 3.7 – Visuals).

The summer operation currently includes the operation of two detachable quad chairlifts that serve the summer ski camps and summer public skiing, and which are visible and audible from the PCNST. Partial Retention is "a visual objective where man's activities may be evident but subordinate to characteristic landscape" The visual landscape is already affected by cut ski runs and the operation of the ski area. The ski area facilities meet the VQO of Partial Retention in that they are evident but subordinate to the characteristic landscape (see also Section 3.7 Visuals).

The current Timberline operation includes skiing opportunities throughout the year (i.e., both summer and winter), as well as a wide range of summer opportunities, as described above. Timberline's recreation offering is consistent with the direction for A11 – Winter Recreation.

3.10.2 Direct and Indirect Effects

No Action

Mountain Biking

Under the No Action Alternative, mountain biking at Timberline would remain as described for the existing condition and the demand for lift-served, designated downhill mountain bike trails would not be met.

The existing cross-country, multi-user trail network would continue to serve cross-country mountain biking with the exception of the Glade and Alpine trails, which would be closed to mountain biking. As a result, pressure for mountain biking on the Timberline to Town Trail, which serves the same function as Glade and Alpine, would increase.

Under the No Action Alternative, the regional demand for lift-served, downhill would not be met at Timberline (see Section 3.10 – Socio-economics).

Under the No Action alternative, no new recreation opportunities would be created in the project area. No recreation effects associated with construction or operation of a mountain bike park would occur.

Developed Recreation

Timberline

Under the No Action alternative, skiers, climbers, sightseers, and tourists would visit the Timberline Lodge area as described for the existing condition. Ski operations would continue as normal and the lodging and dining would remain open for the public. The summer recreation offering at Timberline would not change.

The capacity at Timberline would continue to be limited by parking.

<u>Parking</u>

Under the No Action alternative, parking at Timberline would remain as described for the existing condition.

<u>Public Safety</u>

Under the No Action alternative, public safety would be as described for the existing condition. Timberline would continue to provide public safety throughout the year.

West Leg Road

The effects of the No Action Alternative would be as described for existing condition. No mountain bike trail crossing would be constructed.

Mountaineering

Under the No Action alternative, mountaineering would be as described for the existing condition, with approximately 6,500 people a year climbing Mt. Hood from the south side route.

Ski Bowl

Ski Bowl would continue summer operation with lift assisted mountain biking and Adventure Park would as described for the existing condition. Increases in visitation to Ski

Bowl during the summer would be attributable to population growth.

Summit Ski Area

Summit ski area would continue to operate in the winter months with skiing and tubing. Skiers would continue to ski from Timberline Lodge through Summit permit boundary. No operations would take place during the summer and off-trail mountain biking would be as described for the existing condition.

Trails

Pacific Crest National Scenic Trail

Under the No Action Alternative, the current summer use on the PCNST would continue and there would be a slight increase of use as the population around the area continues to grow. Implementation of the No Action alternative one would not add any new sights or sounds that may disturb the Mt. Hood Wilderness user.

Mountaineer Trail

Effects to the Mountaineer Trail under the No Action Alternative would be as described for the PCNST. No new trail crossings would be constructed.

Timberline to Town Trail

The No Action Alternative would result in no new recreation offering at Timberline. Summer visitation would likely remain constant with a nominal increase reflecting population growth. As described above under Mountain Biking, closure of the Glade and Alpine Trails to mountain biking would divert this use to the Timberline to Town Trail.

Glade and Alpine Trail

Under the No Action Alternative, the Glade and Alpine Trails would be closed to mountain biking upon the completion of the Timberline to Town Trail. With no new development at Timberline, there would be no new pressure for mountain biking or other uses on the Glade and Alpine trail.

Under the No Action Alternative the Glade Trail going through the SUP area would not receive the trail rehabilitation that is included in the Proposed Action. No new drainage controls or contouring would occur. The trail would continue to be neglected and much needed work would not be accomplished.

Pioneer Trail

The effects of the No Action Alternative in the Pioneer Trail would be as described for the Timberline to Town Trail.

Other Trails

The No Action Alternative would result in no new trail crossings and no increased pressure for mountain bikers or other users on these trails. The Government Camp Trail system would not see increased maintenance needs on the existing cross-country mountain biking trail network or would the current trail demographics change.

Wilderness

The users going into the Mt. Hood Wilderness would not experience any changes in human caused sounds or sights resulting from new construction or operations. Visitors would continue to visit the Mt. Hood Wilderness, as in the existing condition. There may be a minimal rise in visitor use over time due to population growth.

Wild and Scenic Rivers

Under the No Action Alternative, no additional development would take place in the study area. As such, there would be no new effects on the free flow character or degradation of the ORVs of the Salmon River.

Forest Plan Direction

Under the No Action Alternative, the Timberline operation would continue to offer recreation opportunities throughout the year. Timberline's recreation offering would remain consistent with the direction for A11 – Winter Recreation.

The summer operation would continue to include the operation of two detachable quad chairlifts that serve the summer ski camps and summer public skiing, and which are visible from the Timberline Trail.

Proposed Action

Mountain Biking

The Proposed Action would result in the construction and operation of the proposed mountain bike park.

The intention of the Proposed Action is to add a new summer recreation opportunity at Timberline (See chapter 1, Purpose and Need). By diversifying and introducing a new type of recreation (lift-served, downhill mountain biking) at Timberline, the area would appeal to a larger customer base during the summer season and it would meet the demand for a different type of mountain biking that is not readily available on the Forest (i.e., a lift-served mountain bike park). (Refer to the Socio-Economics Section).

Visitation at the proposed Timberline Bike Park is projected in the Socio-Economics section of this analysis (See Table 37). Given an estimated Year 6 with 21,656 visits and 10 weeks of operating season, approximately 2,156 visits would occur each week during the summer, on average. Higher visitation would be on weekends. Assuming that the bike park would operate at or near capacity on weekends (i.e., 338 PAOT) for 20 weekend days, a total of 6,760 visits would occur on weekends. That leaves 14,805 visits for the remaining 50 days, which is 296 visits per day (or about 87% capacity). If Timberline would rely on a local market, it would not be possible to maintain 87% capacity throughout weekdays. However, as described in the Socio-Economics section, it is anticipated that a large number of visitors to the area would be regional visitors who are enjoying multiple-day visits to the bike park. In addition, mountain bike events would likely sponsor substantial visits on Fridays, particularly in the afternoon as event participants and guests arrive for the weekend.

Mountain biking is a poplar activity, and as explained in the social economic section lift served mountain biking is a growing. Mountain bike parks are also gaining recognition and mountain bike technology is improving every year. The Mt. Hood National Forest lost approximately one hundred miles of mountain-biking trails due to the recent wilderness expansion. However, the demand for mountain biking has continued to grow in the Mt. Hood area (Thornton, 2010). The increase of mountain bike users and need for more challenging terrain could be supplemented by the Timberline Mountain Bike Park (Thornton, 2010).

The mountain bike park users would be located primarily in an area that is distant from the Lodge and the summer ski terrain. Consequently, only that portion of the mountain bikers at Timberline (i.e., the park capacity would be 338 bikers- at-one-time) that would use other recreational facilities at Timberline, such as ski facilities or trails, would impact the existing users of these facilities. Ultimately, an increase in visitation by 6,000 (Year 1) to 21,656 (Year 6) would account for a small percentage of the two million people that visit Timberline annually.

Developed Recreation

Timberline

The Proposed Action would reduce the quality of the recreation experience for those recreationalists that use the Jeff Flood Express pod in the summer in that the lift would be operating and several hundred mountain bikers would be present in the area on busy days. The mountain bike park would displace some recreationalists in, and around the Timberline area. Implementation of the mountain bike park would contribute to additional human caused sights and sounds that are currently not present in the area. During the first two years, project construction would create human caused noise above the users' current level of experience. Currently the project area is one of the quiet places on the mountain where people can get away from the sights and sounds of the ski area. It is also a popular spot for day hikers and huckleberry pickers. Having mountain bikers in this area would not preclude the existing recreation opportunities, but it may disperse it to other, less developed areas in the Timberline vicinity.

The current hikers, climbers, horseback riders, skiers, huckleberry pickers, tourists and bikers at Timberline are already going to a place that is highly developed, so their expectations under Alternative 2 would not be measurably affected compared to Alternative 1, particularly given that the mountain bike use would be focused on an area that is currently under-utilized compared to the Lodge and upper mountain during the summer. Recreationists coming to Timberline Lodge would now have an opportunity to participate in lift-served, downhill mountain biking, which would enhance the recreation opportunity for a portion of the existing summer visitors.

The summer ski operation at Timberline would continue to function on the upper mountain under The Proposed Action. With the addition of mountain bikers in the vicinity of the Wy'East Day Lodge, all users in the area would realize increased densities. However, it is expected that these densities would remain less than is typical on a busy winter ski day.

Under The Proposed Action, the Timberline Bike Park would be designed to provide a balance between the uphill lift capacity and the downhill capacity. As a detachable lift, the lift operators would be able to load mountain bikes on the chairs without stopping the lift. The winter operating capacity of the *Jeff Flood Express* lift is 1,800 people per hour (pph) and the lift has a total of 102, four-passenger carriers. During the summer, every other chair would be used as a bike carrier with no passengers, leaving 51 carriers for passengers. RLK also proposes to run the lift at 75% speed, resulting in a summer operating capacity of 720 pph (75% of 900 pph). With 6 trails in the bike park, if a mountain biker started down each trail every 30 seconds, 720 pph would descend the trails. Consequently, the lift and trail capacities have been designed to balance at 720 pph.

In the winter time, the *Jeff Flood Express* CCC is 900. Again, operating half of the chairs as bike carriers and running the lift at 75% speed, the PAOT would be 338 (75% of 450 pph). The CCC typically refers to the people that would be divided into three categories: 1/3 on the lift, 1/3 riding the trails, and 1/3 milling about or practicing in the Skills Park. Based on this calculation, approximately 110 – 115 people would be comfortably riding on the trails at any given time during a capacity day. Given that each rider would average approximately four to six laps per hour, the 720 pph calculation balances with the CCC (110-115 riders riding 6 times totals 660 – 675 riders per hour).

Parking

Under The Proposed Action, the current parking limitation at Timberline would continue to be a problem. The Timberline Bike Park would accommodate a PAOT of 338, if each vehicle has an average of two people it would add an additional 169 vehicles on a capacity day. According to the Timberline Express EIS parking capacity is 920 vehicles. The EIS describes that parking issues can be compounded when a substantial number of buses arrive at Timberline, making it so fewer vehicles would fit in the 920 spaces. “For example, on February 9, 2002, all lots were full by 1:00 p.m. with 804 cars and 18 buses (USDA, 2005).” Additionally, the maintenance lot that is used in the winter by skiers is not a realistic option for lodge visitors. In the winter skiers can park at the maintenance lot and ski to and from their vehicle. A summer visitor would need to walk up the steep Timberline Road making it difficult if not impossible for some guests. The summer parking lot wouldn’t only be compounded by buses, but also by the addition of ski camp vans and RVs. The estimated 169 bike park related vehicles on capacity day only include-bike park guests and it doesn’t include the vehicles of bike park employees. Timberline would hire new employees to run the bike park including chair lift operation, trail maintenance and bike patrol (see Section 3.10 - Socio-economics). The existing parking lots would continue to limit the number of visitors in the SUP area and this problem would be exacerbated on a capacity day at the bike park. Timberlines parking capacity would limit the number of visitors to Timberline on more days during the summer than under the No Action alternative.

According to the ODOT traffic counter on the Timberline Road, Timberline already is close to reaching capacity on summer weekends. The ability of non-paying guests at Timberline to find parking would be reduced compared to the No Action alternative. Users and visitors traveling to Timberline may be displaced, which could affect their attitude and visit to the Mt Hood National Forest in a negative manner. During mountain bike events and busy days, RLK would manage parking by segregating “buses, vans and other large vehicles from the main parking lot.” (Kruse, 2012) RLK would also implement parking and spectator management provisions in the Spectator Management Plan (see Table 3, Rec-5 in Chapter 2), which include shuttles or other means to bring visitors to the area. The parking lot would still be first come, first serve and would reach capacity on busy days, thus restricting both paying and non-paying visitors coming to Timberline because parking is not available. On capacity days when Timberline is parked out RLK would collaborate with Oregon Department of Transportation on road closures and parking conditions, as they already do on capacity days in the winter. Currently, RLK hasn’t had to use outside transit or road closures in the summer season. RLK foresees a potential raise in parking pressure due to mountain bikers and plans on managing the increased visitation in the same way they do in the winter months.

Public Safety

Under The Proposed Action, the proposed bike park would cross several Forest Service trails and West Leg Road that are used by hikers, bikers and vehicles. To prevent accidents between hiker/biker, biker/biker and vehicle/biker, the crossings would be eased by the use of chicanes and uphill grades to reduce biker’s speed before trail crossings. A chicane is a feature that creates extra turns in the trail that would additionally decrease the bikers’ speed. There would also be trail signs installed and maintained by RLK stating that mountain bikers should stay on designated bike park trails (see Project Design Criteria (Table 3) in Chapter 2, Rec 1 – 5). Both user groups would be well-informed to expect an encounter at these crossings. Timberline would also have a full time bike patrol and trail crew. The bike patrol would evaluate trail conditions, signing, crossings and respond to accidents when they occur. Since the bike crossing would be fully signed and bikers speed would be decelerated with ample sight lines there would not likely be increased risk to the public as long as drivers and bikers are cautious.

West Leg Road

West Leg Road would be directly affected by the Timberline Mt Bike Park. The upper ~2 miles would be crossed six times by the bike park. All bike trails descending the mountain would eventually cross West Leg Road. On capacity days 660 people per hour could be riding the bike park at one time. The bike park has six main trails, several of the trails cross West Leg Road more than one time. For example, Trail crosses the road three times (see Figure 6 in Chapter 2). Each trail could convey 110[7] riders per hour (660 riders per hour in the park divided by six trails). As described in PDC Rec-1 (see Table 3 in Chapter 2) bike trials have been designed to converge before several of the crossings of West Leg Road. If three trails converge before a crossing, it is estimated that 330 bikers per hour would cross the road at that location. The number of times that West Leg Road would be crossed on a capacity day per hour would be 1,320. The management of the West Leg Road bike crossing is as discussed in the public safety section. The impact of having frequent crossing could lead to more vehicle/bike encounters. The road would remain open for vehicle traffic but some people may choose to take alternative route with the increase of bikes. It would be the biker's responsibility to yield to oncoming traffic, as described above. Having an increase in bike traffic and a chairlift running may take away ambience of the historical road for a portion of sightseers.

Mountaineering

Under Alternative2, the existing summer offering at Timberline would remain, including skiing on the upper mountain. The addition of approximately 318 people in vicinity of the Wy'East Day Lodge and the *Jeff Flood Express* pod would add to the already-congested conditions on busy days. As a result, mountaineers would also be subject to the increased densities. Given that climbing Mt. Hood from Timberline is generally the stated objective of climbers leaving from Timberline, the increased density of other recreationists in the area would not affect mountaineering visitation at Timberline. This is because majority of the climbers arrive at Timberline around midnight and spend the greater part of their time away from the Bike Park area. The Bike Park would be located below the summer ski area and climbing route, resulting in no direct user conflicts.

Ski Bowl

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[7] For purposes of this analysis, each trail is assumed to carry the same number of riders. The bike trails would actually exhibit differing rider densities based on the ability level of the trail. Beginner trails, with a lower gradient and wider path would accommodate a higher hourly rate than a narrower expert trail.

Ski Bowl would be affected by the addition of a Mountain Bike Park at Timberline. Currently Ski Bowl offers mountain biking in the summer. During the initial few years of operation at Timberline, it is expected that current, local Ski Bowl riders would visit Timberline instead of Ski Bowl. However, as more and more regional/destination riders visit Timberline Mountain Bike Park, the presence of these new visitors to the Government Camp area would sponsor new riders at Ski Bowl. Ski Bowl has steeper grade runs than the Timberline Mountain Bike Park proposal, so it would cater to the more advanced mountain bikers.

Summit Ski Area

Summit Ski Area does not operate during the summer. RLK would manage bike park riders to ensure that lift-riding mountain bikers stay within the park and no bike park trails have been designed to connect directly to existing trails. Nonetheless, with increased mountain bike activity, an increase in pressure for mountain bikers to ride through the Summit to access Government Camp from Timberline would be expected. Summit already experiences mountain bikers creating unauthorized user trails through the ski area, so the Forest Service would continue to work with Summit Ski Area to prevent unauthorized use and rehab areas that have been affected. In addition, the Proposed Action at Timberline includes PDCs that are intended to minimize off-trail riding practices in general (see Table 3 in Chapter 2, Rec-3 and 5, Veg-9 and 14).

Trails

Pacific Crest National Scenic Trail

An effect of The Proposed Action on existing users of the PCNST would be an increase in human caused sights and sounds above the current level, affecting the PCNST user experience. Existing trail users that currently see or hear the operations at the ski area and lodge area existing trails would also see or hear the construction and operation of the bike park. The effect this has on the user is largely based on the timing, duration, and intensity of the disturbance as well as the individual’s perception and expectation.

The short-term effects of this project would occur during the construction stage when PCNST hikers would see and hear equipment near the PCNST. This construction would take place during the summer months and for two construction seasons. In addition the majority of the trail construction would take place below the tree line, and away from the PCNST. The long-term effects would include an increase in noise due to the operation of the bike park. A portion of the bike trails would be visible from the PCNST, so trail users would be able to see the running chairlift and mountain bikers entering the bike park. In addition, two wooden structures crossing drainages would be visible. The bike trails that are visible from PCNST are due to wide openings created by existing ski runs. The majority of the bike park would not be visible to the PCNST users because the trails are downhill of the PCNST. The trails would be a small addition to the existing facilities visible from the PCNST. Plus, given that these users already experience operating chairlifts associated with the summer ski season, the bike park operation would add on to the current ski operation.

Implementation of the proposed mountain bike park has the potential to increase the number of summer users at Timberline, and therefore on the PCNST. Although nothing in the project is intended specifically to increase use of the PCNST, it is likely that some of the bike park users and other non-biking users would partake in hiking, which could lead to an increase in PCNST visitation. The number of users going north on the PCNST from Timberline Lodge in 2010 was estimated at 5,100 and a busy Saturday would include approximately 150 hikers. The contribution of additional PCNST hikers (bike park capacity is 318 PAOT) associated with the bike park would be small relative to the existing level of use. Consequently, no measurable increase in PCNST use would result from the bike park.

The PCNST is designated for use by hikers and equestrians only. It is illegal to mountain bike on the trail. Implementation of the mountain bike park has the potential to increase the number of bikes in the area, resulting in increased pressure for mountain bike use on the PCNST. While adding more mountain bikers to the area could result in more pressure for unauthorized bike use, this pressure would be eliminated by implementing and maintaining effective signage and policing by RLK. Mountain bike use would remain illegal on the PCNST and, if effectively policed and signed, The Proposed Action would not contribute to bike use on the PCNST.

Mountaineer Trail

The Mountaineer Trail serves as a connecter to the PCNST. Typical use on the trail is day hiking, sightseeing and viewing wildflowers. The proposed mountain bike park trail system would directly effect and cross the Mountaineer Trail twice on the southwest section of trail. Based on the previous calculation that 110 people per hour could be comfortably riding the trail at any given time during a capacity day and that each rider could expect four to six laps per hour indicates, the Mountaineer Trail would be crossed 220 times an hour on capacity days. The effect and management of these trail crossings would be as described in the Public Safety discussion.

Mountain biker traffic and the overall increase in recreation in the area would detract from the hiker experience, on the Mountaineer Trail compared to the No Action alternative.

Timberline to Town Trail

Increased use resulting from additional visitors around the area of Timberline Lodge could lead to increased crowding and interactions between users. Under The Proposed Action, there would be an increase in bike use around Timberline due to the increased popularity of the area to mountain bikers in general. Combined with the closure of the Glade and Alpine trails to mountain biking, the popularity of mountain biking at Timberline would likely increase pressure on the Timberline to Town Trail.

The proposed bike park trails cross the Timberline to Town Trail 3 three times on its northern end. Each crossing would be crossed 110 times an hour making the total crossings on Timberline to Town 330 times per hour by mountain bikes on capacity days. The effect and management of these trail crossings would be as described in the Public Safety discussion.

The management objective for the Timberline to Town Trail is for use by hikers and bikers. The trail is an uphill and downhill trail, meaning you can hike and bike in both directions. As stated earlier, Timberline to Town trail would be crossed 3 times by the Bike Park. This would give trail access for downhill mountain bikers riding the park. Increased downhill bike use would increase trail maintenance on the Timberline to Town trail. Increased use would increase the rate of channelizing and cupping of trail tread compared to the No Action alternative. The bike park, in conjunction with closure of the Glade and Alpine trails to mountain biking, would increase pressure on the Timberline to Town Trail. It is expected some mountain bikers would shuttle the Timberline to Town trail from Government Camp to Timberline Lodge in a similar way that the Glade and Alpine trails are shuttled in the winter for skiing. While this would not be a direct result of the bike park trails, it would be an indirect effect of the increase number of mountain bikers in the area. Customers of the Timberline bike park would likely use the Timberline to Town Trail as their last bike run of the day, on a rest day, or when the park is closed. The Timberline bike park would increase use on the Timberline to Town Trail compared to the No Action alternative. Consequently, hikers and uphill mountain bikers would be affected by this increased pressure. The intended use and design of the Timberline to Town Trail as a two-way trail would be diminished as result of the mountain bike park. The increase of downhill mountain bike park riders on this multi-use trail may create safety issues for other Cross-Country, Trail and All Mountain bikers and hikers.

Glade and Alpine Trail

The management direction for the Glade and Alpine Trail is to close it to mountain bikers once the Timberline to Town Trail is completed. Since the Glade Trail would be crossed four times by the bike park trails, there would be increased pressure for mountain bikers on the trail. The effect and management of these trail crossings under The Proposed Action would be as described for the Public Safety.

Under The Proposed Action, the Glade and Alpine Trail would continue to be managed for hikers, huckleberry pickers, skiers, and snowshoers. In the summer months, huckleberry pickers would not be directly displaced on the top third of the trail that passes through the bike park. However, the increase in mountain biker traffic and the overall increase in recreation in the area would detract from their experience compared to the No Action alternative.

The Proposed Action includes trail rehabilitation on the Glade Trail through the SUP area. The Glade trail has been used historically as a downhill ski run and the trail contains utility lines that supply Timberline. The trail in the summer time looks much more like a road and Proposed Action would convert the road into a more trail-like appearance. The construction and implementation of this project would affect the quality of the trail for a short period of time when equipment is running. During the construction stage the trail would be closed for a maximum of two weeks. This would be a short term impact and the quality of the trail after construction would be a more durable trail with improved trail grades (see Table 3 in Chapter 2, Rec-7).

Pioneer Bridle Trail

The management direction for the Pioneer Bridle Trail is hikers, equestrians and mountain bikers. The effects on the Pioneer Trail under The Proposed Action would be increased use similar to Timberline to Town Trail with the addition that equestrians would be affected.

Other Trails

The Government Camp Trail system is located outside of the bike park, but trails from Timberline connect with this trail system. It is likely that these trails would see more use that could lead to increased user densities on the trail network. The Government Camp Trail system connects to the bottom portion of the Timberline to Town Trail, so it is possible that additional users would access this trail network via the Timberline to Town Trail.

The management objective and design for the Government Camp Trails System is for use by hikers, skiers, snowshoes and mountain bikers. The needs of each of these user groups must be equalized so a larger recreational group can enjoy the area. The Government Camp EA (MHNF, 2006) discussed the need for these trails to reduce some of the pressure from hikers in the wilderness. With increased destination visitors to Government Camp, it would be expected that increased mountain bike use, as well as other uses by these new visitors, would be realized on these trails, which could detract from the recreation experience of some other users. Consequently, the overall increase in use of downhill mountain bikers on the existing Government Camp Trails would increase the need for routine maintenance of the trails caused by trails cupping and channelizing.

Wilderness

The implementation of the mountain bike park at Timberline has the potential to change the number of summer users in the vicinity of the Mt. Hood Wilderness, as well as the quality of their recreation experience (e.g., presence or absence of noise above current levels) during and after construction.

It is estimated the over 10, 000 people enter the Mt. Hood Wilderness from Timberline Lodge every year. This number would increase under The Proposed Action as the number mountain bikers and other visitors to Timberline Lodge increases. The contribution of new visitors by the bike park (i.e. hundreds of people) would be small relative to the existing level of use at Timberline overall (i.e., thousands of people).

Implementation of the Proposed Action would add construction noise during the first two summers, as well as increased noise from summer operations for the lifetime of the bike park operation. These increased levels of activity and noise would detract from the wilderness experience of those users that would be near the Timberline SUP area. However, these uses would be compatible with the wilderness boundary in that it abuts a developed recreation area.

Wild and Scenic Rivers

The bike park would be located outside the river corridor and approximately 0.5 mile away from the corridor at its nearest point. As such the mountain bike proposal would have no effect on the free flow character of the Salmon River. Also due to the distance to the River and the project design criteria there would be no measurable impact to the water quality of the Salmon River (see Hydrology section), and there would be no degradation of the ORVs of Scenery, Recreation, Wildlife, Fisheries, Hydrology, and Botany/Ecology.

Forest Plan Direction

Under the Proposed Action, the Timberline operation would continue to offer recreation opportunities throughout the year. The mountain biking program would dramatically increase the recreation opportunities at Timberline, as well as increase summertime utilization of the current SUP area. Consequently, under Proposed Action, Timberline's recreation offering would remain consistent with the direction for A11 – Winter Recreation.

Along the Timberline Trail, ski lift facilities should achieve a VQO of moderation. The summer operation currently includes the operation of two detachable quad chairlifts that serve the summer ski camps and summer public skiing, and which are visible from the Timberline Trail. The added operation of the Jeff Flood lift would be consistent with the current summer operation.

3.10.3 Cumulative Effects

The effect on Recreation from the Proposed Action result from increased activity (construction and operations) and increased visitation at Timberline. The following effects would overlap in time and space (Table 35).

Table 35 – Cumulative Effects - Recreation

Project/Activity	Potential Effects	Overlap in		Measurable Cumulative Effect?	Extent, Detectable?	Recreation Effects
		Time	Space			
Operation of Lodge, Ski Area and public visiting Timberline Area.	Limited Parking Space	Yes	Yes	Yes	An overlap in time and location exists between lodge guest, ski area operation, hikers, climbers and the proposed bike park. Also the parking lots would be further taxed by population growth and an increase recreational activity	Potential for cumulative effects include limited amount of parking space for both paying and non-paying guests on peak days.

Project/Activity	Potential Effects	Overlap in Time	Overlap in Space	Measurable Cumulative Effect?	Extent, Detectable?	Recreation Effects
					(see Social-Economics section) under the no action alternative.	
	Increased Noise	Yes	Yes	Yes	The ski area operation and the new construction of the bike park would coincide with each other.	The operational activity from both the bike park and ski area would detract from the natural environment and recreation experience of those seeking a Wilderness experience at Timberline. It would be consistent with the experience of most visitors, who intend to visit the developed recreation site. The effect of these activities is consistent with the Forest Plan Direction for the Timberline SUP area.
Trail Recreation Use	Public Safety	Yes	Yes	No	There would be an overlap in time and in space when hikers would be on the Forest Service Trails and Mt. Bikers from the park would be crossing the trails and West Leg Road. Project elements and PDCs are in place to	None

Project/Activity	Potential Effects	Overlap in Time	Overlap in Space	Measurable Cumulative Effect?	Extent, Detectable?	Recreation Effects
					minimize the effect.	
	Timberline to Town Trail as a multi-use two-way trail	Yes	Yes	Yes	There would be an overlap in time and space when bikers would be at the bike park and riding Timberline to Town. Timberline to Town trail would be crossed three times by bike park trails.	Increased use from bike park riders on the Timberline to Town Trail and the closure of Glade and Alpine Trail to mountain bikes may diminish Timberline to Town as a two way trail and create safety issues.
	Decreased recreational experience	Yes	Yes	Yes	Recreationalists that use the area around Jeff Flood Express lift would now experience an operating chair lift and several hundred bikers on a capacity day.	Displacement of hikers and recreationalists in and around the mountain bike park.
	Visual Quality Objectives	Yes	Yes	Yes	There would be increase human caused sights above current level. During the construction stage PCNST hikers would be able see construction and a few segments of bike trails.	The attained VQOs are consistent with the Forest Plan Direction (see Section 3.7 – Visuals)

3.11 Socioeconomics

The Socioeconomics analysis evaluates the market and economic factors that would affect, and would be affected by the proposed action. The social and economic analysis area includes those communities that would experience economic effects as a result of the proposed mountain bike park at Timberline. Government Camp, located at the base of Mt. Hood would likely observe changes in economic activity should the mountain bike park be implemented. It can also be expected that larger population centers with overnight lodging, restaurants, and retail facilities, would also realize additional economic activity if the Timberline Mountain Bike Park would be implemented. Consequently, the Highway 35 and 26 corridors from Hood River to Sandy are considered the analysis area for social and economic effects.

This analysis includes direct, indirect, and cumulative effects. Direct social and economic effects are those that would result directly from changes in visitation or economic activity at Timberline, such as changes in spending, traffic or cultural activities at Timberline and the Government Camp vicinity. Indirect effects are those that result from implementation of the proposed action, but are not directly attributable to or located in the vicinity of Timberline. These would include changes in economic activity in Hood River or Sandy or altered traffic patterns in these cities. Finally, cumulative effects are those impacts from other actions, that when coupled with the effects of this proposed action, could accumulate in the analysis area. These could include changes in the mountain biking market at Timberline or other nearby resorts or other summer-related activities that could affect cultural activities in the area at the same time and place as the proposed mountain bike park.

The following sections discuss the affected environment for four subject areas: Market and Economics, Emergency Services, Traffic and Parking, and Environmental Justice.

3.11.1 Market and Economics

The analysis of the Timberline Bike Park relies on data generated from a market study completed by IMBA specifically for a lift-served, mountain bike park at Timberline. Numerous studies and analyses are available that document the economic impacts of mountain biking in Whistler, BC and other ski areas. Whistler is not only one of the premier skiing destinations in North America, but it is also becoming a major summer destination as well, in part for mountain biking (MBTA, 2006). This analysis also relies on data generated from the Whistler example and other regional ski area bike parks, as well as from multiple studies, as described below.

IMBA Timberline Bike Park Market Study

During August 2011, IMBA conducted a market analysis of the area within a two-hour drive of Timberline to determine the number of biker visits that this market is capable of generating. The detailed report is provided in Appendix E and summarized in Table 36. The IMBA study also estimates on- and off-site spending based on the visitation projections. These spending projections are not incorporated into this analysis, as described in the Visitation and Spending discussion under the action alternative, below.

Table 36 - Potential Visitation– IMBA Market Study

Item	Value
Market population (2 hr. drive)	2,739,910
3.4% of population are mountain bikers	93,157
22% of mountain bikers use lift-served bike park	20,495
40% of bike park users will not come at all	0
40% of bike park users will do 2 visits per year	16,396
10% of bike park users will do 5 visits per year	10,247
5% of bike park users will do 10 visits per year	10,247
5% of bike park users will do 20 visits per year	20,495
Total number of same day (local) visitors	57,385
Total number of overnight (non-local) visitors	2,869
Total Visits	60,254

As shown in Table 36, the IMBA market analysis indicates that Timberline's local market is capable of generating approximately 60,000 annual visits to the bike park.[8] IMBA indicates that a population of 2,739, 910 live within a 2-hour drive of Timberline, including metropolitan Portland and Hood River. Based on the 2009 Outdoor Industry Association (OIA, 2009), 3.4 % of the total population are mountain bikers. For this market, this translates to 93,157 mountain bikers. IMBA's survey of their membership suggests that 22% of mountain bikers would visit a lift-served mountain bike park, for a total of 20,495 bike park riders in the Timberline market. IMBA's membership indicates that 40% of these bike park users would not come to Timberline at all, 40% would come to Timberline twice per year, 10% would come to Timberline 5 times per year, 5% would visit 10 times per year, and 5% of bike park users would come 20 times per year. With these percentages, the market is capable of generating 57,835 day-use visits. IMBA estimates that an additional 5% of this total, 2,869 visits, would be added by destination, overnight visitors, for a total potential market of 60,254 bike park visits.

Public comments on the Preliminary Analysis suggested that the various sub-markets in the greater mountain biking sector are not clear to the public. Many commenters predicted that the users of the proposed bike park would be younger, "zero gravity" or "freeride" riders seeking a fall-line descent, which is counter to the intended user for the proposed bike park at Timberline. (GravityLogic, 2010) indicates that one quarter of riders at Whistler, for example, are between the ages of 35 and 44.

[8] As described in the Visitation and Spending analysis below, the proposed bike park is capable of accommodating approximately 20,000 annual visits. The IMBA analysis does not consider the capacity limitations of Timberline's proposed facilities. Rather, the IMBA analysis evaluates the potential visits that the market could generate.

In the years since the late 1970s when the first mountain bicycles were put to use, the market has matured and diversified. The following mountain bike rider styles currently exist in the greater mountain bike market.

Cross-Country (XC)

Characterized by the lightest possible bicycles with a focus on peddling efficiency over comfort or control, XC riding is primarily the domain of racers who compete on less-technical trails and for whom physical fitness is more important than riding skill.

Trail

Utilizing bikes with increasing amounts of front and rear suspension (4” – 5”), pedaling efficiency is marginally sacrificed for more stability and comfort. Riders in this category frequently endeavor themselves to long, backcountry rides where solitude, challenge and self-sufficiency are key.

All Mountain (AM)

Typically sporting between 5” – 6” of suspension travel in both the front and the rear of the bicycle, the AM rider prizes descending but expects to use his or her own power to gain all or some of the necessary elevation. The trails used most frequently by AM specialists include both multi-use trails and bike-specific trails that optimize the fun and efficiency of a bicycle, particularly the ability to dynamically release kinetic energy. This is currently the largest portion of the mountain bicycle market by volume of sales.

Freeride (FR)

With growing amounts of rear suspension, typically between 6” – 8”, freeride mountain bikers focus on control and maneuverability in technically challenging conditions, including man-made and natural jumps, drops, rocky areas and steep terrain. Almost all of the trails ridden with FR bikes are gravity-fed as the bikes are not designed for uphill trail riding efficiency. Riders frequently wear more protective gear than XC, Trail, or AM riders, including full-face helmets, goggles, and body armor.

Downhill (DH)

A longer wheelbase and up to 10” of suspension provides downhill bikes with stability at high speeds. Used in the most technically challenging and fastest terrain, downhill riders and racers also typically wear full-face helmets, goggles and body armor. Terrain can be naturally occurring or man-made.

Other Categories

Other styles of mountain biking with varying degrees of participation include dirt jumping, slopestyle, four-cross, dual slalom, mountain cross and enduro. The continued evolution of the sport ensures that categories will combine as well as mutate, driven by the symbiotic combination of improved technology, bicycle-specific trails, and athletes pushing the boundaries of what is possible on a bicycle.

Summary - Bike Park Riders

Bike park trails can be ridden by bicycles that span between the AM an FR categories, in particular that aspect of the categories that focus on descending and releasing kinetic energy. The trails are lift-accessed, but the grades are relatively shallow, necessitating pedaling on the part of the user.

Sea to Sky Mountain Biking Economic Impact Study

The Sea to Sky Mountain biking Economic Impact Study (MTBA, 2006) analyzed the economic impact of mountain biking in the Sea to Sky Corridor including both Whistler Bike Park and the Whistler Valley Trails, which are similar in nature to the existing mountain bike trails on the MHNF. Surprisingly, this analysis showed that in the Sea to Sky Corridor, there was less than 10% crossover between Bike Park Riders and those using the Whistler Valley trails, suggesting that the Bike Park riders are a different user group than traditional trail riders. In fact, 90% of the Bike Park riders surveyed went to Whistler solely to ride at the park.

Overall, 68% of those surveyed were non-residents, and of Bike Park riders, 80% of the respondents were non-residents. Based on the survey methodology, MBTA estimated 1,713 riders per week on the Whistler Valley Trails and 5,111 riders per week at the Bike Park. Of the non-residents, 37% of the total and 40% of the Bike Park riders were from the United States, with Washington accounting for almost half of the US visitors.[9] Non-residents spent an average of $133.13 per person, per day on food, lodging and retail.

For the summer 2006 study period analyzed in MBTA (2006), the study estimates that the bike park itself generated over $39 Million in economic activity (i.e., initial expenditure, indirect spending, and wages), excluding the Crankworx event, which generated another $28.5 Million. In addition, the bike park sponsored 384 total jobs within the bike park and the local economy.

2010 GravityLogic Forum

The GravityLogic Forum (GravityLogic, 2010) is a conference that has been organized since 2005, where mountain biking experts speak on all a wide range of topics relating the bike park industry. Attendees typically include resort operators, land managers, and regulators interested in starting, expanding, or improving bike parks around the world. About half of the attendees for the 2010 event were from outside of North America.

As shown in Illustration 9, Whistler Mountain Bike Park has grown in visitation at least 10% for the previous ten years, with 115,000 biker visits in 2008 and 125,000 biker visits in 2009. Similarly, the much newer Winter Park in Colorado grew 60% in biker visits between 2008 and 2009, and retail sales at Winter Park increased 600% from 2009 to 2010. Winter Park Instruction and Programs had more total students and more revenue in June 2010 than in the

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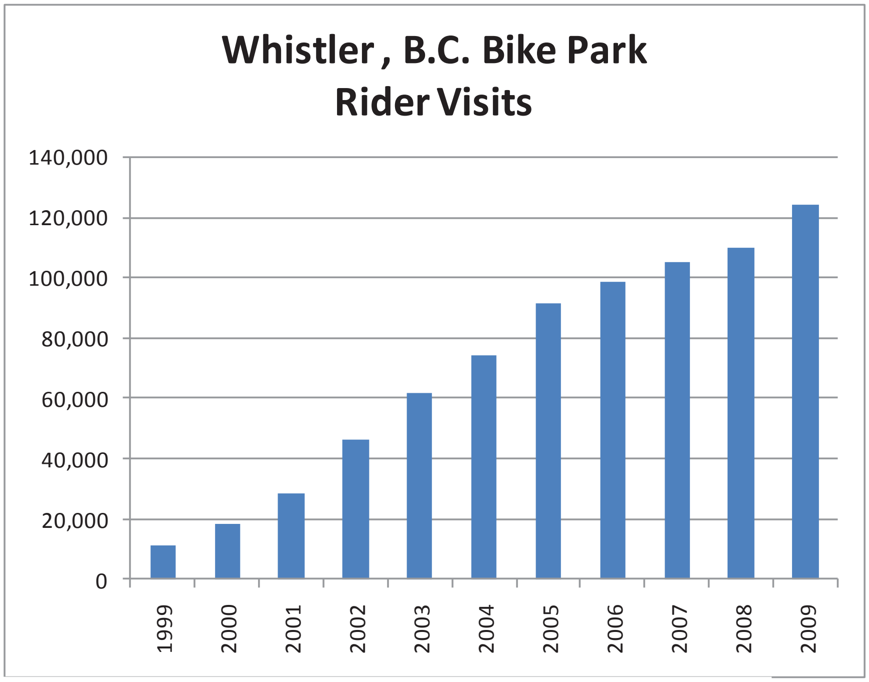
[9] MBTA, 2006 did not quantify riders from Oregon. Only Washington was separated from other US riders.

entire 2009 season. This is attributed directly to the conversion of cross-country riders to mountain bike park riding.

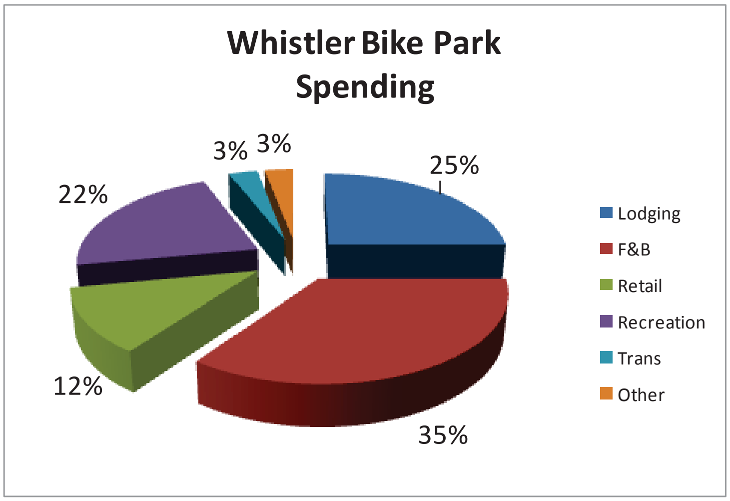
Illustration 9 - Whistler Mountain Bike Park Visits 1999 - 2009



Source: Re-Align Environmental, adapted from GravityLogic (2010)

The economic impact of the Whistler Mountain Bike Park is evident in that the busiest weekend and week for the mountain-owned bar and restaurant at the base of Whistler Mountain is now during the summer. Prior to the bike park opening, the same restaurant used to close its doors in the summer. As shown in Illustration 10, the largest percentage of bike park spending is on food and beverage, which totals 35% of the revenue at Whistler Bike Park. Second, lodging represents 25% of the revenue generated from bike park riders and third, recreation (including park tickets) accounts for 22% of the spending. An estimated 12% of revenue is generated from retail sales.

Illustration 10 - Whistler Bike Park Revenue Breakdown



Source: Re-Align Environmental, adapted from GravityLogic (2010)

GravityLogic (2010) reports that during 2009, 25% of mountain bike park riders came from United States. The majority of bike park guests (65-80%) had overnight stays with an average length of 6 nights, which was longer than the average stay for a winter guest at Whistler. Including locals and out-of-towners, the typical bike park rider averaged 14 days in the bike park. Mountain bike park riders during 2009 were 76% male and 24% female and almost 25% of the visitors were 35 – 44 years old. During 2009, the average person spent approximately $230 per day at Whistler Bike Park and offsite facilities (e.g. lodging, food and beverage, retail).

Outdoor Industry Foundation (OIF, 2006)

The Outdoor Industry Foundation (OIF) is a non-profit organization whose mission is to inspire and grow future generations of outdoor enthusiasts. OIF funded this economic analysis, which was conducted by Southwick Associates, Inc., a firm that specializes in quantifying the economics of fish, wildlife, and outdoor-related activities for government agencies and industry.

According to this study, the Oregon active recreation economy contributes more than $5.8 billion annually to Oregon's economy, supporting 73,000 jobs across the state. The active recreation economy generates $310 million in annual state tax revenue and it produces $4.6 billion annually in retail sales and services across Oregon – accounting for 3.4% of gross state product. OIF (2006) estimates that Oregon has 773,028 bikers or 28% of the State's population, which is approximately 10 times the estimate used by IMBA (2011).

Oregon offers spectacular recreation, including the Columbia River Gorge, Crater Lake, and other treasured destinations that bring in tourist dollars from out-of-state active outdoor recreation participants. Oregonians also recreate close-to-home in local parks and venues.

The Value of the Bicycle-Related Industry in Portland (Alta, 2008)

This report provides an update of the 2006 study: Bicycle-Related Industry Growth in Portland (sponsored by the Portland Office of Transportation). This report estimates direct bicycle-related business activity in Portland. The estimated total bike-related economic activity in Portland is approximately $90 million. The largest segment of this economic activity is in the retail sector, totaling approximately 60% of the market. The $90 million in activity represents a 38% increase in the value of the bicycle-related industry since 2006. The total number of companies in the bicycle-related sector rose from 95 in 2006 to 143 in 2008, a growth rate of 50%. New businesses are primarily small and locally owned.

The bicycle-related economy provides between 850 and 1,150 jobs in Portland. Hand-built bicycle manufacturers increased from 5 to 17 between 2006 and 2008, representing 340% growth. Portland is currently home to nearly 4,000 annual races, rides, events and tours (an average of one ride every 27 minutes). This has nearly doubled since 2006, when the number of rides was 2,100.

While this report addresses the overall bicycle industry, including both road and mountain biking, it is indicative of the level of economic activity that the industry sponsors in the Portland region. This report also provides evidence that the bicycle industry is rapidly growing in the Portland area.

Outdoor Recreation Participation Report (Outdoor Foundation, 2010)

According to Outdoor Foundation (2010), an outside force is needed to convince Americans to leave their home and recreate in the outdoors. Outdoor activities such as fishing, running, camping, bicycling or hiking can serve as a “gateway” to outdoor activities, often leading people to participate in other outdoor activities. Participation in these gateway activities generally increased in 2009. Biking has grown in popularity since 2006, as displayed in Table 38. Overall, this study suggests that the largest growth in recreation activities between 2006 and 2009 has been in active sports that require roads or trails. For example, the largest growth rate, 16%, is in the area of Running/Jogging and Trail Running. Likewise, both Hiking and Road/Mountain Biking and BMX have increased by 9% during the same time.

Table 38 - U. S. Participation in “Gateway” Activities Between 2006 - 09

Activity	2006	2007	2008	2009	% Growth
Fresh/Saltwater and Fly Fishing	49,696,000	51,836,000	48,206,000	48,046,000	-3
Running/Jogging and Trail Running	38,719,000	41,957,000	42,103,000	44,732,000	16
Car, Backyard and RV Camping	43,123,000	39,836,000	42,396,000	44,034,000	2
Road/Mountain Biking and BMX	39,688,000	42,126,000	41,548,000	43,264,000	9
Hiking	29,863,000	29,965,000	32,511,000	32,572,000	9

Source: Re-Align Environmental, adapted from Outdoor Foundation (2010)

People who participate in these gateway activities are more likely to participate in another outdoor activity than they are likely to participate in one activity alone. Outdoor Foundation (2010) found that 88 percent of hikers participate in more than one outdoor activity. Their participation in these activities often leads to higher activity levels and a greater connection with the outdoors.

Other Regional Ski Areas with Bike Parks

Public comments on the Preliminary Analysis included many observations that the demand for a lift-served bike park at Timberline could be met at other regional bike parks at other ski resorts in Oregon, such as Ski Bowl, Willamette Pass, Mt. Bachelor, or Stevens, Pass in Washington.

Ski Bowl

Ski Bowl is approximately 6 miles from Timberline and offers lift-served mountain biking. The trails offered at Ski Bowl are comprised of steep, downhill trails (FR) and easier road systems (AM). Many of the mountain bike trails at Ski Bowl are multi-use and allow hiker and horseback rider traffic, as well.. During the summer Ski Bowl offers a full adventure park, which includes an alpine slide, a bungee tower, a climbing wall, horseback rides, disc golf and much more. Ski Bowl's mountain biker market includes both FR and AM riders of advanced to expert ability levels from within a two-hour drive. Ski Bowl rents mountain bikes, but offers no beginner terrain or a skills park.

Willamette Pass

Willamette Pass is located approximately one and a half hour's drive outside Eugene. Willamette Pass has operated a bike park for many years, but offers limited facilities, steep terrain and it is difficult to access except from Eugene. Similar to Ski Bowl, Willamette Pass' bike park is frequented primarily by a small, local market that is comprised of advanced to expert FR and DH riders. Riders at this bike park are encouraged to wear helmets and armor. Willamette Pass does not rent bikes or any other equipment and no beginner terrain or skills park is offered.

Mt. Bachelor

Mt. Bachelor is located outside Bend on Bachelor Butte. Mt. Bachelor currently offers a limited XC mountain biking operation with no lift service. The Bend area has a vibrant mountain biking community ranging from road bikers to XC and FR mountain bikers who have several hundred miles of smooth single-track available. Ecosign (2010) suggests that there is a growing local demand for lift-served, downhill mountain biking that could be met at Mt. Bachelor. As a result, the Master Development Plan (MDP - Ecosign, 2010) includes a bike park that is similar to the proposed action in this analysis. The US Forest Service has accepted the MDP and it is under NEPA analysis. Regarding the intended market for Mt. Bachelor's bike park compared to Timberline's proposed bike park, the Forest Service has indicated that:

> "One of the key elements that separate Mt. Bachelor from Whistler is that Mt. Bachelor does not have onsite lodging. In marketing, Whistler markets their experience as a

"resort experience".   Bachelor plans to market themselves as a part of the recreation opportunities currently provided in central Oregon - you can golf one day and ski the next, or ride XC trails one day and bike park trails at Mt. Bachelor the next.

Historically, Mt Bachelor's destination skiing visitor base has been from northern California. The Portland crowd has always gone to Mt. Hood for skiing. Central Oregon is a destination for mountain biking. More of the Portland crowd may come to Mt. Bachelor for weekends. However, day use will be important at Timberline given its proximity to Portland (Tinderholt, 2011)."

Stevens Pass

Stevens Pass, WA received approval, and in 2011 constructed a bike park that includes about 7 miles of downhill mountain biking trails, accessed from the existing Hogsback chairlift. The bike park at Stevens Pass is intended to serve recreationists with a lift-accessed downhill mountain biking opportunity in Washington State (USDA, 2009). It is estimated that the bike park at Stevens Pass would serve approximately 18,000 riders during the season (ibid.). Given that Stevens Pass provides no lodging, it is expected that visitation at Stevens Pass' bike park will be local use from the greater Seattle market.

Summary

In summary, these reports, presentations and regional bike parks paint the picture of a recreation industry that is growing each year and that includes considerable participation in the Pacific Northwest. The active outdoor recreation market in the Portland – Hood River corridor area appears to be thriving, as are bicycle-related markets.

These analyses indicate that bike parks at ski areas are a viable economic enterprise and that a demand for lift-served mountain biking at Timberline exists within the Portland – Hood River corridor. A lift-served mountain bike park in the Mt. Hood area would help meet the demand for over 60,000 bike park visits in the marketplace. The descriptions of existing or proposed bike parks at other Oregon and Washington ski areas shows that they generally serve local markets, and that only Stevens Pass, WA currently offers an experience similar to the one proposed at Timberline. The Mt. Bachelor Bike Park, if approved, would also offer an experience similar to the proposed Timberline bike park for Bend residents and destination visitors to that area. A lift-served mountain biking park in the Portland – Hood River corridor, similar to the Whistler Bike Park also offers an opportunity to capture some of the Oregon market that currently travels to Whistler along the I-5 corridor.

The analysis of the Whistler Bike Park operation also suggests that visitation at bike parks represents the opportunity to sponsor economic activity outside of the bike park itself, including food and beverage, lodging and retail during the critical shoulder and summer operating seasons.

3.11.2 Emergency Services

Public services for Timberline, including fire and emergency medical, are provided via the Hoodland Fire Department, which has a station in Government Camp. The Hoodland Fire

Department is a combination volunteer/career organization funded primarily through taxes levied on property within the District. Additional revenue is generated from fees assessed on non-resident drivers involved in vehicle crashes on Highway 26. The nearest Clackamas County sheriff station is located in Oregon City, approximately 50 miles from Timberline. The nearest hospital is in Gresham, approximately 38 miles from Timberline. AMR, the Clackamas County ambulance service, dispatches 2 rigs each day out of Government Camp. Their response time to Timberline is approximately 15 minutes.

3.11.3 Traffic and Parking

At full winter-time operation, Timberline operates seven chairlifts with a CCC of the 3,990 guests per day. Although the ski facilities are capable of reaching this capacity, the greatest factor limiting Timberline from reaching their actual CCC is limited parking capacity – 920 spaces. The existing parking lots accommodate both skiers and non-skiers, thereby limiting the number of skiers that can park at Timberline. Due to this unique parking situation and available parking for ski guests, Timberline's actual winter-time operating CCC is approximately 2,900.

The summer parking capacity has not been specifically measured for many reasons. Primarily, the summer visitor at Timberline stays for less time than the winter visitor, making parking counts difficult to quantify. In addition, the absence of snow and the ski season arrival window (i.e., a rush of cars in the morning) create a situation that is much less constrained and much less in need of management compared to the winter time. The majority of visitors at Timberline in the summer are tourists visiting the historic lodge, but other visitors that are in need of parking include skiers, mountain climbers, hikers and other similar visitors. Consequently, parking that is occupied by these visitors may turn over several times during the day. RLK reports that on all but the busiest of days currently, the parking lot is usually capable of accommodating several hundred additional cars, particularly when parking is managed in the lots (Kruse, 2011).

3.11.4 Environmental Justice

Environmental justice is an important component of Federal regulatory programs, initiated by President Bill Clinton's Executive Order No. 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations* (Federal Register, 1994). As stated in the Executive Order:

> "…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high adverse human health of environmental effects of its programs, policies and activities on minority populations and low-income populations…" (Federal Register, 1994)

The minority and low-income groups living in the area surrounding Mt. Hood work in diverse occupations. Some minorities, low-income residents, and Native Americans may rely on forest products or related forest activities for their livelihood and/or culture.

There are no known areas of religious significance in the area. There are no known special places of minority or low-income communities within the project area. Individuals may work, recreate, gather forest products, or have other interests in the area.

3.11.5 Direct and Indirect Effects

No Action

Market and Economics

Under the no-action alternative, RLK would not construct or operate a mountain bike park within the SUP area. As a result, there would be no additional capital expenses or operating expenses. Similarly, there would be no new revenues. RLK's current operating model would remain in place and any changes to Timberline's economic conditions in the analysis area would be the result of population growth and/or other larger-scale economic conditions.

Emergency Services

Any increased visitation due to population growth or other economic factors would result in a corresponding increased use of emergency services. As the Hoodland Fire Department is funded by property taxes and fees assessed on nonresident drivers, any increase in services would be balanced by increased revenue. Similarly, any increase in ambulance service would be balanced by the corresponding increase in recreationists in the Government Camp area and associated spending and tax revenues.

Traffic and Parking

Under Alternative 1, the current 920 parking spaces at Timberline would continue to accommodate a theoretical 2,900 people. The presence of skiers and non-skiers in the parking lots during the summer would continue to result in the availability of parking spaces during all but the busiest of summer days.

Environmental Justice

There would be no change in access to the Timberline SUP area with implementation of the No Action Alternative or the Proposed Action. Consequently, no disproportionate effects to minority or low-income populations relating to access would take place under the No Action Alternative.

The No Action Alternative would retain the existing patterns of recreational use at Timberline, and therefore would not disproportionately affect low-income or minority populations wishing to recreate in the area.

Proposed Action

RLK and their bike park design firm, GravityLogic prepared a preliminary evaluation of the potential biker visitation to the proposed Timberline bike park, as well as economic pro forma, which modeled the capital and operating costs with the potential revenues[10]. Subsequent to finalizing the Proposed Action in this EA, RLK re-evaluated the pro forma (Re-Align Environmental, 2011) and included a shorter phasing of construction, reducing the construction time from 5 years to 2 years. The revised calculations were used to project visitation, revenues and expenses for the mountain bike park. In order to estimate the economic effect of the bike park on the analysis area, the revenue sectors provided in the Whistler bike park (Illustration 10) were used to estimate offsite economic activity that would be sponsored by the Timberline bike park.

Market and Economics

Visitation and Spending

The economic performance of the Timberline bike park under Proposed Action was modeled using Excel for a period of 6 years, starting with Year 1 as the initial year of construction and Year 2 as the first operating season (see Table 37). The following assumptions were used in the analysis:

- The capacity of the bike park at full build-out and a utilization of over 80% would result in approximately 20,000 season visits as the ultimate comfortable carrying capacity of the bike park (see Recreation Section – Capacity).
- Using precipitation and streamflow data to determine the effect of PDC Soil-11on the operating season, the precipitation threshold is exceeded 3% of the time and the streamflow threshold is exceeded 8.8% of the time (Parker, 2011). Therefore, a conservative estimate for the effect of wet conditions is 10% of the season, or approximately 9 days where all or portions of the bike park would be closed to use.
- Each bike park visitor would account for $200 in total spending – MBTA (2006) reported $133 plus bike park spending per day and GravityLogic (2010) reported $230 per day.
- Timberline Bike Park Revenue is based on RLK's revised pro forma (Re-Align Environmental, 2011).
- Food and beverage spending is 35% of total spending, based on GravityLogic (2010).
- Offsite Lodging spending is 25% of total spending, based on GravityLogic (2010).
- Offsite retail spending is 12% of total spending, based on GravityLogic (2010) and RLK Retail Revenue is based on RLK's revised pro forma (Re-Align Environmental, 2011).
- Offsite Retail Revenue is based on Total Retail Revenue less RLK Retail Revenue.
- Bike park construction would be funded with cash – no loans or debt service is considered in the analysis.
- All values are in 2011, US dollars.

[10] The original Feasibility Study is in the project record and is not included in this analysis due to the revisions that were made during the final development of the Proposed Action.

Table 37 – Economic Impact Analysis - Proposed Action

Year	Projected Visits	Total Revenue ($)	Timberline Bike Park Revenue ($)	RLK Revenue as % Total Revenue	Food and Beverage Revenue ($)	Offsite Lodging Revenue ($)	Total Retail Revenue ($)	RLK Retail Revenue ($)	Offsite Retail Revenue ($)
1	0	0	0	0	0	0	0	20,000	NA
2	6,000	1,200,000	393,000	33	483,000	345,000	165,600	30,000	135,600
3	7,500	1,500,000	496,500	33	603,750	431,250	207,000	31,500	175,500
4	11,250	2,250,000	770,625	34	905,625	646,875	310,500	50,625	259,875
5	19,688	3,937,500	1,413,750	36	1,584,843	1,132,031	543,375	98,437	444,937
6	21,656	4,331,250	1,547,625	36	1,743,328	1,245,234	597,71	108,281	489,431

As shown in Table 37, it is expected that RLK would initiate retail sales to promote the Timberline Bike Park during the first year of construction. Aside from this retail revenue, no other bike park-related revenues would be generated in Year 1.

In Year 2, all of the Phase 1 trails and skills park would be built (see Chapter 2 and Appendix B – Proposed Action) and the bike park operation would open. With an operating season of approximately 90 days, it is projected that the Timberline Bike Park would realize 6,000 bike park visits.

During Year 3, the entire bike park would be constructed. This would be the first year for RLK to market the bike park in its entirety, so it is not projected that visitation would increase by more than 25%, projected at 7,500 biker visits.

Year 4 is projected to see a 50% increase in visitation due to increased marketing and the potential for several events to take place in the bike park, resulting in a projected 11,250 bike park visits.

By Year 5, it is expected that RLK marketing would be fully implemented and word-of-mouth among U.S. Mountain bikers would sponsor a 75% increase in bike park visits, growing to 19,688 visits.

As of Year 6, the bike park would have reached its operating capacity, increasing visits by 10% and resulting in 21,656 visits for the season.

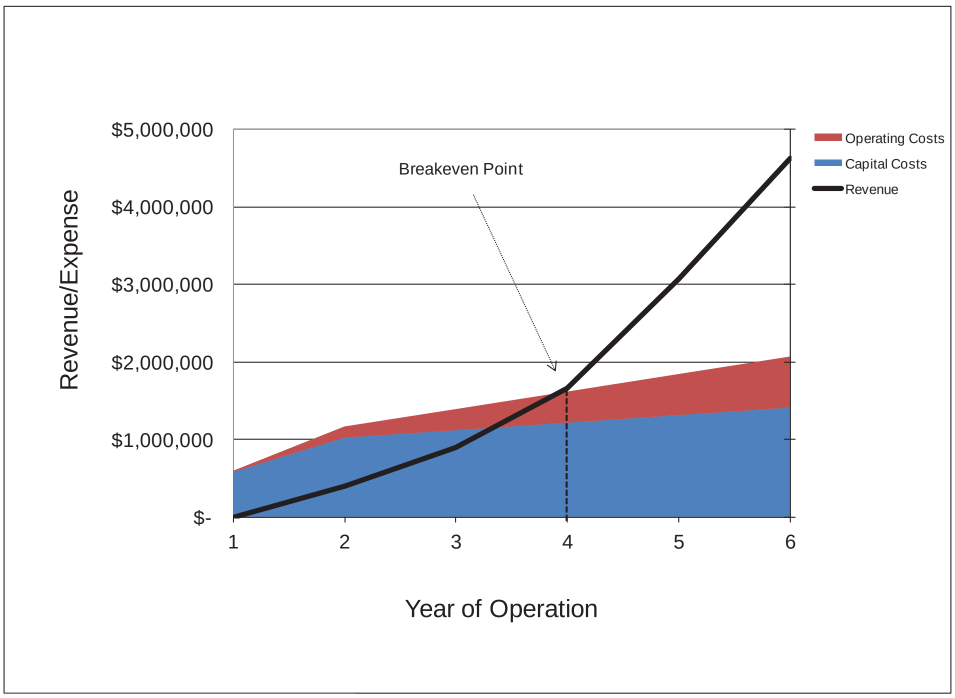
Table 37 shows that RLK's projected revenue would reach 36% of the total revenue by Year 6, suggesting that 64% of the total revenue would be realized at offsite facilities such as hotels, restaurants and stores in Government Camp and along the analysis corridor from Hood River to Sandy.

Breakeven Analysis

A Breakeven Analysis was conducted to evaluate the economic viability of the proposed Timberline Mountain Bike Park. The breakeven analysis evaluated the revenues and expenses associated with a 6-year timeframe. Operational break-even represents the number of bike park riders needed in any given year to cover all costs that the bike park incurs in that year. The determination of a break-even point is an important measure used to assess the financial feasibility of the bike park. This helps the Forest Service determine the financial and operational security of a newly approved facility on NFS lands.

The break-even analysis was completed for a six year period following the implementation of the Proposed Action by evaluating the capital and operating costs compared to the revenue received from the visitation projections described in Table 2. The costs tied to capital and operating expenses were subtracted from the revenues to determine the net revenue. An operational break-even point was then computed as the point in which the net revenue equals the operating and capital costs. As shown in Illustration 11, the Timberline Bike Park is projected to reach operational breakeven during Year 4.

Illustration 11 - Breakeven Analysis – Proposed Action



Source: Re-Align Environmental

Emergency Services

Under the Proposed Action, any increased visitation would result in a corresponding increased use of emergency services. As the Hoodland Fire Department is funded by property taxes and fees assessed on nonresidents, any increase in services would be balanced by increased revenue.

With over 20,000 additional summer visits at the Timberline Bike Park under Alternative 2 (Year 6), it is expected that injuries would increase to some degree. However, it is not expected that additional ambulance staging would be required in Government Camp or at Timberline and the numbers of injuries would be substantially less than during the ski season.

Traffic and Parking

Under the Proposed Action, the current 920 parking spaces at Timberline would continue to accommodate a theoretical 2,900 people. The presence of both skiers and non-skiers in the parking lots during the summer would continue to result in the availability of parking spaces during all but the busiest of summer days. As described in the Recreation analysis, the Timberline Bike Park would accommodate a PAOT of 338, resulting in an additional 169 cars on a capacity day[11]. The existing parking lots would continue to limit the number of visitors in the SUP area and this issue would be somewhat exacerbated on a capacity day at the bike park.

During mountain bike events and busy days, RLK would manage parking by segregating user groups into different parking areas. RLK would also implement parking and spectator management provisions in the Spectator Management Plan (see Table 3 in Chapter 2, Rec-5), which would include the use of shuttles from Government Camp to reduce the parking demand resulting from the bike park.

Environmental Justice

Under the Proposed Action, installing a fee-based mountain bike park at Timberline would serve a specific, “high end” market, as described earlier in this section. As a result, the intended user group – mountain bikers – would benefit the most from the Proposed Action. However, the bike park would be developed in an area that is typically not heavily used by recreationists during the non-skiing season, and therefore would not displace any other user groups such as non-paying mountain bikers using West Leg Road or other mountain bike trails in the area. As a result, the Proposed Action would not cause any disproportionate recreation effects to low-income or minority populations.

The Confederated Tribes of the Warm Springs have expressed interest in gathering huckleberries within the Timberline SUP area (USDA, 2004). The Proposed Action may result in the removal of individual huckleberry plants along the ground disturbance corridor due to the creation of the bike trails. However, given that the majority of the bike trails are in heavily forested areas, where huckleberry growth is typically more sparse, as opposed to the ski trails where

[11] Assuming 2 people per car, which is less than the average for ski days in the winter.

huckleberry growth is more dense, the availability of, or access to huckleberries in the SUP area would not be measurably reduced. Consequently, under the No Action or the Proposed Action, there would be no disproportionate effects to tribal huckleberry gathering.

3.11.6 Cumulative Effects

Because none of the alternatives would be expected to disproportionately affect low-income populations or minority populations, there would be no contribution by the No Action Alternative or Proposed Action to cumulative effects associated with environmental justice.

Recent upgrades to the mountain bike trail system at Ski Bowl would add to the supply of developed mountain bike trails in the Government Camp area. Ski Bowl has voiced support for the Timberline Bike Park, indicating that they believe the new bike park would draw more people to the Government Camp area, including both Timberline and Ski Bowl. The economic impact of this synergy would likely increase offsite spending beyond the projections in this analysis.

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Chapter 5: List of Preparers

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Kristy Boscheinen NEPA Specialist and IDT Leader- *USFS*	BS Forest Management, Colorado State University 1999; Master of Public Administration, University of Colorado, 2007. Forest Planner for Mt. Hood NF since 2009	Project Leader
John Dodd Soil Scientist- *USFS*	BS Soil Science, Land Use Emphasis. 23 years of experience with the Forest Service	Soil Resources Watershed Resources Watershed Restoration
Alan Dyck Wildlife Biologist- *USFS*	BS Wildlife Management, Humboldt State Univ., 1980. Wildlife Administrator Ft. Pickett, VA 1984-1996. Wildlife Biologist NRCS, VA, 1996-2000, Forest Wildlife Biologist Mt. Hood NF, since 2000	Wildlife Biology
McKenzie Jensen Recreation Specialist- *USFS*	BS Earth Sciences, Montana State 2004. 6 years experience with the Forest Service	Recreation
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Todd Parker Hydrologist- *USFS*	BS Forest Management and BS Business Management, Oregon State Univ., 1981. Hydrologist on the Columbia Gorge and Zigzag Ranger Districts since 1992.	Watershed Resources Watershed Restoration GIS analyst
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Jim Thornton Recreation Specialist- *USFS*	BS Environmental Sciences, Richard Stockton State College, 1980. 30 years experience with the Forest Service.	Recreation
Contractors		
Bill Granger, Project Manager and NEPA Specialist – *Re-Align Environmental*	BA Biology, Alfred University, NY 1987 MEM Aquatic and Wetland Ecology, Duke University, 1988. 23 years experience preparing NEPA documents and leading NEPA teams.	Proposed Action, Visuals, Socio-Economics, Recreation, Aquatics, Document and Map Production
Rebecca McLain, Social Scientist – Independent Consultant	PhD Forest Management (Policy specialty), University of Washington, Seattle 2000; MSc Land Resources, University of Wisconsin-Madison 1986; BA Anthropology, University of Texas-Austin 1977; 30 years experience in applied social science research; Senior Social Scientist with the Institute for Culture and Ecology since 1999.	Sense of Place Assessment

Appendix A: Response to Comments

Public Comment	Response
Editorial/Document Production	
The image on the cover provides the very first impression of the proposal under analysis in the document, and the image provided on the cover is that of a cross-country mountain biker. RLK asks that you replace this image with one that is more typical of our rider, and that reflects our stewardship as explained in the proposal and discussed with the Forest Service for over a year now. If appropriate, RLK would be glad to provide such images. Page 3 contains the same image.	The image on the cover of the EA has been changed to better reflect the typical rider using a lift assisted managed mountain bike trail.
The inside Cover shows a date of January 2011 while the outside cover shows March 2011.	This typographical error has been corrected in the EA.
Page 1, paragraph 2 provides a very brief description of the proposed action under analysis. However, this brief description does not provide the entire proposed action – several of the restoration projects in the proposed action are not described here because the author chose to use miles as the metric. At a minimum, RLK asks that this paragraph be revised to reflect the overall acreage of mountain bike trails (17.19 miles and 12.1 acres) as compared to all of the restoration projects (2.1 miles of roads and trails as well as 5 restoration sites totaling 5.9 acres). We understand that these numbers are given later in the document, but again, this is Page 1 of Chapter 1 – the first impression is the most important.	Additional discussion of the restoration projects has been added in this section of the EA.
On page 10, the response regarding “Illegal Trails” suggests that reducing unauthorized use is not one of the purposes of this proposal. This response is inconsistent with the second paragraph in Section 1.2.	The discussion on unauthorized trail use in section 1.2 has been clarified in the EA.
On page 17, the description of excavated trails does not stress enough that hand tools will be used for construction almost as much as the excavator. The picture of a work crew on page 25 is typical of how the trails will be hand-finished after the initial shaping by the mini-excavator. RLK asks that the description for Wide-Excavated and Narrow-Excavated trails be revised to reflect the use of hand tools.	Additional discussion on the use of hand tools has been added to section (2.3.3) of the EA.
Figure 4 on page 20 shows the wrong location for the skills park and the associated drainage features. It seems as if the whole image is “shifted” to the west. Please revise this figure to reflect the correct location of the skills park under the Bruno’s chairlift.	A more accurate figure of the skills park has been included in the EA, see Figure 4.
On page 22, Section 2.1.3 – Watershed Restoration, paragraph 2, the introductory sentences are misleading as to what is actually in the proposal. The first sentence describes the	Additional discussion of the restoration projects has been added to Section 2.3.3 of the EA.

Public Comment	Response
project in acres, with miles in parenthesis. The second sentence then breaks it down by watershed using miles as the metric and acres in parentheses. The 5.9 acres of restoration includes more than the 2.1 miles of roads. Please revise this text so that acres are consistently the metric and the figures cited clearly explain what is in the proposal.	
Later in page 22, paragraph 2, line 10 does not include a number in "*would be surfaced with inches of gravel*". RLK will place six inches of gravel over this road – please make this revision.	This clarification has been added in Section 2.3.3 of the EA.
Page 41 – Restoration Actions, paragraph 1 refers the reader to "above section entitled 'Observed Road and Trail Erosion'". No such section is provided in the PA section, and this appears to be a copy/paste from the specialist report. This appears to be a copy/paste error. RLK asks that this section be re-written properly.	This has been corrected in the EA, see Section 3.1.
The existing PA documentation is a compilation of pasted material from the specialist reports that is inconsistent and confusing. This is unfortunate given that the PA was the first public view of the final proposal and the environmental analysis. RLK is concerned that an inordinate amount of work will be needed to respond to erroneous public comments that are based on the confusing nature and format in the PA.	Reports prepared by specialists on the interdisciplinary team provide important information that is utilized in the environmental analysis. Edits have been made to Chapter 3 of the EA to clarify any perceived inconsistencies or confusion that was raised by commenters.
Chapter 1/General NEPA	
The existing Infrastructure at Timberline provides the best location for the Bike Park. Allowing this use at a site that is currently operating in the summer makes sense. The NSAA/FS MOU stresses the use of existing infrastructure for four-season use.	A discussion of the NSAA/FS MOU has been added in Section 1.2 of the EA.
Timberline's Conceptual Master Plan should undergo NEPA – acceptance of the Master Plan is a Decision.	The "acceptance" of a Conceptual Master Plan does not approve or authorize any use or activity. The Forest Service does not make any decision on any element in a conceptual master plan when it is accepted. Compliance with NEPA is required before any decision is made authorizing any use or activity that is envisioned in a conceptual master plan. The role of the master plan is discussed in section 1.x) of the EA
The Conceptual Master Plan should be made available to the public (online).	The Conceptual Master Plan is a document that is owned by RLK and Company. Any decision to post it on the internet would be made by them. The Forest Service copy is available for

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	review at the ZZRD.
The SUP language will have to be revised to allow this bike park. Normally a change of allowed use requires a NEPA process.	This mountain bike proposal, including any language changes to the SUP, is currently going thru the NEPA process.
The proposal should include Molly's Base Area and other lifts like Molly's.	Molly's Base Area or any other lifts have not been proposed by RLK and therefore not included in this analysis. A discussion on other elements in the conceptual master plan is included in Section (1.1) of the EA.
Forest Service has already decided to approve the bike park as demonstrated by the "Coming Soon" campaign on Timberline's website.	To date, no decision has been made by the Forest Service on the proposed mountain bike park. Timberline's website is operated by RLK and Company and not the Forest Service.
Addition of restoration should be re-scoped and is not consistent with NWFP. The restoration should be made a part of the No Action alternative because it should happen no matter what under the SUP. The wording in the report sounds like a threat that if the bike park is not built, the restoration will not take place.	The restoration activities were described and included in the proposed action that went out for public comment. We disagree that restoration is inconsistent with the Northwest Forest Plan. The restoration activities are part of the proposed action and are not intended to be a threat. Under the No Action Alternative no new activities of any kind would be approved. Additional discussion on the restoration activities and their inclusion in the proposed action has been added to Sections 1.2 and 1.3 of the EA.
The PA violates NFMA regarding MIS by relying on 2005 NFMA planning regulations, which were vacated and enjoined by the northern District of California.	The NFMA planning regulations "…set forth a process for amending and revising land and resource management plans…" 36 CFR 219.1a. The PA did not rely on the 2005 planning regulations. The Mountain Bike Park is a proposed project under the existing Mt. Hood NF Land and Resource Management Plan and is not a revision or amendment of that plan. As such, the direction for MIS in the existing Forest Plan has been followed.
We question the need for lift served mountain biking and request further clarification on the information, if any, relied upon by the Forest Service in demonstrating this need.	Additional discussion on information related to the demand for lift served mountain biking has been included in Sections 1.1 and 1.2 of the EA. Section 3.10 of the EA has also been updated to include a market study specific to the Proposed Action.
The analysis assumes that the proposed bike park will reduce "free-riding" and associated resource damage, but no means	Although a reduction in unauthorized "free riding" would be a desirable outcome of the proposed bike the analysis does not assume this

Public Comment	Response
of achieving this is included in the analysis.	will happen and is not one of the purposes of this proposal.
The analysis lacks details regarding the prevention of unanticipated environmental impacts by spectators.	If RLK would propose events with spectators, PDC Rec-5 (see Table 3 in Chapter 2) would provide direction regarding the management of spectators to prevent environmental impacts.
The Hydrology Report mentions the DWPAs for Government Camp and Timberline and says that the Drinking Water Protection Plans have not yet been prepared. This is one of a dozen plans that is mentioned in the PA but not included in the PA. Obviously the proposed project cannot proceed in the DWPA until the plans have been developed.	The finalization of the DWPA planning is an independent process that has nothing to do with this NEPA process, or the Forest Service. This analysis does not rely on the DWPA planning process, nor does the DWPA process rely on this NEPA process. Lack of a current Drinking Water Protection Plan does not preclude the development of the proposed bike park and restoration projects. In this analysis, impacts to drinking water were not identified as an issue or an impact (See Section 3.2
The list of authors is not listed near the title page. The list does not include their job title and it is unclear whether they work directly for the Forest Service or not. The impression is that the authors do not wish to be connected to this proposal.	Additional information has been added to Chapter 5 of the EA.
The report does not contain a section that explains the process for a "Preliminary Assessment" and in several places the document refers to itself as an "Environmental Assessment".	This has been corrected throughout the EA.
The document should include a discussion about the history and purpose of Timberline Lodge, including quotes from President Roosevelt's dedication of the Lodge and how the lodge is intended to provide "new opportunities for play in every season of the year". A diverse recreation offering has been the desired future condition at Timberline since its inception despite some people's desire for it to be a "wilderness retreat".	Noted. Additional discussion on the history and purpose of Timberline Lodge, as well as the desired future condition, has been added in Section 1.2 of the EA.
Page 4, Section 1.2 Purpose and Need for Action, paragraph 2 describes unauthorized, downhill mountain bike trails being created on the National Forest and suggests that our proposal will provide an alternative for these users. RLK asks that you correct this paragraph to reduce the appearance that our proposal is intended to reduce unauthorized activities elsewhere on the Forest. RLK indeed hopes to capture these users as customers, but that is the logical limit of the discussion regarding these riders.	Although a reduction in unauthorized "free riding" would be a desirable outcome of the proposed bike the analysis does not assume this will happen and is not one of the purposes of this proposal. Section 1.2 of the EA has been updated to better display the Purpose and Need for this proposal.
Page 8, Section 1.6 describes documents that provide "over-arching" direction, guidance, or precedent. RLK asks that you include discussion about the many Forest Service documents	While the Bike Park Proposal is consistent with the overall goals of the More Kids in the Woods program (reconnecting kids with nature and

Public Comment	Response
that address the agency's support of mountain biking. These include the *More Kids in the Woods* program, and the agency's Service-Wide Memorandum of Understanding 06-SU-11132424-076 between the United States Department of Agriculture Forest Service and The International Mountain Bicycling Association (IMBA). RLK also asks that the Recreation Section of the analysis be updated to better reflect the proposed action's consistency with these initiatives.	improving children's health), it is not directly related. This program is a competitive funding program for partnership projects that are nominated and selected annually. This proposal is not one of those projects. Additional discussion of the IMBA MOU as well as the NSAA MOU has been added to Section 1.2 of the EA.
Chapter 3 contains a great deal of editorial comments, which we find biased. Also, RLK requests that any discussion about effects include a discussion about pertinent project design criteria (referring to Table 3 to save space) that are intended to reduce or prevent the impact.	Additional references to the Project Design Criteria in Chapter 2 (see Table 3) have been added to Chapter 3 of the EA.
Chapter 2	
The Skills Park shown is too small compared to what will be built. 0.2 acre does not allow for expansion in the future.	The size and description of the skills park is what is being proposed by RLK and is what would be built if approved. Any expansion of the park would have to be proposed and analyzed consistent with NEPA.
Construction access corridors are not analyzed in the Preliminary Assessment and must be identified in the EA.	Access for construction would use existing roads and/or bike trails themselves. No new roads are being proposed.
The report does not include any discussion about alternatives that were explored. No Reasonable range of alternatives is provided – regional sites and various trail types must be evaluated. The only Forest Service sites that might be suitable alternatives for the proposed bike project are sites that have been mined.	Section 2.1 of the EA has been updated to display the evolution of the proposed action, including the ways that other trail configurations were initially considered. Other sites such as other ski areas or mining areas and other trail types would not meet the purpose and need for the proposal – this analysis is in response to a proposal for a bike park at Timberline. Thus, analysis of bike parks at other facilities is outside the scope of this analysis.
The document asserts that the project will result in a "net" disturbance of 7 acres by erroneously assuming that 13 acres of bike trail disturbance will be offset by about 6 acres of restoration.	The EA has been clarified to better display the positive and negative environmental effects associated with implementation of the Proposed Action. The discussion about a "net disturbance" has been removed.
It is unclear how the park would be maintained and managed, including events, spectators, off-trail riding, volunteer/paid staff, control of wet and dry riding conditions and unlimited potential expansions or modifications.	The Project Design Criteria in Table 3 provide detailed direction on operation and management of the bike park, spectator management, management of off-trail riding, and weather conditions. The potential for expansion or modification is outside of the scope of this analysis – RLK has made no proposal to modify

Public Comment	Response
	or expand the proposed bike park. Any such proposal would require analysis and approval under NEPA.
The PDCs will need to be integrated into construction documents, Special Use Permit conditions and other relevant documents and be enforced by Forest Service personnel. The Forest Service would have to have adequate funding each year the bike park operates to monitor implementation of the PDCs. Forest Service specialists should have full access to all of the monitoring data.	If the bike park is approved, the PDCs would be incorporated into construction/operating plans and would be monitored by the Forest Service.
I did not see mention of the accessways or roads that would be created to allow access for construction, maintenance and emergency rescue.	Access for construction, maintenance, and emergency rescue would use existing roads. No new roads are being proposed. Section 2.3 of the EA has been updated to better display the access corridors for construction, maintenance and emergencies.
It is inconceivable to think that at a time when living trees are so essential for moderating global climate disruption that your agency is proposing to destroy trees for these proposed trails, roads, and "wooden TTF's".	To the extent practicable trails have been designed to avoid cutting any trees greater than 6" DBH, and the skills park is proposed in an existing cleared area under a chairlift.
The forest trail in the north Georgia piedmont where I have run and walked as passive "recreation" since 1991 provides an excellent example of the significant impacts that even low-impact off-road biking causes to forest trails. …even moderate use of these trails by bikes was causing: 1) significant erosion of the trails, 2) damage to roots of trees and other vegetation in the area and 3) significant disruption to the wildlife and runners and hikers. Consequently those forest trails were designated as "off-limits" for all bike use. "Off-road" biking is restricted to the gravel maintenance roads at the forest.	The bike trails are being proposed as down hill mountain bike use only and are not intended to accommodate mixed use. Project Design Criteria (see Table 3 in Chapter 2) have been included in the proposal to reduce erosion, damage to vegetation, disruption of wildlife, and conflicts with other recreational users.
In my opinion, the erosion and damage to roots that would result from the proposed project are sufficient reasons for your agency to conclude that the proposed project is unsuitable for the environmentally sensitive Mt. Hood area. Therefore, your agency should either deny the project or conduct a comprehensive Environmental Impact Statement (EIS) and formal consultation with the US Fish and Wildlife Service (USFWS) to determine all of the direct, indirect and cumulative adverse impacts of the proposed bike project, in addition to addressing suitable alternative sites.	An analysis of impacts to soils and vegetation is included in section 3 of the EA. The responsible official will use this information in determining the need for an EIS and for making a decision on the proposal.
The PA did not contain information regarding the design of the trails, including engineering-type drawings, a clearer picture of how the trails interact with each other, sediment controls, etc.	The EA has been updated to better display the details of the trails. Appendix B contains the design parameters that would be used, should the Proposed Action be approved. Engineering

Public Comment	Response
	drawings are not available at this time because the project has not been approved for construction.
Our review of the Preliminary Analysis left us feeling as if there is some question in our ability to operate this facility. The document contains dozens of conflicting statements, confusing or out-of-scope editorial, and very little recognition of the collaboration between RLK and the Forest Service specialists during the initial trail layout process. The document contains mis-information such as comparisons of our day-use, managed bike park to unmanaged overnight mountain bike terrain, or even more surprising, to motorized OHV terrain. It is apparent that the specialists' analyses are rooted in a lack of understanding of our proposal despite numerous written communications, site tours, and meetings. Worse yet, many of the statements in the specialist reports come across as editorial, value-laden preaching that decries mountain biking in general while never distinguishing our proposed bike park from other, less managed mountain bike terrain. The resulting project design criteria are far-reaching and are not in keeping with the standards to which the Forest Service holds itself or other similar permittees on the Mt. Hood National Forest.	The EA has been updated to provide a more thorough analysis based on issues and indicators that would be consistent with a bike park analysis anywhere on the National Forest. The Project Design Criteria are extensive. Many of the criteria in Table 3 are similar to those used in other bike parks on the National Forest, while others are specific to the issues and concerns associated with the construction and operation of a bike park at Timberline.
RLK understands that this is a new, unique (we would suggest 'exciting') recreation offering on the Mt. Hood and the proposed project design criteria reflect a lack of familiarity with the concept of a lift-served mountain bike park, as well as how different it is from more traditional mountain biking. Much of the analysis seems to include the unfortunate mis-perception of mountain bikers as young, crazy people who ride off trail and throw trash everywhere.	Noted. Section 3.10 of the EA has been updated to better display the various types of mountain bikers. Chapter 2 of the EA has been updated to display that the proposed bike park would service individuals and families from beginner to expert (see Section 2.3).
RLK finds that the document does not properly address the significant amount of collaboration that has been undertaken to design the mountain bike park. The size and scope of the bike park has been reduced since original inception, which was scoped to the public and is briefly mentioned in Chapter 2. Chapter 2 does not do justice to the amount of work, the many field meetings with the Forest Service specialists, and the public, as well as the dozens of revisions by RLK and our bike trail designers. Much of the analysis in the PA seems to make the assumption that we won't care for these trails to the same standard that we have cared for our permit area for decades. Similarly, we are committed to implementing the watershed restoration projects with the same level of care.	Additional discussion has been added to Section 2.1 of the EA to better reflect the level of collaboration that has occurred in designing the trails.
The description of the proposed action is thorough and detailed. This is reflective of the tremendous amount of work that RLK has done to address Forest Service issues since the	Additional discussion has been added to Section 2.1 of the EA to better reflect the level of collaboration that has occurred in designing the

Public Comment	Response
initial scoping of the project. We are concerned that the discussion about the development of the proposed action is buried in the back of Chapter 2. RLK asks that the numerous field revisions and our revisions be more visible in the document – could this discussion not be located before Section 2.1 – Proposed Action? Again, it is the public's perception we are concerned – we want the public to know that the proposed action is substantially less than our originally envisioned bike park and we have made dozens of revisions to address issues raised in scoping and by agency staff. RLK is not "getting everything that we want" as we have seen and heard from the opposition to this project.	trails.
Page 24, Table 2, Alpine Trail, describes the action that will be undertaken to restore the trail. The term "surfacing" is used. This is confusing given that we are also surfacing roads. RLK asks that this text be clarified to reflect that we will re-surface the trail differently than the way will re-surface roads.	This has been clarified see Section 2.3.3 of the EA.
Page 26, 2.1.5. If dates must be given in this text, RLK asks that the text be revised to better reflect that opening and closing dates will be largely dictated by site conditions, and this will be clearly articulated in our Ski Area Operating Plan, similar to the ski operations.	Section 2.3.6 of the EA has been updated to reflect that the dates indicated are general guidelines.
On Page 27, the first line states that RLK patrol will be given at least one hour to sweep the trails before sunset. RLK asks that this sentence be revised to better reflect that opening and closing times will be determined by RLK based on site conditions, consistent with the Ski Area Operating Plan.	Section 2.3.6 of the EA has been updated to reflect that opening and closing times for the bike park would be determined based on site conditions and demand.
Table 3 on page 27 provides project design criteria that are included as components of the proposed action. RLK asks that the project design criteria all be revised to reflect work that has already been done in the design rather than stating that it "would" be done.	Table 3 has been revised to reflect work that has already been done.
RLK asks that Mon-2 be revised to reflect that we will communicate with the Forest Service as directed in our Ski Area Operating Plan and more importantly, to stress that we as the operator will act in our best interests to constantly provide the highest level of experience for our guests. In short, we will manage the trail system better than any restrictions imposed by the Forest Service in these project design criteria because that is what we do. We will communicate with the Forest Service about the mountain bike park just as we do with the ski area and the Lodge.	The Forest Service has revised Mon-2 to reflect monitoring and reporting that would be necessary to ensure implementation of the Project Design Criteria and to validate the analysis in this EA.
Her-1 instructs us to lay out the trails in a manner that is the least visible to West Leg Road. The trails have already been laid out in the best location for meeting many objectives,	Her-1 has been revised to reflect that the trails have already been laid out in this manner (See Table 3).

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including riparian issues and minimizing the impact to forest stands (i.e., no clearing of trees >6" dbh). We are concerned that the wording of Her-1 will result in us being asked to move trails away from the road, when they have already been sited and walked by the ID Team many times. Further, what is the definition of "least visible"? RLK asks that Her-1 be re-worded to reflect that the trails have already been laid out and determined to be minimally visible from West Leg Road, with the exception of crossings or areas where the trail parallels the road itself. These have been deemed acceptable by the Forest Service.	
Rec-1 indicates that parallel trails "would be" joined into one trail prior to crossing West Leg Road. Again, the trail layout has already occurred. In many cases, this situation is true, but in other cases, we have simply moved trails to avoid crossing West Leg Road altogether. RLK asks that the first sentence of REC-1 be omitted.	Rec-1 has been revised to reflect that the trails have already been laid out in this manner (See Table 3).
Rec-5 refers to a Spectator Management Plan and indicates that RLK may not provide restroom facilities at the bottom terminal of the Jeff Flood Express. We currently provide porta-potties at the bottom terminal of EVERY chairlift during the ski operation. Nonetheless, RLK understands the sensitive riparian areas that are more apparent in the snow-free season, so we will adhere to this Rec-5. RLK requests that this portion of Rec-5 be revised to reflect that we can provide restroom facilities in other locations near the bottom terminal that are away from riparian areas.	Rec-5 has been updated to allow for porta-potties near the bottom terminal, but outside of riparian reserves (See Table 3).
Rec-7 suggests that a "qualified trails designer" would oversee our work on the Glade Trail and that we will be held to the standards in the Forest Service Manual and Handbook. While we applaud the opportunity to fix this long-time problem on a Forest Service trail, the Forest Service Manual and Handbook standards are in some cases outdated. If the agency wishes to design the road-to-trail conversion, then please do so. If you wish for RLK to design it for your approval, that is fine too. Tell us what to do and we will do it, provided that we are not being held to a higher standard than the Forest Service would hold itself to (i.e., will the Forest Service's Timberline to Town Trail meet visual standards within one year?). Please clarify Rec-7 to reflect these concerns and clarify what we are supposed to do.	Rec-7 has been modified to indicate that the qualified trail designer must be approved by the Forest Service (See Table 3).
Soil 7 estimates 7 tons per acre of Woodstraw or equivalent. We have found in our restoration efforts at the bottom terminal of the Jeff Flood Express that this application rate may be much too high – possibly preventing the establishment of ground vegetation. RLK asks that you omit this text from Soil-7. The last sentence allows us to verify application rates	Soil-7 has been updated to indicate that application rates would be verified in the field (See Table 3).

Public Comment	Response
in the field, so there is no need to state a number, especially one that is too large.	
Soil 11. The Ski Area Operating Plan provides operational guidelines and the basis for our communication with the Forest Service about operations. We have successfully communicated with the agency for decades this way. The Forest Service has never directed us to open or close a trail – our permit and partnership puts the responsibility on RLK to make those decisions on a daily basis. RLK suggests that in order to meet the objective of Soil-11, you allow us to monitor the existing rain gauge at the SNOTEL site, just as we monitor the weather for snow season. The decision to open or close should be ours and it should be based on the trail conditions, not a reading on a website. Tell us when the Bull Run River is at 200 cfs when you tell others and we will respond accordingly by looking closely at site conditions and assessing the operation per our Ski Area Operating Plan – this is what we do. Our preference would be to eliminate Soil-11 because Soil-5 addresses the same concern.	Soil-11 has been updated to provide for flexibility in the opening and closure of bike trails due to moisture in the ground or rain. The Forest Service permit administrator would monitor conditions in collaboration with bike park staff (See Table 3).
Soil-13 has the same issues as Soil-11. RLK has the expertise and a demonstrated, successful record of operating and responding to weather conditions. RLK asks that Soil 13 be omitted because Soil-5 addresses the same concern.	Soil-13 has been modified to include evaluation of onsite conditions (See Table 3).
Veg-2 states that the Forest Service will approve any clearing limits for trees greater than 6" dbh. We find this very frustrating in that since our first introduction of the project, RLK has stated that we propose to cut no trees greater than 6" dbh. This has been re-stated in our formal proposal to build the bike park, and Veg-1 – right above it in the table- says that we will not cut trees greater than 6"dbh. Furthermore, the trails have all been flagged in the field and they all avoid large trees. The botanist has reviewed these trail alignments. Because of this error, the PA suggests that RLK plans to cut large trees for the mountain bike trails. This is wrong and mis-leading to the public. RLK asks that Veg-2 be omitted and any reference to cutting trees greater than 6" dbh be removed from the PA and technical reports.	Veg-2 has been updated to remove any discussion of cutting trees greater than 6" DBH.
Veg-6 requires RLK to conduct noxious weed surveys. RLK would be willing to receive training from the Forest botanist on methods for finding and managing these species. However, the requirement that we create and maintain a geo-referenced database is far and above more than the Forest Service requires of itself. RLK requests that Veg-6 be re-written to include a more collaborative effort in managing noxious weeds.	Veg-6 has been modified to indicate that monitoring would be carried out by the Forest Service and RLK.

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Veg-7 is an example of project design criteria that ignores the collaborative planning that has already happened over the past one year. The botanist has walked the trails as flagged on the ground and seen that we propose to cut no tree greater than 6" dbh. Given this, why are we being instructed not to "daylight" trails? How could we daylight trails without cutting large trees? Soil 3 already states that we will protect roots and vegetation, so why is this even included? We have already done this by design and again, this statement in the PA suggests that there is potential of us creating canopy openings. This is potentially confusing to the public. RLK asks that Veg-7 be removed from the PA and the technical reports.	The issue driving Veg-7 is protection of large trees during the operation of the bike park, such that large trees along the trials are not damaged, resulting in future mortality, which would open the canopy.
Veg-8 instructs RLK to treat invasive plants with herbicides. This could have easily been written into Veg-6. During the public forum held by the Forest Service for the Villages of Mt. Hood in January 2011, the District Ranger stated that no herbicides or pesticides would be used in the mountain bike park. RLK asks that you clarify this inconsistency.	The use of herbicides would be warranted, per Veg-8 (See Table 3).
Veg-10 requires RLK to prepare a plant salvage plan. RLK is more than willing to salvage and/or transplant vegetation under the direction of the botanist. Rather than a paper exercise in developing a plan, RLK asks that the botanist visit the trails pre-construction to tell us what to do. We find the use of the term "needlessly" in Veg-10 to be an editorial on the botanists' view of our proposal. The last sentence should be eliminated and Veg-10 should be re-written to reflect a more collaborative effort in the salvage of vegetation.	Veg-10 has been revised to reflect that this plan would be prepared in collaboration with the Forest Service.
Veg 12 instructs RLK to collect and propagate seeds. Given that the Forest Service wants to oversee every aspect of the bike park operation (i.e., what we do) to look for impacts that will not occur, we find it ironic that this criteria assumes we are capable of propagating native seeds. If the agency would like for us to collect seeds under the guidance of the Forest botanist, we will do so. RLK asks that Veg-12 be re-written to better reflect a collaborative effort in the propagation of native seed.	Veg-12 has been updated to include a reference to Veg-10, such that this effort would be a collaborative part of the Plant Salvage Plan (See Table 3).
Veg-15 is based on mis-information and appears to assume that our mountain biking guests will be hell-bent on destroying the bike park and its environment. The botanist's own research suggests that there is little evidence of substantial environmental damage (see previous comment regarding page 11), yet Veg-15 lists a litany of issues that seem to be there only to suggest the assumed likelihood of impacts. The intended readers of this signage are not the mountain bikers that would be guests at our bike park. This appears to us to be arbitrary and capricious.	Veg-15 has been revised to better reflect the intended message to bike park users (See Table 3).

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Veg-16 requires riders to wash their bikes before entering the park. This is an attempt to highlight and respond to the invasive plant issue that may or may not exist. RLK intends to provide a washing station for our guests to use after their day in the park, which is typical of the industry. This again seems arbitrary and capricious in that it would not be applied consistently to the other user groups that may harbor invasive species (e.g., hikers) on the Mt. Hood National Forest or even in our SUP area. This is just editorial in nature and does not belong in a PA. It is based on lack of familiarity about this sport and the user group. This could be perceived as impractical and unreasonable by our guests. RLK requests that Veg-16 be omitted from the PA and the technical reports.	Veg-16 has been updated to reflect that bike park users would be required to wash their bikes prior to entering the bike park to prevent the spread of invasive plants. This is consistent with other bike park approvals on the National Forest. The bike park entrance presents an opportunity to manage for invasives because all users will enter the park at this location, unlike other dispersed users.
Veg-17 instructs RLK when to open the mountain bike park. Again, our Ski Area Operating Plan is the mechanism for determining our operational requirements. Similar to our comments on Soil-11, RLK requests that Veg-17 be re-written to reflect our expertise and history in operating lifts and trails with consideration of weather and site conditions.	Veg-17, like Soil-11, is intended to be a guideline for trial opening. The Forest Service would monitor site conditions in collaboration with bike park staff.
Veg-20 instructs RLK to salvage plants from the skills park area and the bike trails. Is this not already included in Veg-10? Our comments on Veg-10 apply here, as well.	Veg-20 specifically refers to the bike park plants. Veg 20 refers to Veg-11 (plant salvage and re-planting guidelines) an Veg-11 refers to Veg-10, which has been updated to better reflect collaboration between RLK and the Forest Service in the plant salvage effort.
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WS-3 lists “rock, mineral soil causeways, raised wooden boardwalks, and/or rock armoring” as means to protect wet areas in trails. RLK asks that “or other appropriate measures” be added to this list so not to limit other possible solutions.	WS-3 has been updated to include “or other appropriate measures” (See Table 3).
WS-7 is too specific. Not all turns in trails will require such substantial grading as to result in an in- or out-slope. It is true that bermed turns will be treated this way where topography and drainage dictate this treatment. Please revise WS-7 to reflect this clarification.	WS-7 has been modified to indicate that generally, banked turns would be treated in this manner (See Table 3).
WS-17 is too vague for RLK to implement. RLK suggests that this measure be revised to state that we will, at a minimum, monitor turbidity in the Still Creek and West Fork Salmon drainages at points that allow for a determination that increased turbidity is or is not a direct result of an activity in the bike park (i.e., upstream and downstream of a construction site).	WS-16 and WS-17 have been updated to better display the intended monitoring.
Chapter 3	

Public Comment	Response
Soils	
The analysis does not assess the effectiveness of proposed restorations. Road de-commissioning will not restore infiltration rates or vegetation composition for years.	Sections 3.1 and 3.2 of the EA have been updated to better assess the effectiveness of the proposed restorations.
The analysis assumes that rules would be followed, PDCs would be implemented and restoration would be effective. The EA should discuss the effectiveness of the PDCs and other measures.	Correct. It is assumed that RLK would follow the rules, as they currently do. The Project Design Criteria include monitoring by the Forest to ensure implementation and effectiveness monitoring. Sections 3.1 and 3.2 of the EA have been updated to better assess the effectiveness of the proposed restorations.
The analysis fails to discuss Standards and Guidelines for soil quality.	The Soil Specialist Report, on file at the ZZRD, states that "This analysis, which is very similar to the recently completed OHV EIS analysis, again provides unique and new challenges regarding how to measure and predict impacts using standards that apply primarily to timber management practices from the era when the Mt. Hood National Forest Land and Resources Management Plan was new. The existing standards still work very well for assessing and predicting impacts to soil productivity in specifically bounded and measurable areas, such as stands undergoing vegetation treatments. However, they are more difficult to use for other recently completed analyses, such as grazing and invasive plant treatments where the analysis area is so large that collection of soil samples is not practical, or a standard does not exist to address a specific concern." For this reason, soil standards are not specifically addressed in the EA.
The analysis fails to discuss soil compaction.	Section 3.1.2 of the EA addresses compaction. Project Design Criteria Soil-6 and Soil-12 also address soil compaction (see Table 3).
The soil analysis fails to discuss impacts from riders on rogue or other trails.	The Project Design Criteria are intended to minimize, if not prevent off-trail riding. As a result, off-trail riding is not considered an impact to soils compared to the proposed bike trails and restoration projects.

Public Comment	Response
Address hauling of mulch and rock (PDC 1 and 7) and its effect on soils.	Section 3.1.2 of the EA addresses effects to soils.
Cumulative effects fails to acknowledge past and existing soil impacts.	Section 3.1.1 – Affected Environment and Existing Conditions displays past and existing soil impacts.
The analysis does not disclose the location of the referenced successful restoration elsewhere on Mt. Hood.	Section 3.1.2 has been updated to describe that the referenced restoration is at Mt. Hood Meadows.
The soil analysis fails to disclose the loss of soil productivity from the proposed bike trails and maintenance, including the acreage and loss of soil productivity from soil in riparian reserves.	Section 3.1.2 of the EA has been updated to address soil productivity. Riparian Reserve effects are described in Section 3.2 – Hydrology, Geology and Water Resources and Section 3.3 – Fisheries and Aquatics.
Page 38, Section 3.1 Soils in line 3 states that "This is a very important 1,200 feet" when referring to the elevation range of the project area. Why is this an important 1,200 feet? What is meant by the term "important"? How does this relate to the mountain bike park proposal?	As explained in the Existing Condition, the reason is that from a soils perspective, the vegetative cover is driven primarily by elevation.
Page 39, Trail and Skills Park Construction is a one-paragraph description of the mechanism by which the bike park would affect soils. The two mechanisms, removal of vegetation and compaction, are carried to a discussion about the risk for erosion. The section then lists the project design criteria (this is the second time in the massive document), stating that they would minimize the environmental impacts. This analysis presents no discussion about acreages or soil types, no discussion about the context (narrow trails dispersed throughout the area as opposed to clear-cuts), and no discussion about how the design criteria address the severity of the impacts. RLK asks that this analysis be tied into the design criteria by referring to specific measures in Table 3 (that is, delete the design criteria from this section).	The Project Design Criteria have been removed from Section 3.1 of the EA, including a reference to Table 3 in Chapter 2. The context is key to dispersing out the impacts in a narrow linear fashion throughout the SUP areas as opposed to a concentrated area.

Public Comment	Response
Again on page 41, the bullets following “Restoration Actions” include items that are under the control of RLK (bullets 1 – 4) and under the Forest Service’s control (bullets 5 and 6). The presence of the last two bullets makes it appear as though RLK will be accountable for an erosion control plan for Glade and Alpine, and that we are responsible for the road maintenance backlog. RLK requests that this text be clarified to show which actions are included in this analysis and which ones are out of scope. Further, the Existing Conditions discussion should better articulate how these restorations relate to the current conditions (i.e., both RLK and Forest Service issues exist in the watershed).	The Forest Service would be accountable for the Glade and Alpine Trails, however, the implementation of the erosion control on these trails is analyzed in this EA as a way to reduce the existing sediment problem.
Appendix B - Under Analysis Assumptions the introductory statement describes the challenges of conducting the analysis and the (in) applicability of standards from the Forest Plan. While we may agree that the standards for timber management may be outdated in addressing our operation, we find this type of editorial discussion unnecessary for supporting the analysis.	This discussion is relevant to the way in which the analysis has been conducted. Without it, there would be no basis for ***not*** using the existing Standards and Guidelines.
Appendix B - The discussion about Observed Road and Trail erosion fails to distinguish between Forest Service roads/trails and RLK roads/trails. RLK will be restoring our work roads and bottom terminal areas as part of this proposal. However, West Leg Road, Alpine Trail and Glade Trail are all Forest Service facilities. Will the agency restore these failing culverts and filled-in ditches? Will the agency repair damage to the drainage along West Leg Road that resulted from the fuels reduction project in 2009**?** RLK is concerned that the analysis in the PA seems to point to the RLK facilities and operation as the source of sediment in the watershed when the reality is that all development and operation in the area results in sediment mobilization, including agency-maintained roads.	Acknowledged. The analysis focuses on the restoration that is included in the Proposed Action, and which would be implemented by RLK.
Hydrology, Geology and Water Resources	
The EA should acknowledge the research showing that that Mt. Bike impacts are similar to hikers and less than equestrians.	Impacts with respect to the hydrological processes of concern are addressed in the individual models as recommended in the models’ user guides and/or white papers for the models that are included in the hydrology analysis. The hydrology analysis analyzes the mountain bike park proposal and therefore does

Public Comment	Response
	not address hiking or equestrian effects on hydrologic resources.
The PA fails to discuss Standards and Guidelines for water resources.	Noted. Key Watersheds, Special Emphasis Watershed, Riparian Reserves and Riparian Area were assessed, however general Water Standards and Guidelines were not. General Water standards and guidelines have been addressed in EA Section 3.2.4 – General Water.
The PA fails to address cumulative effects for water resources.	Noted. Cumulative Effects for water resources have been addressed in the EA (see Section 3.2.3).
The combined footprint of wooden features was not calculated and added to the total area of disturbed ground.	The area of wooden features was included in the total area of disturbance in the PA and carried into to the EA. It is assumed that the wooden features would occupy the same disturbed ground as the trail network. As described in the EA, the wooden features are intended to protect resources such as sensitive soils and tree roots. Therefore, by including these protective measures in the analysis with no reduction in disturbance area, the analysis of effects is a conservative analysis.

Public Comment	Response
The idea that restoration will mitigate the disturbance caused by the bike park is wrong for several reasons. First, the majority of the restoration projects do not reverse disturbance levels that would result from the project itself. Second, best available science indicates that decommissioning 2.1 acres of roads will not rapidly eliminate disturbance on treated roads. Third, empirical evidence indicates that many restoration measures are often quite ineffective and/or transient. Fourth, best available science indicates that restoration that treats the symptoms rather than the cause is often largely ineffective. Development of the bike park would have to take place after the establishment of the restored areas for them to have their true ecological benefit.	Restoration projects were designed to address hydrological processes of concern (fine sediment deposition and stream drainage network enhancement). Changes in processes of concern that are presented in the PEA are based on model outputs for that process. These models incorporate best available science and are carried into the EA.
The PA does not describe the additional area of disturbance to riparian reserves. The EA should analyze these impacts and incorporate the impacts into all of the salient analyses.	Impacts were assessed by individual processes of concern. An assessment of consistency with the Aquatic Conservation Strategy objectives, which assess impacts to riparian reserves, was completed as part of the PEA and has been carried into the EA (see Section 3.2.4). As described in Section 3.2.4 of th EA, there are 296.6 acres of riparian reserves within the analysis area and the proposed mountain bike trails would impact 2.0 acres of riparian reserves or 0.7% of the riparian reserves in this area. In addition, the planned restoration activities would restore 1.5 acres within the riparian reserves.

Public Comment	Response
The PA fails to describe impacts of the mountain bike trails and maintenance to Riparian Reserves and their functionality, including loss of soil productivity, the irretrievable inability of these soils to grow trees that would someday provide LWD or recruitment to streams, stream shade, micro-climate regulation, and water temperature.	An assessment of consistency with the Aquatic Conservation Strategy objectives was completed as part of the PEA. Site productivity that will impact the ability to grow trees in the Riparian Reserves is not expected to be impacted by this project due to the minimization of trail acreage in riparian reserves and the limited width of the proposed trails relative to the spacing of trees, and the protection of trees greater than 6" DBH. There are 296.6 acres of riparian reserves within the analysis area and the proposed mountain bike trails would impact 2.0 acres of riparian reserves or 0.7% of the riparian reserves in this area. In addition, the planned restoration activities would restore 1.5 acres within the riparian reserves.
The PA fails to examine and disclose other impacts from trails that will cumulatively elevate water temperatures. For instance, runoff from bare, compacted surfaces delivered at bike trail stream crossings will elevate stream temperatures.	All of the new stream crossings would be over ephemeral stream crossings, there are PDC in place to control intercepted surface water in these locations (see Soil-2, WS-7, and WS-8 in Table 3). Soils in this area have moderate infiltration rates so it is expected that any intercepted subsurface water would be routed back to the subsurface level and stream temperatures in this area, which are very low (~40C), would not be measurably impacted. The EA has been updated to clarify this rationale for not disclosing any impacts on stream temperature (see Section 3.2.2).
The PA fails to disclose that the removal of vegetation near and for trail crossings will decrease bank stability in channels.	There are PDC in place to protect streambank stability (see WS-1 and Veg-1 in Table 3) and streambank stability was assessed in the consistency review of the Aquatic Conservation Strategy Objectives in the PA. This analysis has been carried into EA section 3.2.4.

Public Comment	Response
The PA fails to assess the likely impacts of the proposed action on sediment delivery. First, the PA assumes that only constructed trails within 80 feet of streams will deliver sediment. The rationale for this assumption ignores at least 10% of the sediment that will be delivered from distances greater than 80 feet. Second, the total precipitation in the project area is twice that of the Idaho area where Ketcheson and Megahan did their research. Consequently, the analysis ignores the effect of higher rainfall on duration and magnitude of surface runoff. Third, the sediment delivery estimates in the PA are implausibly low – best available science indicates that trails and stream crossings are highly efficient at delivering sediment to streams. Fourth, the analysis assumes that trail use would only occur when trails are dry. The PDCs do not provide assurance for this assumption because they allow construction and use when the soils are quite wet.	Noted. Based on comments on the PA a more robust sediment yield analysis was completed for the EA. This new methodology assesses direct and indirect sediment deposition associated with roads and trails in the area using the best available science. This analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. The staff concluded that "this approach sounds well reasoned and supported by data". There are PDC in place to prevent the construction or use of the bike trails when they are wet (see Soil-11, Soil-13, WS-3 in Table 3).
The PDCs for precipitation levels do not assure that operations won't occur on wet trails because they do not assess soil wetness caused by trails' interception of shallow subsurface water.	There are PDC in place to control intercepted surface water (see Soil-2, WS-7, and WS-8 in Table 3) and based on over 20 years of experience in the Sandy Basin refining the precipitation and streamflow threshold to insure that earth disturbing operations do not impact water quality on projects throughout the MHNF, it is the professional opinion of the project hydrologist the PDC are adequate to prevent operations on overly wet trails. In addition, RLK's interest would be in protecting the trails by not allowing bikes to operate under wet conditions.
The estimation of sediment reduction from restoration is unsound in several ways. First, the analysis assumes that restoration will be immediately effective. Best available science indicates that the benefits of road decommissioning and re-vegetation are slow to accrue. Second, the sediment reduction estimates assume that the restoration will be effective when they in fact may not be.	Noted. Based on comments on the PA, a more robust sediment yield analysis was completed. The analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. The staff concluded that "this approach sounds well reasoned and supported by data". Sediment reduction values associated with model results for restoration activities have been used in the EA.

Public Comment	Response
The PA fails to properly assess the impact of the existing road network on stream drainage network and the effect of the proposed action on stream-route connectivity and resulting effects on peak flows and stream network extension. First, the PA baselessly assumes that the stream network is only expanded by trails for 50 feet at trail-stream intersections. It is not sound to assume that roads extend the stream drainage network more than trails because the PA itself (p. 56) acknowledges that trails have the same effect on hydrology as roads. Second, the PA fails to assess the expansion of the stream network by trails at other locations other than crossings, including trails near streams and their drainage relief points. Third, the PA makes the baseless assumptions regarding the different distances that roads with different surfaces expand the channel network at crossings under the existing condition.	Noted. The stream drainage network expansion modeling has been refined and better documented in the EA to address these concerns (see Section 3.2.2). With respect to stream drainage network expansion at stream crossings these distances are based on the distance between the nearest drainage relief structure for the ditchline and the stream crossing. For this project, PDC Soil-2 (see Table 3) specifies the distance between such drainage structures to be no more than 50 feet. Thus, the maximum distance between a stream crossing and drainage relief structure would be 50 feet. Research (Wemple 1996) indicates that the likelihood of ditch relief culverts forming gullies is substantially higher on steep slopes (greater than 40%). Based on this research, trails that paralleled streams within 200 feet were examined for slopes over 40% and there were no areas found that were expected to have gullies form between the trail drainage relief structure and the nearest stream. This rationale has been added to the EA.

Public Comment	Response
The PA fails to adequately assess impacts of peak flows and consequent impacts on aquatic habitat and ACSOs. The proposed bike park and maintenance roads would prevent your agency from maintaining and restoring all 9 of the ACSOs and meeting its primary purpose of ensuring that our forests are in the healthiest condition possible. First, it understates the existing and proposed extension of the stream network. Second, it confounds this defect, assuming that elevated peak flows within the project area are not significant because they are estimated to have increased by less than 10%. Best available science indicates that channel erosion and sediment transport to downstream reaches increases with an increase in peak flow.	For this project, PDC Soil-2 (see Table 3) specifies the distance between such drainage structures to be no more than 50 feet. Thus, the maximum distance between a stream crossing and drainage relief structure would be 50 feet. It is generally accepted that based on considerations of gage and measurement error at high-flow events, a minimum detectable change in peak flow (detection limit) of ±10 percent for site-scale analysis. Percentage changes in peak flow that fall in this range are within the experimental and analytical error of flow measurement and cannot be ascribed as a treatment effect (Grant, 2008). Recent studies (Grant, 2008) support the inference that when present, peak flow effects on channels should be confined to a relatively discrete portion of the stream network: stream reaches where channel gradients are less than approximately 0.02 and streambed and banks are gravel and finer material. Peak flow effects on channel morphology can be confidently excluded in high-gradient (slopes >0.10) and bedrock reaches, and are likely to be minor in most step-pool systems. On the other hand, if channels are gravel or sand-bedded, a more detailed hydrologic and geomorphic analysis seems warranted. The EA has been updated to include this rationale.
The EA should address the unresolved past problems in the special use permit area such as high dissolved solids from salting, failed revegetation and sediment issues from existing uses and roads.	The analysis examines key hydrologic processes of concern and when appropriate the existing condition is factored into the models (such as administrative use roads in the sediment yield analysis). Dissolved solids are not a factor of concern in the mountain bike park analysis and are therefore not included. The proposed action includes restoration projects that address past and ongoing problems with re-vegetation and sediment issues in the SUP area. The analysis addresses the current effects of these issues as well as the modeled benefits of implementing the restoration projects.

Public Comment	Response
The bike trail construction and ongoing ground disturbance, and sediment produced are not consistent with Key Watershed objectives.	Consistency with the Key Watershed Objectives was examined in the PA assessment of consistency with the Aquatic Conservation Strategy objectives. This analysis has been updated and carried into the E (see Section 3.2.4).
The PA compared the sediment yield from trails in this project to another project near Government Camp, but this comparison may not be acceptable because this project involves a uniquely high risk activity. Lift assisted mountain biking involve trails that run across the contours, not parallel to the contours and it involves lot of braking on soft volcanic soils.	Noted. Based on comments on the PA a more robust sediment yield analysis was completed. The analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. The staff concluded that "this approach sounds well reasoned and supported by data". Sediment reduction values associated with model results for trails will be used in the final document. It should also be noted that the proposed trails do not run directly across the contours and they include features such as grade reversals to minimize the use of excessive breaking to reduce speed (See Appendix B of the EA).
It is unclear whether there is an accurate "road use" input for the WDNR model – one that accurately reflects the real effects of a dense network of lift-assisted mountain biking trails.	Noted. Based on comments on the PA a more robust sediment yield analysis was completed. The analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. The staff concluded that "this approach sounds well reasoned and supported by data". Sediment reduction values associated with model results for trails have been updated in the EA.
Moving logs and cutting gaps in them will reduce the functionality of down wood by reducing the sediment storage capacity and increasing the rate of downhill soil movement.	Noted. Based on comments on the PA a more robust sediment yield analysis was completed. Sediment yield associated with the trail surface (through the cut and or moved logs) was assessed with this model.

Public Comment	Response
I have reviewed the Watershed Resources Report (appendix c) and it seems to me that there are serious flaws in the assumptions and the logic of the write up. There will be 34 new crossings of Still Creek and the report goes on to show how the project will have a minimal impact. The problem is that they fully acknowledge that there are many real world issues they have not included. Page 17 states that the study assumes all ditches and culverts are properly maintained. Page 21 states that the study does not assess the effects from unmaintained road ditches and culverts (note: the new trails will need many). Page 23 states in the italics note that they have no model to predict sediment increases for portions of the project. Finally on page 36 the study author states that a cumulative effects analysis was not performed for watershed processes because adverse direct or indirect effects associated with the alternatives were not identified.	Noted. Based on comments on the PA a more robust sediment yield analysis was completed. The analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. They concluded that "this approach sounds well reasoned and supported by data". A described in the PDC, monitoring and maintenance of the proposed bike trails and drainage control structures will be a requirement of bike park operations. The stream drainage network expansion modeling has been refined and better documented in the EA. A cumulative effects analysis for key watershed processes has been completed as part of the EA.
The report failed to show where the proposed trails would be located with respect to streams and wetlands. Despite this fatal flaw, it is my opinion as an expert with more than 30 years of experience in evaluating environmental impacts to wetlands that it would be impossible to construct the 17 miles of proposed trails and maintenance roads without resulting in the discharge of fill into waters of the US and causing adverse impacts.	Stream and wetlands were delineated as part of the planning effort for the Timberline Express EIS and are displayed in PA Figure 7 and Hydrology Figure 3. These figures have been carried into the EA (see Figures 9 – 11). All stream crossings have been examined in the field by IDT personnel there would be no discharge of fill into wetlands or other waters of the US planned as part of this project.
I am not aware of any scientific support for the conclusion that the proposed bike trails will not have a greater adverse environmental impact than roads. For example, in my opinion, erosion from the proposed trails would exceed that from paved roads.	Noted. Based on comments on the PEA a more robust sediment yield analysis was completed. The analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. The staff concluded that "this approach sounds well reasoned and supported by data". Sediment values associated with model results for roads and trails have been used in the EA. For purposes of this analysis, the term "roads" is used to refer to native-surface roads as opposed to paved roads.
Although wetlands are an important component of the proposed site and may rely on groundwater, a discussion about wetlands does not fulfill the need to address impacts to groundwater. In fact, the "Groundwater Resources" section did not even include any information on ground water.	Noted. In the PA, groundwater is briefly described in the introduction to the Watershed section on page 43 and in the geomorphology section on page 47. Groundwater in the project has been described in more detail in the EA (see Sections 3.2.1 and 3.2.2).

Public Comment	Response
Page 49, paragraph 3 states that A4 stream types typically have a high sediment supply and that with high energy stream flows results in high bedload of sediment. Given that the PA analysis focuses heavily on the effect of approximately 20 tons of sediment, it would be very helpful to understand the natural range of sediment transported down the streams for scale. For example, is it 0 tons or 500 tons?	On page 63 of the PA it states "Based on rough extrapolation of average sediment yield rates for the Riparian Reserves modeled, the total background sediment yield for the Analysis Area may occur within the range of 114 tons/year to 526 tons/year." This analysis has been carried into the EA.
Page 56, second to last paragraph states the "mountain bike trails are similar to roads in the way that they impact hydrologic processes associated with streamflow." This statement does not take into account the project design criteria, which provide for many different ways of conveying surface water away from the mountain bike trails and into the surrounding forest. Nowhere in our documentation have we mentioned ditches that could extend the stream network. This section should state that the distances provided later on page 57 are very conservative compared to what is proposed. Our intention is to build trails that deliver almost no drainage from the trails to streams. Our intention is to retain soil and sediment on the bike trails.	The models for sediment yield and stream drainage network enhancement account for the project design criteria associated with this project.
Page 60, 3rd paragraph indicates that a total of 5.4 cubic feet of material would be added to streams due to the bike trail stream crossings. Again, for scale it is important to note that this is approximately one wheel-barrow full of sediment delivered to the streams over a course of time. RLK asks that this sediment load be related to the natural range of sediment delivered to these streams in any given year. RLK also asks that this sediment load be compared to the amount of sediment delivered to Still Creek from sanding the roads.	On page 63 of the PEA it states "Based on rough extrapolation of average sediment yield rates for the Riparian Reserves modeled, the total background sediment yield for the Analysis Area may occur within the range of 114 tons/year to 526 tons/year." The EA provides comparison of the modeled sediment yield from the mt. bike trails to other sources in the Cumulative Effects Analysis.
Page 61, first paragraph describes the sediment delivery model. Our documentation provided to the Forest Service included trail widths (maximum 66 inches for wide excavated trails) and a maximum disturbance area equal to 1.5 times that width. It is our understanding that the analysis multiplied this width again by another 1.5 for the sediment model, thereby assuming disturbance of up to 2.25 times the width of the proposed trail. If the analysis had used our proposed disturbance widths (i.e., the area we proposed to disturb), then the modeled sediment increase would have been less. RLK requests that this discussion refer back to the information that we have provided for disturbance corridors, describe why another factor of 1.5 was applied, and discuss how this affected the modeled sediment delivery (i.e., it could be modeled as more than double based on this conservative application of another 1.5 times the width).	Noted. Based on comments on the PA a more robust sediment yield analysis was completed. The analysis methodology was reviewed by staff at the Watershed Processes Research Team that is part of the Aquatic and Terrestrial Ecosystems Work Unit of the Rocky Mountain Research Station in Boise, ID. The staff concluded that "this approach sounds well reasoned and supported by data". Sediment values associated with model results for roads and trails have been used in the EA. With respect to disturbance widths the IDT was provided a range of potential disturbance widths for each trail and the maximum provided disturbance width was multiplied by 1.5 to define the disturbed area.

Public Comment	Response
The Preliminary Analysis does not identify the number or size of streams that will be affected by restoration activities, if any.	No restoration activities are proposed directly in streams. The analysis examines key hydrologic processes of concern and assessed the impacts of restoration activities on these processes.
Aquatics	
The PA excluded an assessment of the impacts on coho and spring Chinook salmon and failed to assess impacts on coastal cutthroat habitats and populations. It also failed to assess impacts on coastal cutthroat trout, which is a MIS with populations and habitats that occur downstream of the project site.	This analysis included an assessment of the project impacts to Lower Columbia ESU Spring Chinook and coho (pp 26-31 of the Fisheries Biological Evaluation). The determination was that there would be no impact to these species or designated critical habitat as a result of this project. This determination was based on the assessment that a) the project results in a net reduction in the amount of sediment, turbidity, and road density present within the headwaters of the West Fork Salmon and Still Creek sub-watersheds, therefore those project elements would not impact spring Chinook or coho, b) No direct effects to any listed species were identified, c) Chinook salmon and designated critical habitat are not present within the Action Area , d) historically, coho have been documented within the Action Area in Still Creek but have recently only been observed up to RM9.0, and e) critical habitat has not yet been designated for the Lower Columbia River coho ESU. The discussion of impacts to coast cutthroat trout, which are present within the Action Area, has been added to the Fisheries Biological Evaluation (p.38) and is included in the Aquatics section of the EA (see Section 3.3).

Public Comment	Response
The PA fails to assess the impacts of the project on salmonid survival, and that high levels of fine sediment in spawning habitats causes reductions in their survival as best available science has repeatedly shown. The EA must make it known that high fine sediment levels are already so pervasive that it is likely the salmonids cannot avoid impacts of elevated fine sediment due to the project.	A discussion of how each project element may impact aquatic organisms and their habitat can be found in the section of the Fisheries Biological Evaluation Titled "Description of Environmental Baseline Condition and Effects of the Proposed Action," (pp. 39-67), also summarized in the Aquatics section of the EA (see Section 3.3). Our review of potential impacts to listed species and/or their critical habitat found that project elements relating to the operation and maintenance of the Bike Park would increase sediment, turbidity and substrate embeddedness, and road (trail) density within critical habitat for winter steelhead. Those same project elements would also increase the stream drainage network. Additional habitat element impacts were documented as a result of construction activities. A suite of watershed restoration actions were identified as part of the proposed action, which when taken as a whole, results in a net reduction in sediment, turbidity, and road density within critical habitat for winter steelhead. All indicators had a summary determination of Insignificant or Discountable. No direct effects were identified to listed fish or critical habitat.
The PA fails to adequately examine the project's inconsistency with MHNF and NFP standards, including ACSOs and those for riparian reserves and instream habitats.	The Project's consistency with ACS objectives is discussed in the Hydrology and Aquatics sections of the EA (see Section 3.2.4).
The PA fails to adequately assess impacts on elements of habitats for salmonids, including those that are MIS and/or ESA listed.	A discussion of how each project element may impact aquatic organisms and their habitat can be found in the section of the Fisheries Biological Evaluation Titled "Description of Environmental Baseline Condition and Effects of the Proposed Action," also summarized in the Aquatics section of the EA (see Section 3.3). Our review of potential impacts to listed species and/or their critical habitat found that project elements relating to the operation and maintenance of the Bike Park would increase sediment, turbidity and substrate embeddedness, and road (trail) density within critical habitat for winter steelhead. Those same project elements would also increase the stream drainage network. Additional habitat element impacts were documented as a result of construction activities. A suite of watershed restoration actions were identified as part of the proposed action, which when taken as a whole, results in a

Public Comment	Response
	net reduction in sediment, turbidity, and road density within critical habitat for winter steelhead. All indicators had a summary determination of Insignificant or Discountable. No direct effects were identified to listed fish or critical habitat.
The PA fails to assess the spread of noxious weeds, weed treatments, and the resulting impacts to the aquatic and watershed resources. The PA is devoid of any assessment of the impact of herbicides on the aquatic environment.	The effects of the proposed action on noxious weeds is addressed in the Vegetation analysis in the PA, and it is carried forward into the EA See Section 3.5). Any herbicide application would follow the requirements set forth in the FEIS and ROD for the 2008 Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, including Forest Plan Amendment #16. Based on these requirements, impacts to the aquatic environment from herbicide application would not occur and are therefore not analyzed.
Given that this designation (Key watershed) occurred after the previous lift development, the continuing erosion into Still Creek and potential for additional sediment is unacceptable and may be large enough to have an effect on steelhead trout and their critical habitat.	The project, as proposed, would result in a net reduction of sediment and turbidity within winter Steelhead Critical Habitat in Still Creek.
Page 162, Section 3.9 Aquatic Resources was very difficult to understand and seems to be a hurried summary of the Draft Biological Evaluation. RLK asks that this section be re-written to better display an analysis of the existing condition, direct and indirect effects, and cumulative effects.	The Aquatics section of the EA has been updated in the EA (see Section 3.3).
Page 163 shows a figure of the “Action Area” and describes it as the area that is “likely” to be affected. Given all of the assumptions in the modeling of sediment, the use of the word “likely” suggests uncertainty in the analysis. RLK does agree that the sediment analysis is conservative and probably overstates the projected effects of the bike park given the project design criteria. Is the Action Area the area that “could” be affected if there is a sediment impact? Please clarify this language. The figure shows areas almost ½ mile upslope of the proposed mountain bike park as part of the area that is likely to be affected. How will our bike park affect areas uphill from the highest trail? Please revise the figure to depict the actual area that could be affected, which is substantially less than shown in the figure.	The distinction between “Action Area” and “Project Area” is provided in pages 7-9 of the Fisheries Biological Evaluation.

Public Comment	Response
Page 166, paragraph 3 suggests that resident rainbow trout was historically present in the “project area”. What is that basis for this statement? Does the author mean “Action Area”? The majority of streams in the project area are intermittent or ephemeral streams that drain snowmelt to the springs near the bottom terminal of Jeff Flood Express.	Rainbow trout (O. mykiss) and coastal cutthroat trout (O. clarki) were historically present in both the Project Area and the Action Area, including perennial streams in Still Creek and the West Fork Salmon River. West Leg Road, Timberline Road, and Highway 26 have created impassable fish barriers that limit or prevent access into those former habitats.
Page 166, paragraph 3 it is stated that critical habitat extends upstream to the bottom end of the project area. It should be clarified that there is a discontinuity between the designated critical habitat (i.e. up to the project area) and the actual location of LCR Steelhead, which are blocked by the Highway 26 culvert. The suggestion is that the bike park will impact fish habitat that Steelhead could never use because of the culvert and two natural blockages upstream of that.	Critical habitat for Lower Columbia Winter Steelhead ESU extends up to the base of the Jeff Flood lift and is therefore present within both the Project Area and the Action Area. Critical Habitat encompasses areas of habitat that are crucial to the survival of a species and essential for its conservation and that have been formally designated as such by rule published in the Federal Register.
Page 170, paragraph 5 states that suitable habitat for coho exists in the Action Area. Because of the natural barriers at RM 14.4 and 15.1, RLK requests that the PA clarify that this habitat is naturally inaccessible?	As described in EA Section 3.3.1, the Action Area extends below Highway 26 in Still Creek.
Page 175, paragraph 2 states that “due to a lack of any physical barriers, sea-run cutthroat are assumed to be present within the Action Area in Still Creek”. On page 166, the LCR Steelhead discussion indicates that the Highway 26 culvert acts as a fish barrier. The discussion also references natural waterfalls that act as fish barriers in both Still Creek and the Salmon River. Later on page 180 under Essential Fish Habitat, it is mentioned that “Salmon EFH excludes areas upstream of longstanding naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years).” These statements are inconsistent. RLK requests that the Aquatics analysis be clarified to clearly discuss the effect of the blockages on anadromous fish, critical habitat and EFH in the Action Area and the Project Area, as was done in the Timberline Express EIS.	As described in Section 3.3.1, the Action Area extends below Highway 26 in Still Creek. The presence of a fish barrier does not preclude an area from being part of the Action Area or designated as EFH. In this case, areas upstream of the blockages are critical to the survival of these species even though they may not be accessible to these species.

Public Comment	Response
Wildlife	
The PA fails to describe how agency is carrying out programs to meet Section 7(a)(1) of ESA.	No BA is needed because there are no effects to listed species.
The project's lower elevation is at 4,200 ft. and could provide NRF habitat for Spotted Owl. Describe the data used in reaching conclusion that no owls nest above 4,600'. Could an owl at 4,200 feet forage for food above 4,800 feet?	The project's lower elevation is at 4,800 feet. The highest recorded nest site on the Mt. Hood National Forest was at Snow Bunny at approximately 4,400 feet. There is no spotted owl suitable (nesting, roosting or foraging) habitat within the project boundary , as described in Section 3.4.1.
More thorough analysis is needed to justify the impact determination on Johnson's Hairstreak Butterfly.	The Johnson's hairstreak butterfly is dependent on dwarf mistletoe. There will be no removal or reduction in dwarf mistletoe from this project.
Future use of area by Wolverine will be eliminated due to 17 miles of trails.	Wolverines are highly sensitive to human presence. Past and present use of the Timberline/Government Camp area makes this area unlikely that wolverine would utilize this area. Studies indicate that wolverine prefer habitat at and above 7,000 feet in the lower 48 states and seek isolation from human presence. This area already is above the threshold of human presence that is preferred by wolverine. As stated in Section 3.2.4, "There is a potential for disturbance and loss of utilization of some of the potential wolverine habitat by implementing the Proposed Action. Increasing human presence in currently unutilized areas would further degrade the habitat for this species if the species, in fact, still exists on the Mt. Hood National Forest."
The PA has no evidence that the proposed bike park would not threaten existence of Malone's jumping slug in the area.	Malone's jumping slug is no longer on Survey and Manage list per the 2011 Settlement Agreement.
Document all surveys for Survey and Manage species, and buffer/ management requirements.	The only survey required for Survey and Manage species for this project was for Pristiloma arcticum crateris. The survey is documented. A link to the BLM survey and Manage website is referenced for more information on survey protocols.
Conduct surveys for Red Tree Vole.	No removal of large trees is proposed, so there would be no impact. No surveys are necessary.

Public Comment	Response
The PA analysis does not adequately analyze snag removal at the site scale.	The proposed action does not include removing trees >6" or snags , so impact to available habitat would be negligible. Snag analysis is based on a watershed scale for DecAid and a project scale for LRMP standards. This project meets the LRMP standards since no harvest is occurring. In addition, there are many naturally occurring snags within the project boundary, and no cumulative effects from reasonably foreseeable past, present, or future actions in the area would occur.
Disclose percentage of B-11 (summer range) including Wisdom et al. 4 km impact distance.	There is no mapped B-11 habitat in the project area. There are more references on the specific effects of mountain bikes included in the analysis.
Discuss Cook's work on nutrition limitations – summer forage quality, quantity availability, and impact on elk productivity.	Section 3.4.1 of the EA has been updated to state that Cook indicated that inadequate dietary quality during summer and fall may influence populations of free-ranging wild ungulates by reducing fertility of adults, neonatal immunocompetence, juvenile survival and resistance to adverse winter weather and food shortage (Cook et al. 1996).
Discuss potential effects to elk calving and calves due to abandonment and predation.	Elk calving occurs prior to mid-June, when the project area would still be under snow every year. No calving occurs in the project boundary. Calves are older when they move into the project area and are better equipped to dealing with human presence and disturbance.
Add a conclusion to Cumulative Effect analysis for elk. The tables in the PA provide no true cumulative effects analysis.	A cumulative effects discussion has been added to the tables (see Section 3.4.3).
Provide evidence that human disturbance to American Marten and Pileated Woodpecker will not impact life cycles.	There is no evidence one way or another-- there aren't any disturbance studies on marten or woodpecker; just habitat studies. They both inhabit areas that are populated like the amphitheater near Timberline Lodge, garbage cans, ski trails, etc., although the evidence is anecdotal and not research based.

Public Comment	Response
Better describe how the PA complies with Migratory Bird MOU.	The most important conservation measure incorporated into the mountain bike park is to reduce habitat removal. Since very few trees or shrubs will be removed the effect to the regionally important bird species is very low and at an acceptable level to meet the intent of the Migratory Bird MOU. See additional information in the specialist report about regionally important species and the MOU.
The elk herd at Timberline is already nocturnal and highly adapted to human activity.	Acknowledged.
It is important to note that there is already substantial biking activity occurring in the Timberline Area. The Glade trail is heavily used for downhill mountain biking and has been growing in popularity for the last decade with no apparent detriment to the elk or change in their behavior. In addition to these recreation activities, Timberline's lift maintenance program is a daily occurrence all summer and fall on the lower mountain. Maintenance includes heavy equipment, welding, grinding, radio communication, lift movement and transport between terminals by ATV. It is not uncommon to see elk heading down the mountain in the morning, apparently unconcerned with these activities.	Acknowledged.
The Timberline to Town trail goes through the same areas as the proposed bike park, yet the Forest Service's analysis of that trail did not identify effects to elk as an issue even though the trail is also a mountain bike trail.	There were two issues related to the difference in the effects of the Timberline to Town and the Timberline Mountain Bike trail proposal. First, the Timberline to Town trail is a single trail that would only impact 300 feet on each side of the trail for elk harassment. By contrast, the proposed bike park is a network of trails that occupy a larger area where a high amount of forage habitat occurs. Second, field reconnaissance conducted for the Timberline mountain bike proposal revealed that elk use of the area is heavier than previously thought during the analysis for the Timberline to Town EA.
The PA and wildlife report summary chart omit displacement of elk and nesting birds from the area and no research was cited on how elk will react to displacement. My recent research suggests that elk will leave the area and not forage in the early morning and evening.	Additional information on elk displacement by mountain biking is included in the document in the Deer and Elk section (see Sections 3.4.2 and 3.4.3).

Public Comment	Response
We have seen Least Weasel in the project area. This species would be negatively impacted by the project, as would larger weasels, deer and elk.	There would be negative impacts to multiple species in the project area from disturbance. The least weasel is not federally listed, nor does it have any status. The species is not considered in danger from a viability standpoint. The project disturbance effects will not create any viability issues for any of the species found in the project area. Deer and elk are addressed in Sections 3.4.3, 3.4.4 and 3.4.5 of the EA.
One could expect the raven population to multiply further in the area as a result of this facility, as it has all over the southern flanks of Mt. Hood. Ravens have a deleterious effect on other wildlife. At Frog Lake, six miles south, they are eating the western toads coming in to breed.	There is no evidence that raven population would expand. The forest canopy would not be more open if the project was implemented. Nothing associated with this project (for example, if trash was not picked up) would cause them to expand.
Ironically, statements in the bike report, such as the following quote from the Botany section, not only provide no support for environmental impact claims but simultaneously imply that significant adverse environmental impacts would occur from the proposed bike project. "The effect of mountain bike trails designed for high level capacity of users would in effect be much like high traffic roads." Research has shown that high open-road densities lead to harassment of elk.	Yes, there would be harassment of elk from increased human use, and the effect would be like a high-traffic road. But at night, the elk are expected to return to the area. The report cited in the BE states: "A recent study by Naylor & Wisdom (2009), however, produced contrary results, albeit for a different species. In a controlled experiment, the behavioral changes by 13 female elk (Cervus elaphus) were monitored in response to four types of recreational disturbance: all-terrain vehicle riding, mountain biking, hiking, and horseback riding. Compared to control periods when elk spent most of their time feeding and resting, travel time increased in response to all recreational disturbance, but decreasing in the order listed above (i.e. ATV use eliciting the greatest increase in travel time, horseback riding eliciting the least). Both mountain biking and hiking activities were found to significantly reduce resting time for elk."

Public Comment	Response
Obviously an EIS is required to determine the actual extent of the area of impact after analyzing all of the direct, indirect, and cumulative impacts from the proposed bike project. For example, spotted owls nesting below 4,600 feet elevation of the proposed bike project could experience significant adverse impacts from project-related erosion in the higher elevation areas as well as adverse impacts from the proposed project if the adults or fledglings forage for food above 4,600 feet elevation. Additionally, changes associate with global climate disruption also could result in spotted owls nesting at higher elevations, in the precise area proposed for the destructive bike project.	The highest recorded spotted owl nest site is at 4,400 feet. There is no suitable spotted owl habitat in the project area. It would take over a century for a habitat change that would create nesting habitat above the current elevation and that habitat change is speculative and may or may not occur. It is beyond the scope of this assessment. There are no significant impacts to wildlife that would trigger the need for an EIS.
While it is known that elk adapt to humans, the elk on Mt. Hood are assumed to be a wild herd that has made the area part of their natural range. While Elk have specific needs they find in these woods in the summer season relegating them to adapting to using it in the evening, after bikers have left, is unlikely.	Scientific literature cited in Section 3.4 and the professional judgment of the wildlife biologist is that the elk will indeed return to the area in the evening, similar to the existing condition, in which maintenance and operations take place during the day.
If a vagrant wolverine can't use the publicly owned side of Mt. Hood then where?	Wolverines are highly sensitive to human presence. Past and present use of the Timberline/Government Camp area makes this area unlikely that wolverine would utilize this area. Studies indicate that wolverine prefer habitat at and above 7,000 feet in the lower 48 states and seek isolation from human presence. This area already is above the threshold of human presence that is preferred by wolverine. Most vagrant wolverine are males and they're looking for females, so if they don't find one they die or move on. Most historic sightings on the Mt. Hood were on north side because there is more human use on the south side. All habitat above 7,000 feet on Mt. Hood—no matter which "side" they're on—are publicly-owned.
Page 95, Management Indicator Species, paragraph two states the "the effect of mountain bike trails designed for high levels capacity (sic) of users would in effect be much like high traffic roads". Likening the trails in a mountain bike park to high traffic roads is not consistent with the projected visitation and the calculated capacity of the bike park. Would the Forest Service call a road with 20,000 visits per summer a high use road? Is there any research to suggest that a mountain biker descending a trail is anything like a vehicle on a high use road? The estimated capacity of the bike park is 338 PAOT, as described in the Recreation analysis in the PA. If approximately one-third of these people are on the trails at any given time (estimated at 113 people) and there are 12.1 miles of trails, that equates to 9.33 people per mile on average, or	Forest Service road engineers consider the amount of traffic described as a "high traffic forest road" to be similar to Highway 224 on the Clackamas River Ranger District. If there are 338 people per day and they each make 5 trips down the 6 trails, there could be 23 people coming down a trail per hour. That equates to high traffic for wildlife disturbance issues. It is the presence of people that cause elk to flee more than the vehicle itself.

Public Comment	Response
one person every 1/9 mile. Is this truly like a high use road compared to other trails in the area? RLK lives with this herd – we know where they are and when. We see them when we are driving to work, working on summer grooming and lift maintenance, or operating the extensive summer offering at Timberline. We believe that the wildlife analysis over-states the use estimates for the bike park (i.e., high-use), unfairly compares mountain bikers to automobiles on a high use road, and ignores the fact that these elk are accustomed to foraging within our recreation area where people are recreating and maintenance activities are routinely taking place. RLK asks that the analysis be revised to state that the worst possible effect would be displacement during the daytime and busy operations – this is possible. However, on any average operating day in the park, bikers in the woods may not adversely affect elk in meadows or on cleared ski trails. The analysis should state that there may indeed be no effect on elk behavior at all. This is equally likely but never mentioned.	
Appendix D - Page 39, paragraph 4 admits that there is little research on the effects of mountain biking on wildlife. It also admits that wildlife biologists are forced to use professional judgment and anecdotal evidence. The analysis goes on in the 5th and 6th paragraphs to compare mountain bikes to vehicular traffic and motorized ORV's to form a basis for impact analysis. To compare mountain bikers coasting quietly down a trail to a motorized Jeep or dirtbike seems unfair and even more of a reach than comparing these users to overnight, cross-country mountain bikers (botany analysis). There is no basis for comparing bikers to motorized users as compared to hikers or equestrians, and then the PA suggests in paragraph 7 that the harassment, which seems to be a given, will be avoided by the daytime use restriction. RLK asks that the specialist report b+B24e revised to better display the conservative nature of these assumptions and to include more analysis of effects to wildlife when comparing park riders to less motorized users.	Although there is not a lot of research on the effects of mountain bikes on wildlife, the research that has been published is cited in this report. For some species, there is no research and professional judgment based on observation is required. The effects of mountain bikes is compared in the document and shows that although hiking and mountain biking is less impactful in terms of displacement than ATVs, it is higher than equestrian use. All of the research cited does show a displacement or movement of animals based on human presence. If a projection of 20,000 users per season for the 90-day operating season use the 6 main trails for 12 hours per day there could be one bike on the path passing by a point every 4 minutes if each user makes only 5 trips down the trails per day. This could be more intense on the weekend and lighter during the week. This would be similar to a moderate to high traffic forest road. Very similar to the traffic on highway 224 on the Clackamas River Ranger District.

Public Comment	Response
Botany	
Revegetation efforts have high rate of failure at high elev. and on fragile soils, or revegetation may take several years. The PA talks a lot about the process of plant restoration, collecting seeds, propagating seeds in a nursery, using weed-free straw, etc. It appears as if none of this activity has begun.	Project design criteria Veg-10-14 (Table 3) address collection of native seeds and propagation. Seed collection and plant propagation would only begin when and if the proposed action is approved.
Do not use non-native ryegrass in restoration – it exacerbates fragmentation and loss of habitat.	Native plant materials are preferred and recommended over annual ryegrass. Project design criteria Veg-10-14 (see Table 3) address collection of native seeds and the use of native materials. Annual ryegrass is commonly used as a restoration species if native plant materials are not available or in sufficient quantity. It does have the potential to occupy a site and delay the establishment of native species. However stabilization of disturbed soils would take priority over establishment of native soils, so the use of ryegrass would be appropriate if native species are not available.
The botany analysis does not discuss the effect of non-native species on existing native vegetation.	The section entitled "Risk of Introducing Invasive Non-Native Plants or Plant Pathogens" in EA Section 3.5.1 address non-native species.
Determination of "unlikely to lead to trend toward listing" for sensitive species is unjustified given the moderate to high threat of invasion by invasives.	The only rare botanical species found in the proposed mountain bike park, so far, are the moss Rhizomnium nudum and two coral fungi (Ramaria spp.). R. nudum is confined to streambanks and wetland habitat in the vicinity of the Jeff Flood chairlift terminal. The two mycorrhizal fungi are dependent on conifers in the area (mountain hemlock, Pacific silver fir, and subalpine fir). Construction of the proposed restoration projects, as well as the mountain bike park and subsequent bike traffic would not be enough of a ground-disturbing event to induce a massive invasion by non-native species that would displace R. nudum, the two Ramaria spp., and conifers because project design criteria Veg-6 and 14 provide for monitoring for invasive plants , early detection and rapid response on an annual basis. The EA has been updated to include this justification (see Table 3).

Public Comment	Response
Better display of effects to sensitive species from aggressive treatment of invasive species, including use of herbicides and its affect on aquatic habitat.	If invasive species were introduced into wet habitats occupied by Rhizomnium nudum, control efforts would be complicated. R. nudum plants would need to be shielded from spot-spraying of herbicide. There are herbicides designed for use in or near aquatic habitats that are considered safe to fish and wildlife, but they would be harmful to R. nudum because they are not selective in what plant species they kill. It's not clear how coral fungi might be affected by herbicide use. Fungi tend to bioaccumulate (bioconcentrate) contaminants and heavy metals present in soils.
The botany Cumulative Effects analysis should include projects contemplated in the Master Plan as well as offsite cumulative impacts.	The cumulative effects analysis addresses the effects of other actions that would overlap in space and time with the proposed action. It is therefore not appropriate to address Master Plan projects, which have not been proposed for development (no temporal overlap), or offsite cumulative impacts (no spatial overlap).
The EA should better address the effects of bike park in light of effects from climate change (i.e. stress on plant communities, changes in elevation ranges for species, etc.).	The Cumulative Effects to Vegetation & Climate Change Section (see Section 3.5.2) of the Vegetation analysis addresses climate change and the in the light of the effects of the proposed action.
The EA should address the conflict between the statement that the Proposed Action will extirpate species at the site and that PA is not likely to contribute to a trend toward Federal listing.	The proposed project would not extirpate any TES or Survey & Manage botanical species, as described in the Section 3.5.1.
The botany report recommends a bike and shoe cleaning station to reduce the likelihood of invasives, but we did not find this measure in the project plan.	The botanical BE (p. 9) recommended a bike cleaning station at the top of the bike park (at the Wy'East Lodge). Project design crieterion Veg-16 addresses this cleaning station.
The botany analysis seems to suggest that fragile plants will be replaced by plants that are durable to trampling. We are not aware of any native plants that are resilient to the impacts of downhill mountain biking and the ripping force of mountain bikes braking.	Some papers in the scientific literature on mountain biking recommend the planting of plants that would be more resilient to trampling (e.g., grasses, sedges) than forbs, but no native plant species is resilient to chronic trampling/disturbance. As stated in chapter 2, the bike trails would remain unvegetated, spo there would be no vegetation subject to mountain biking.

Public Comment	Response
The PA is not clear whether surveys for survey and manage species have been conducted, including equivalent effort surveys for fungi. The botany analysis seems to justify not doing surveys because trail construction would not be a significant disturbance. At any given site the disturbance may be small, but cumulatively over 17 miles the effect may be large enough to warrant equivalent effort surveys.	Surveys for S&M species have been conducted The survey protocol for S&M fungi is two years of surveys with two surveys each fall and two each spring. So far, the 2010 and 2011 fall surveys and 2011 spring surveys have been completed. The 2012 spring surveys remain to be done.
On page 11, the response to the issue about invasive plants indicates that several design criteria are included to address invasive species. This will be discussed in more detail later, but the issue states that bike tires are a "likely" source of invasive plants and insects. This is simply not true – bike tires are designed specifically not to carry dirt that could harbor these species. In addition, bikers routinely wash their bikes upon leaving a bike park…AFTER they have finished riding a course. The agency appears to have accepted the premise that tires are a "likely" source of invasives, when your own research does not support this assertion. Surely, if a source is likely, there must be research showing that there is a high probability of the effect. The Plant BE itself at p. 25 – Mountain Biking and the Spread of Invasive Plants, first sentence states that "Little scientific research exists investigating the potential of mountain biking to introduce and spread invasive non-native (exotic) plants. Consequently, researchers have been cautious in making any generalizations or drawing any conclusions." Is accepting the "likely" premise not a generalization or a conclusion? The analysis of effects to vegetation in the PA and the Plant BE literally assume that mountain biking is a vector for invasive species and the Project Design Criteria in Chapter 2 reflect this. RLK asks that the response to this issue be clarified to reflect the actual status of research into this subject, and not to make any generalizations or conclusions that point directly to mountain bikes as a cause for invasive weeds in an area that has already been developed into ski terrain, and is routinely visited by hundreds of cars, hikers, hunters, and other users.	People, animals (wild and domesticated), vehicles, and mountain bikes can introduce and spread invasive plants. The seeds or other reproducing parts of invasive plants can hitchhike on clothing, shoes, fur, wheels, tires, pedals, frames--almost any surface. the Vegetation analysis provides a brief overview of some articles in the scientific literature on the transport of invasive plants. The reason for a bike cleaning station at the top of the park to be used by all riders before they descend the trails is to prevent the introduction and spread of invasive plants in the park. Many mountain bike trail systems do not have a cleaning station. Requiring that all bikes be cleaned before entry into the park is the best and only way to ensure that weed seed and reproductive propagules are not introduced. The recently-approved bike park at Stevens Pass, WA includes a washing station and requires washing before and after use of the park. On this basis, requiring Timberline mountain bikers to wash before riding in the park is consistent with standard practice on the National Forest in the Pacific Northwest.
Page 101 – 3.4 Botany, paragraph 2, last sentence states that "Special status species that are known or suspected to occur on the Mt. Hood National Forest and that may have potential habitat in areas open to special forest products use/harvest are displayed in botany Table 1." Why does the botany analysis refer to special forest products use/harvest? This appears to be the result of a copy/paste from an analysis of a tree harvest project. RLK questions the validity of comparing this project to a tree harvest. This can be very mis-leading to the public.	The referenced sentence introduces the list of species on the MHNF that have habitat in areas that are open to special products use (including recreation) and harvest. The sentence refers to areas on the entire forest where these species may be affected by management actions. There is no comparison of the proposed action to a harvest.

Public Comment	Response
Page 105, Vegetation Effects describes how our mountain bike proposal would result in limited direct impacts outside of the trails, so long as riders stay on designated trails. We applaud the recognition that the effects would be limited to the trails. However, as previously discussed, we are building trails along the best possible fall-lines within our lift system. The riders in our park will not want to go off trail because our trails will be by far the best ride down. The project design criteria include measures such as constant patrolling that will prevent this from happening.	The Proposed Action has been designed, and project design criteria would be applied, that would minimize the incentive to ride off-trail. Nonetheless, there is no guarantee than riders would never ride off-trail, despite bike park patrolling the park on a continuous basis.
Page 105. The last sentence of the same paragraph shows the continued bias of the author: "…impacts of concern". Again, this document is meant to be an environmental analysis of effects. Effects will happen or they won't. Whether they are of concern to the author is not a part of NEPA. The list of projected effects again includes worst –case effects for an un-managed mountain bike trail system…trail widening resulting in ruts, grooves, gullies and berms(see Soil 1 – 5, Soil 9, Soil 11, Soil 13, Veg-7) …formation of unauthorized trails (see Veg-9) ….removal of snags (Wild 1) …damage to tree roots (see Soil 3). All of these effects are addressed in the project design criteria and are in no way reflective of the bike park that RLK is proposing to operate. If these effects occurred on our bike park it would be an embarrassment to our ability to operate. RLK asks that this section and the corresponding specialist report be revised to eliminate any bias, and to focus on impacts that may actually occur in our managed mountain bike park. The disclosed effects in this analysis are hypothetical and not consistent with the project design criteria.	The scientific literature review (pp. 21-27 of the BE in the Preliminary Analysis) anchors the assessment. The project design criteria would prevent or reduce environmental impacts, such as trampling of plants, widening of trails, creation of unauthorized trails, damage to tree roots, introduction of invasive plants, and other effects. Whether those effects are likely or not, they are a possibility and thus they are considered in the BE."
Page 106, top of page, item number 5 mentions an increase in human detritus as a potential botany impact. How is increased litter a "botany impact of concern"? RLK asks that any discussion of litter either reflect itself as a direct impact on botany or be eliminated from the discussion.	Ecological effects are well within the purview of a botanical analysis. Botanists are plant ecologists. Trash and other human detritus degrade high montane, subalpine, and meadow habitats. They can affect plants and animals. It is quite appropriate to address this concern in the botany (terrestrial ecology) report.

Public Comment	Response
The remainder of page 106 is editorial that does not belong in the PA. The mountain bike park will have no effect on plants' ability to germinate in subalpine habitat (paragraph 1), or plants' ability to survive on the "ecological edge" (paragraph 2). Paragraph 2 goes on to discuss the "the high likelihood that trampling of vegetation along the sides of trails or through the creation of informal (unauthorized) trails made by "rogue riders" will occur despite the best intentions of trail designers and RLK & Company. Has the botanist visited any similar bike parks to verify this assertion? Has the botanist reviewed any literature about bike parks in our region as opposed to cross-country mountain biking around the world? With all of the project design criteria these effects will still occur despite our best intentions? RLK asks that this section include documentation that these effects have occurred at areas in the Pacific Northwest, where several ski areas have had bike park trails for years.	The botany report addresses and assesses potential effects based on a review of the scientific literature, professional judgment, observations made during field surveys, and conversations with other Forest Service botanists and natural resource specialists. See scientific literature review on mountain biking on pp. 21-27 of the BE in the Preliminary analysis)for an overview of concerns addressed or investigated by researchers. The project design criteria are intended to prevent or reduce the effects of rougue riders, but there is no guarantee that off-trail riding would never occur. As a result, there is no need to include documentation from other Pacific Northwest ski areas because there is arguably at least a remote possibility of off-trail riding in the bike park.
The third paragraph on page 106 goes on to create an imaginary scenario where RLK removes "quite a number of snags" from the bike park. Wild-1 requires that RLK coordinate any hazard tree removal with the Forest Service. We have stated again and again that we intend to "remove" no trees. If a tree would fall over a bike trail, we would simply cut a section out to allow safe passage by our guests, for example, per our Operation Plan and Forest Service Hazard Tree Guidelines. RLK asks that this discussion about snag removal be stricken from the botany analysis and specialist report, and included in the Ski Area Operating Plan.	The cutting of snags in order to ensure the safety of riders, which could occur over the lifetime of the mountain bike park, is an outcome that cumulatively could alter the structure and ecosystem function of forests habitat in the bike park and therefore, could affect wildlife habitat.
The last paragraph on page 106 (and carrying on to 107) states that "even with careful armoring of trails to buffer impacts to root systems, mountain bike traffic will damage tree roots..." This section of the PA makes assumptions that are counter to the collaboration that has taken place over the past year, as well as the project design criteria. Our intention is to manage the trail network to prevent damage to root systems.	The proper implementation of PDC would reduce impacts, and p. 18 of the Botany BE, as well as Se3ction 3.5.1 of the EA, were modified to better reflect that. Nonetheless, the effect to root systems would be an unavoidable effect of operating the bike park. In a scenario where armoring of roots is reduced through use over the course of a day, this trail condition would not be addressed until the bike park patrol discovers the issue and the trail is closed to remedy the problem. Prior to its discovery, the roots in question would be subject to impact by the mountain bikes, no matter how minimal.

Public Comment	Response
Page 107, second paragraph discusses "rocks of various sizes would be pried out and moved from locations nearby to armor the surface of trails, resulting in soil disturbance additional to that caused by trail construction…" RLK has never suggested that we would "mine for rocks". Soil-1 instructs us to use only rock sourced from the bike trail or watershed restoration disturbance areas. This appears to be an effect that simply will not happen because it is not authorized. RLK asks that this discussion be removed from the PA and the specialist report.	The EA has been updated to reflect the use of rock from the trail disturbance area only.
Page 107, paragraph 3 surmises that knotweed and clover have become established in certain ski runs because they were "evidently introduced in the wood strand or seed mix that was applied to these areas in 2007." RLK applied only certified weed-free seed mix to these areas as instructed by the Forest Service. How is such an assertion part of an unbiased disclosure of effects? Additionally, the reference to the Timberline Express analysis is outside the scope of this PA.	The certified weed-free seed mix evidently wasn't completely weed-free. Clover is frequently used in restoration seed mixes. Prostrate knotweed and clover were introduced to the area and the most logical vector for this introduction is the seed mix. No blame was intended by this statement in the botany report. RLK used certified weed-free seed mix as instructed an unfortunately, it appears to have contained weeds.
Paragraph 4 on page 107 describes how there is little or no research about the likelihood of invasive weeds attributable to mountain bikes alone. Again, bike tires are designed specifically NOT to hold soil and most bike park riders wash their bikes after riding. Hiking boots do hold and carry soil. Similarly, horseshoes and horses themselves (through elimination) are vectors for invasive plants. The paragraph goes on to express Ferguson's "distress" about garlic mustard in Ontario presumably there because of off-trail riders, and then to state that deer and elk are a possible vector for this same species. How is Ferguson's distress part of an unbiased analysis of the potential impacts of our proposal? How will our bike park increase the likelihood of deer and elk serving as vectors for garlic mustard? If some of these species are already found along Lolo Pass Road, along the PCT, and in the wilderness as stated in this paragraph, is that not damning to hikers, equestrians, and/or pack animals – all of which are precluded from the mountain bike trails? Will the mountain bike park really cause that much more of a likelihood of the spread of invasive plants, or is the spread of invasive plants already likely given the number of hikers, motorists, deer and elk in the area? There is no data to justify the over-analysis of non-native weeds in this mountain bike park analysis and we ask that the analysis be revised.	People, animals (wild and domesticated), vehicles, and mountain bikes can introduce and spread invasive plants. The seeds or other reproducing parts of invasive plants can hitchhike on clothing, shoes, fur, wheels, tires, pedals, frames--almost any surface. The Vegetation analysis provides a brief overview of some articles in the scientific literature on the transport of invasive plants. The reason for a bike cleaning station at the top of the park to be used by all riders before they descend the trails is to prevent the introduction and spread of invasive plants in the park. Many mountain bike trail systems do not have a cleaning station. Requiring that all bikes be cleaned before entry into the park is the best and only way to ensure that weed seed and reproductive propagules are not introduced. The recently-approved bike park at Stevens Pass, WA includes a washing station and requires washing before and after use of the park. On this basis, requiring Timberline mountain bikers to wash before riding in the park is consistent with standard practice on the National Forest in the Pacific Northwest.

Public Comment	Response
Page 108, paragraph 1 describes how mountain bike tires have been documented carrying root pathogens for Port Orford cedar in southern Oregon and northern California. Do these studies also suggest that hikers, equestrians, pack animals or livestock carry these pathogens? This pathogen does not affect species that are present in our Pacific Northwestern forest. RLK asks that this issue be either revised to reflect a documented Pacific Northwest mountain bike trail or omitted from the discussion. These referenced effects are most certainly from cross-country riding and not bike parks that provide washing stations and where riders ride on bare soil, rocks and wooden features.	The botany report acknowledges that Port Orford cedar root rot is not a pathogen that would affect tree species in the special-use permit area. The point the report attempts to make is that pathogens can be transported on mountain bikes just as they could be transported on people's shoes, by vehicles, and by animals.
Page 108, paragraph 3 describes the effect of overnight mountain bike trips on a "range of biophysical impacts to the environment", including human waste in the meadows and forest. We propose to provide porta-potties near the bottom of the bike park (and away from the bottom terminal of Jeff Flood Express as described in our comment on Rec-5 above), so this is a non-issue. RLK asks that this discussion be removed from the analysis as the referenced sources are referring to cross-country mountain bikers. The paragraph also describes that lost or discarded human detritus would "certainly increase". The very nature of riding in a lift-served bike park provides for an uninterrupted descent – that is the intent. Bike Park riders will not stop along their descent of a narrow bike trail to drink, eat or dispose of clothing, as suggested by this statement. Additionally, restroom facilities will be conveniently located at the top and bottom of the project area.	This consideration was clarified in the botany report on page 20 and in the Vegetation section of the EA (see Section 3.5).
Page 108, paragraph 3 describes trash as "unsightly". How does this relate to the effects of our proposed mountain bike park on botany resources? Use of this charged language reflects badly on our proposal. Unsightly is an opinion, not an impact.	The term "unsightly" has been removed from the discussion.

Public Comment	Response
On page 110, for the third time, the project design criteria are provided in their entirety. This analysis should be completely revised to reflect the probable effects of the proposed managed, lift-served, day-use, downhill mountain bike park as opposed to world-wide references to cross-country and overnight mountain biking. The analysis should include the net effect of the project with the project design criteria in place, referencing them in Table 3 to save pages of space. The analysis should consider the projected effects of the bike park in light of the existing invasives at Lolo Pass, on the PCT, and in the Wilderness – surely our bike park did not cause those. This analysis has served only to mis-inform the public about what will happen at Timberline, remarkably ending with a MIIH determination despite the many value-laden editorial comments decrying mountain biking.	The report is not value-laden. The report provides all readers, whether supporters or opponents of the park, with a discussion of concerns and possible/probable outcomes.
Page 113, paragraph 3 – Special-Status Species describes how a proposed mountain bike trail was revised in the proposed action for reasons "other than the presence of R. nudum." R. nudum is a riparian species and the trail was revised to avoid effects to riparian habitat. The way this is stated makes a positive outcome seem like a bad thing. RLK asks that this sentence be revised to reflect that R. nudum will be protected because we moved the trail and the entire trail system was designed to avoid riparian areas as much as possible during the collaboration in the Summer of 2010, thereby protecting R. nudum .	A trail segment was removed to protect R. nudum, but there are still concerns about sedimentation from mountain bike trails higher up on the mountain entering headwater streams and affecting downstream R. nudum populations and issues relating to impacts to R. nudum populations near the Jeff Flood chairlift terminal from the concentration of riders in the area. Implementation of the PDC(see Table 3) in conjunction with the restoration and stabilization at the bottom terminal would reduce the potential for this effect, however the possibility remains.
Page 122, paragraph 4 references the widening of trails or the formation of unauthorized trails as a potential effect on special-status fungi. Once again, the analysis ignores the project design criteria that are a part of the project proposal. We propose to patrol the bike park (see Soil 5 and Veg 9) to prevent these impacts from happening to our trails…our trails…our quality recreation offering to the public. RLK asks that this paragraph be removed from the analysis and the associated specialist report.	Trails may widen with use over time. The proposal has been designed, and project design criteria would be applied, that would minimize the incentive to ride off-trail. Nonetheless, there is no guarantee than riders would never ride off-trail, despite bike park patrolling the park on a continuous basis. These disturbances would affect fungi, plants, and habitats. Project design criteria would reduce the likelihood of these impacts from occurring but there is no guarantee that trail widening or off-trail riding would not occur over the lifetime of the bike park.
On Page 123 the discussion provides justification for not performing equivalent effort surveys for this project. However, previously on page 122, paragraph 2 states that two years of fall and spring surveys are needed. This is confusing. RLK asks that this discussion be located at one place in the document and clarified to state whether surveys are needed or not.	Two years of surveys for Survey & Manage fungi, required for ground- or habitat-disturbing activities in old-growth forest, are being completed in the proposed downhill mountain bike park project area.

Public Comment	Response
Appendix E - Starting on Page 5, the PA provides a long list of actions that are intended to reduce effects on vegetation. Most of these have been clarified and re-stated in the project design criteria. RLK asks that the botany specialist report refer to the same set of project design criteria as the other specialist reports.	The botany report offers a list of recommended project design criteria. In order to condense the number of project design criteria formulated by all of the natural resource specialists, the EA provides a slightly different set of project design criteria that incorporate the specialist input. The project design criteria in the EA (Table 3) would be approved as a part of the project if it is approved. The project design criteria in the botany report are the botanist's professional recommendations.
Appendix E - Page 7 includes a portion of the intended list of recommendations for restoration that would reduce impacts on vegetation. The third bullet includes "Fulfill restoration commitments agreed to in the Timberline Express EIS (2005)." First and foremost, requirements in the Timberline Express EIS are outside of the scope of this NEPA analysis. This type of statement does not belong in this PA. Second and equally important, RLK implemented the actions that were required in the EIS at least three times. The agency's recommended re-vegetation treatments were not successful. RLK agrees that this is unfortunate and we continue to work with the Forest Service to remedy this situation, counter to the tone of this statement.	The botany report attempts to relate in a scientific and professional tone the potential effects of a downhill mountain bike park on Mt. Hood. The statement is simply made that a number of areas in the Timberline Express ski runs constructed in 2006-2007 remain sparsely vegetated and it remains RLK's responsibility to re-vegetate these areas just as it will be RLK's responsibility to re-vegetate disturbed areas in the downhill mountain bike park, if approved.
Page 8 refers to monitoring that will reduce effects on vegetation. Again, the first bullet asks RLK to fulfill the monitoring requirements from the Timberline Express EIS. This statement suggests that we have not fulfilled our monitoring obligations. For the record, RLK has fulfilled these monitoring requirements.	It is acknowledged that RLK fulfilled the monitoring requirements for Rhizomnium nudum.
Page 10, Mountain Bike Skills Park, bullet 1 requires RLK to transplant vegetation from the skills park to the Welcome Plaza Garden, where Veg-20 requires us to transplant them around Timberline Lodge. These are contradictory. RLK asks that the project design criteria serve as the basis for this requirement and that this (and all) requirements that are not included in the project design criteria be removed from the botany specialist report. The inconsistencies are confusing and sometimes conflicting.	RLK and the Forest Service would prepare a plant salvage plan (PDC Veg-10) that would describe transplant protocols and locations.

Public Comment	Response
Page 10 – Future Planning suggests that as a part of this project, the next Forest Plan should include a long-term management plan to “conserve and protect forest and meadows” in the SUP area. The Forest Plan provides the direction for activities and future development at Timberline. Our Special Use Permit requires RLK to prepare a Master Plan that describes our vision for the future, consistent with the Forest Plan. That the stated goal for our SUP area is to “conserve forest and meadows” ignores the land planning process, the special use permit process, the Timberline Compact and the NEPA process. This is unacceptable. The PA is suggesting that no further development take place at Timberline. RLK asks that this out-of-scope discussion be removed from the specialist report.	This text has been removed from the BE.
Page 21, last paragraph states that “mountain biking is sustainable, even with bike riders preferring downhill runs, steep slopes, and curves, as long as trails are appropriately designed, located and managed.” While this one positive statement is buried, it states our objectives clearly. As described in Appendix A and Chapter 2 of the PA, our proposed downhill park includes no sustained steep slopes. The documentation in Appendix A and the project design criteria show our intent that this bike park will be well-managed. Consequently, this bike park will be sustainable, using the PA’s own references.	Implementation (e.g., trail construction, park operation, and rider management) would determine whether the park can be run in an environmentally sustainable manner without trails being widened, plants being trampled, invasive plants being introduced, and native plant communities being harmed.
Page 22, last paragraph describes how in controlled conditions, mountain biking impacts are often comparable to those of a hiker. Again, the documentation in Appendix A and the project design criteria show that our intention is a very controlled, sustainable mountain bike park that will be patrolled throughout the day. The very design will minimize aggressive riding styles, avoid wet areas and provide grade reversals to slow speed – thereby minimizing the need to brake or skid. Given that our controlled, managed mountain bike park will meet all of these criteria, why do the botany and wildlife specialist reports treat our proposal like cross-country mountain biking and motorized OHVs? Should the analysis not include discussion about the similarity to hiking and therefore reduced environmental impact compared to equestrian or pack animal trails?	The purpose of the scientific literature review in the botany report is to provide a context or overview for understanding the range of issues and potential effects associated with mountain biking as investigated by researchers. The review allows each reader to acquire a better and more informed understanding of the potential effects of a downhill mountain bike park.
Heritage	
Historical Structures other than Lodge not mentioned. There is no mention of Phlox Point. There is no mention of the old campground at the base of Pucci. There is no mention of the old Still Creek Trail.	Historic structures and sites within one mile of the project boundary are discussed in the Heritage report but were redacted in the public document.

Public Comment	Response
The bike park will adversely affect the Lodge. Visitors expect the atmosphere to be that of a ski lodge. The lodge and its grounds are a sanctuary. The SUP should not allow such an activity with a detrimental effect on visual historic value. Consider impact mountain biking on the ability to enjoy the art and architecture of the Lodge and its surroundings (all contributing elements of the landmark designation)	An archeological and visual heritage assessment was completed that was in compliance with Section 106 of the National Historic Preservation Act. Both assessments concluded that there were no adverse effects to the historic property with which the State Historic Preservation Office (SHPO) concurred.
To what degree have the tribes had the opportunity to submit input on the development and its impact on the cultural integrity of the area? Has SHPO been consulted by the FS?	SHPO has been consulted on this project and has concurred with our agency finding of ”No Adverse Effect” for the project. In March, 2012, the Confederated Tribes of the Warm Springs sent an email to the Forest Service which stated that they had reviewed the proposal and had no issues with the proposal moving forward.
WLR should be preserved in its current state – bike park would have detrimental effect on the historic value of the road.	As discussed in Section 3.6.1, the proposed project will not alter the physical characteristics of the road or its alignment and will therefore not affect the qualities that make the Historic West Leg Road eligible to the NRHP.
With bikes zooming past the edge of West Leg Road, it is doubtful that the historic area will be enjoyed, as it would have been prior to the development of the bike park. Presence of 6 crossings will change the experience when traveling along WLR.	As discussed in the Heritage report (pgs 13-14, and 16), the proposed project will not alter the physical characteristics of the road or its alignment and will therefore not affect the qualities that make the Historic West Leg Road eligible to the NRHP.
Evaluate risk, to culturally important trees like old growth hemlock and White Bark Pine. Goal of no large tree cutting is insufficient to protect cultural value of forest growth.	To ensure adequate protection of historic values and culturally important flora, trails were laid out to avoid sensitive areas. To further guard these resources from damage the implementation of PDC (Table 3) would be employed.
Include Lodge in APE	The Lodge was assessed in the Heritage Visual Analysis (section 3.7.1).
Over the years a number of non-historic elements have been introduced to the Lodge’s immediate environs including ski lifts, parking lot expansions and improvements, and the Day Lodge. Though relatively minor in scale to these other improvements, will the proposed facilities and activity have an adverse cumulative effect on the historic qualities of the Lodge?	Cumulative effects were discussed in Heritage report (pg. 16-17). The proposed project will have a negligible cumulative effect on the resources' ability to convey the integrity of the property's significant historic features.

Public Comment	Response
We are specifically concerned with potential direct or indirect effects this new activity and user group may have on the lodge. A few examples: Will adequate measures be designed into the project to restrict bicyclists to the designated trails and to protect the fragile alpine ecosystem in the immediate environs of the lodge? Is there any clothing or equipment associated with this activity that, if introduced into or near the Lodge, would affect the building's historic integrity? Are there potential user conflicts?	As discussed in Sections 3.7, 3.8, and 3.9, the proposed bike park has been designed not to be visible from Timberline Lodge, and to operate out of the existing day lodge. Just as the lodge now accommodates summer skiers, other recreationists and tourists, it would likely see an increase in visitors associated with the mountain biking public. Cleats on biker shoes are addressed in Section 3.8.
We also recommend design criteria be added to the proposal that requires an annual review of implementation and operation of the project, would investigate any potential direct or indirect effects on the historic integrity of the Lodge, and that mitigations would be developed and implemented to address any effects that the review identifies.	Through the visual and archaeological analysis completed by this agency and concurred on by SHPO, the project does not represent a direct impact to the historic lodge. This undertaking would not adversely affect the building's characteristics that qualify it for inclusion as a National Historic Landmark, and therefore design criteria, annual reviews, and mitigation measures not already addressed are not warranted.
Visuals	
The visual analysis does not consider the large and constant cloud of dust during operating hours causing air pollution and visual impact on southern viewscape.	The majority of bike trails would be in the forest, out of view. With approximately 110 - 115 bikers on the 17+ miles of trails at any given time, no constant dust clould is anticipated, just as current mountain biking events at Timberline (i.e., Glade Trail) do not generate a large and constant cloud of dust.
The visual analysis fails to address direct and indirect effects of the bike park. The preliminary analysis only used the EIS visual analysis without consideration of THIS project. Construction will require clearing of trees, shrubs and groundcover. This will change the natural appearance in all landscape character types and will affect the scenic quality of the area.	The visuals analysis in the EA tiers to the analysis in the Timberline Express EIS, which selected 8 viewpoints from which to assess the effects of the lift and ski trails. The proposed action in this analysis would take place in the exact same area, therefore the use of the 8 viewpoints is warranted and consistent. The analysis does assess the visibility of the bike park from these 8 viewpoints. The VQO of Modification would be met in all areas affected by amendment #15.
Wooden features are very un-aesthetic and conflict with the innate, natural beauty of the MHNF. The large number of these objects, the large scale of mass and unaesthetic design will contribute to a degraded visual experience.	These wooden features would only be placed on the bike trails, most of which would not be visible to anyone that is not on the bike trail itself due to the location of the trails through the forest rather than in open areas.

Public Comment	Response
Statement of cumulative effects does not consider cumulative impact that may result from introduction of summer activities in an area used primarily for winter recreation.	Cumulative effects are those effects of actions that would overlap in space and time with the effects of the proposed action. No known projects would cause visual effects in the project area at the same time as the proposed action. The Timberline SUP area currently provides summer recreation and the bike park would have effects to this summer use as described in the Recreation analysis.
Removal of trees in tree islands will not retain "gradual transition from undisturbed forest to cleared ski trails" as in the EIS analysis of tree removal. The Proposed Action will reduce canopy cover resulting in significant cumulative effects to the human environment.	The proposed action includes PDC Veg-1 (see Table 3), which states that no trees greater than 6" dbh would be cut for the bike trails and Veg-7, which states that daylighting of the trails would not occur through protection of larger trees.
The preliminary analysis improperly applies rationale for the VQO amendment. The existing Standard of Partial Retention and the goal of ski area development require ski facilities, but there is no mention of mountain bike facilities. The preliminary analysis fails to mention how downhill mountain biking is consistent with the prescribed VQO of "Modification". The preliminary analysis fails to describe how bike trails or activities will utilize the natural form, line, color and texture of the landscape as required by the VQO of Modification.	As stated in the PEA and carried into the EA Section 3.7.2, a VQO of modification means that man's activity may dominate the character of the landscape but at the same time, utilize the natural established form, line, color and texture." Ski trials and lift corridors currently meet this standard in that they follow the natural fall-line and topography. On this basis, mountain bike trails that wind down the slope between the trees would easily meet the same standard in that the trails would be in the forest and therefore would only be visible in the foreground. The Recreation analysis (Section 3.9) addresses the consistency of mountain biking with the desired future condition for the Timberline SUP area.
The Visuals section fails to address Timberline Lodge Special Emphasis Area or the PCT Comprehensive Plan.	The Visuals analysis assesses the 8 viewpoints addressed in the Visual section to evaluate the VQOs from these viewpoints. The Heritage analysis addresses the Timberline Lodge Special Emphasis Area. The PCT Comprehensive Plan was not included in the analysis because Amendment #5 changed the VQO to Modified along the Timberline Trail. The Forest Plan sets the standard for visual quality along the trail.
Trails from top terminal will be visible from Lodge front entrance or rear patio, but PA says they won't be without any justification for the statement.	The trails have been designed to be screened rom Timberline lodge by both topography and vegetation, as well as the day lodge itself.

Public Comment	Response
Re-do the visual representations in the summer or fall when there is no snow and use more than 10 feet to represent a biker jumping off of a 3-foot feature	The use of ten feet is based on a rider riding atop a 3-foot feature, not jumping off of one. As stated in Appendix F of the PA, ten feet more than accounts for the height of a rider on a 3-foot feature. This analysis was not re-done without snow, as the snow only ads to the height when viewed from Timberline lodge. On this basis, the analysis presented in Appendix D of the EA is a conservative analysis.
Recreation	
The range of mountain bike trails at other ski areas is not like the trails in this proposal. No bike park serving this type of mountain bike user exists in the Pacific Northwest, resulting in people going to Whistler to get this experience.	Noted. The Socio-economic analysis describes the market and demand or a lift-served mountain bike park at Timberline (see EA Section 3.10)
The development of the proposed bike park will result in a reduction in the number of unauthorized trails because it will provide the type of riding that these people want.	While a reduction in unauthorized mountain bike trails would be a beneficial impact, the proposed bike park is intended to meet only the Purpose and Need described in Chapter 1 (see Section 1.2). Any reduction in unauthorized trails is outside the scope of this EA.
The presence of the Bike Park and crossings of West Leg Road suggest that there will be a push to close West Leg Road to cars.	The proposed action includes no discussion of closing West Leg Road. West Leg Road would remain open if the proposed action is approved. PDC would be in place to cause mountain bikes to respond in the event that an approaching vehicle on west Leg Road is encountered.
How will RLK ensure segregation of bikers from other trails?	The Developed Recreation section of the EA indicates that signs would be posted at intersection of mountain bike park trails and other bike trails. This is included as a PDC Rec-2 in the EA (see Table 3). The PDC also indicate that bike park trails would also be patrolled by bike park staff, employed by RLK (see Soil-5, -9, Veg-9, and WS-3 in Table 3).
The bike park will add another fee-based user group at Timberline, resulting in further loss of parking for non-paying guests.	The Recreation analysis in the PA indicates that "The addition of 169 cars on a capacity day would further tax the parking lots." If the proposed action is approved, parking would remain first come first serve, which could lead to some conflict with non-paying and paying guest. The Recreation and Social-economics analyses in the EA have been updated to better acknowledge this potential impact.

Public Comment	Response
A designated bike park will result in reduced conflict between mountain bikes and other users on other multi-use trails.	Noted. As described in the Recreation analysis, the increased popularity of mountain biking at Timberline would also increase the use of other mountain bike and/or multi-use trails at Timberline if the bike park is approved.
RLK should preserve the area for PCT users so they experience the landscape as is existed prior to development.	As discussed in trails PCNST section of the Recreation analysis (see Section 3.9), PCNST users are already coming to highly developed area via the trail, including operating chairlifts. The development of a lift-served bike park is consistent with the Forest Plan allocation and desired future condition at Timberline.
The Forest Service admits that downhill, lift served mountain biking is a niche market. The EA must clarify whether it has information on local or regional demand for niche market and whether Thornton, 2010 addresses that niche market or mountain biking generally.	The socio-economic analysis in the EA (see Section 3.10) has been updated to include more discussion about the various markets within the greater mountain biking community. In addition, the socio-economics section has been updated to include more discussion about regional and local demand, including a market analysis specifically for the proposed Timberline bike park. Thornton (2010) states "With the modern style of riding, the newer bikes and their higher speeds, we will continue to see increased maintenance needs to patch together our outdated existing trails. The proposed development at Timberline will accommodate today's mountain bikers and greatly reduce the stress on the backcountry trails." On this basis, he is suggesting that the greater mountain biking community and the demands it places on trials would be served by the proposed Timberline bike park because these riders would choose to participate in the niche aspect of the sport (i.e., the lift-served bike park).
The Forest Service must address impacts to non-mechanized recreationalists, including hikers, climbers, horseback riders, skiers, etc. The bike park project represents a clear conflict with all of the public who share my passive approach for enjoying the natural beauty and spiritual solitude of Mt. Hood.	The Recreation analysis addresses impacts to hikers, climbers, horseback riders, skiers and cross-country mountain bikers in the Developed Recreation section. The Timberline SUP area is designated MA-11, which provides for a developed winter recreation facility an associated summer infrastructure. On this basis, the Timberline SUP area currently provides developed recreation (i.e. lift-served summer skiing) that would not be consistent with passive recreation or solitude.

Public Comment	Response
The Forest Service needs to quantify the impact that the bike park will have on the existing facilities at Ski Bowl.	The Recreation analysis in the PA stated “Ski Bowl would be affected by the addition of a Mountain Bike Park at Timberline. Currently Ski Bowl offers mountain biking in the summer. During the initial few years of operation at Timberline, it is expected that current, local Ski Bowl riders would visit Timberline instead of Ski Bowl. However, as more and more regional/destination riders visit Timberline Mountain Bike Park, the presence of these new visitors to the Government Camp area would sponsor new riders at Ski Bowl. Ski Bowl has steeper grade runs than the Timberline Mountain Bike Park proposal, so it would cater to the more advanced mountain bikers.” The Socio-economics analysis in the PA stated that “Recent upgrades to the mountain bike trail system at Ski Bowl would add to the supply of developed mountain bike trails in the Government Camp area. Ski Bowl has voiced support for the Timberline Bike Park, indicating that they believe the new bike park would draw more people to the Government Camp area, including both Timberline and Ski Bowl. “These discussions have been carried into the EA (see Section 3.10).
The Recreation analysis concludes that facilities will be visible from the Timberline Trail and that hikers will be able to hear and see mountain biking. The EA must include S&G that apply and determine whether these impacts are allowed.	The EA has been updated to include an analysis of forest plan consistency with regard to the hiker experience along the Timberline Trail. Along the Timberline Trail, ski lift facilities should achieve a VQO of partial retention. A11-020 defines Partial Retention as " A visual quality objective where man's activities may be evident but subordinate to characteristic landscape. The summer operation currently includes the operation of two detachable quad chairlifts that serve the summer ski camps and summer public skiing, and which are visible from the Timberline Trail. On this basis, the added operation of the Jeff Flood lift if the proposed action is approved would be consistent with the current summer operation.
The proposed trails will cut through the Timberline to Town trail, increasing erosion along both trails, creating user conflicts between a downhill thrill ride and a more family-friendly, forest-oriented activity. Will the free trail be closed as mitigation in favor of the fee-based trails?	Timberline To Town trail would not be closed as mitigation for the fee-based trails if the proposed action is approved.

Public Comment	Response
Timberline's special use permit is for winter operations only. The bike park is a non-snow activity.	RLK's special use permit authorizes the current summer activities at Timberline, including the operation of two chairlifts and skiing on the slopes above Timberline. As described in the Forest Plan Consistency section of the Recreation analysis "the desired conditions for this allocation are that 'opportunities exist for summer recreation activities such as hiking, mountain bicycling, and horseback riding.'"
What consideration has been given to the mingling of bikers and ski/snowboard campers in the parking area and day lodge? Campers, when done around noon will take up biking, resulting in borrowed, broken and misplaced bikes. How will bike traffic be controlled so that bike park riders do not intermingle with other visitors on trails and roads around the lodge?	Currently, there are trails in the vicinity of Timberline Lodge open to bikes. Visitors can expect to see bikers on designated bike trails. Trails that are not designated for bikes would be posted and RLK would patrol for unauthorized use. It is anticipated that campers would make up a small proportion of those who ride the bike park. It is expected that park riders and RLK would manage their own mountain bikes such that bikes would not be stolen for use in the bike park.
Will other bikers be allowed to use West Leg Road after the bike park is built?	Yes, bikers would still be allowed on West Leg Road if the proposed action is approved.
What will be done to control free riders riding the trails and shuttling each other to the bike park? This would increase traffic and hazard on the road.	The bike park would be closed to riders in the park and the route to Government Camp from the bottom terminal of the Jeff Flood lift would not be desirable for use by bike park riders. RLK would patrol the area to insure there would be no unauthorized use (see Soil-5, -9, Veg-9, and WS-3 in Table 3).
Based on information available on the web, this type of biking also has been referenced as "zero gravity" type biking. For this type of biking, the most important target components are: 1) obstacles, 2) elevation, and 3) speed of a course. The wooden features include drops of 10 to 20 feet, precluding multi-use. In the presentation given by the Forest Service, it was stated that the bikes do not have brakes to facilitate a fast ride down the course. Communing with nature, or more specifically with a natural forest or historical area does not appear to have any significance for this activity.	The Socio-economics section of the EA (se Section 3.10) has been updated to better describe the various mountain biker markets. A lift-served, downhill bike park is a separate market from "zero gravity" riders – one that includes various ability levels and provides for all ages. All mountain bikes used at the proposed bike park would have brakes, however the trails would be designed with grade reversals and other features to reduce speed without the use of brakes. With the thousands of skiers that frequent Timberline, it is anticipated the many mountain bike park guests will also visit the historical Timberline Lodge.

Public Comment	Response
Page 131 and 132 – 'Mountain Biking' speaks very briefly about the evolution of mountain biking and the segregation between cross-country and downhill mountain biking. This section should be revised to better describe how this evolution has resulted in the burgeoning mountain bike park concept, which is vastly different than cross-country or overnight mountain biking (as referenced repetitively in the Botany section). The revised section should describe the behaviors of the rider in each category and their effect on the environment (e.g., human detritus, vectors for invasive species, likelihood of riding off-trail).	The socio-economics section of the EA has been updated to better describe the various user groups within the greater mountain biking community. The proposed action includes no cross-country or overnight mountain biking and restroom facilities would be provided in the bike park, so no human detritus is expected in the bike park. Vectors for invasive species are addressed in the Botany analysis and the project design criteria (Table 3) address both off-trail riding (see Soil-5, -9, Veg-9, 18 and WS-3) and invasive species (see Veg-4,6,8, and 16).
Page 138 – Timberline to Town Trail indicates that under the No Action alternative there would be no increased pressure for use on this new trail, ostensibly because the bike park will not be built. Those who currently ride on Glade and Alpine will most certainly ride on the new trail, resulting in increased pressure. This discussion should be revised to reflect the closure of Glade and Alpine to mountain biking and the resulting increase in mountain biking use on the new trail. Similarly, the description of the effects of the bike park on the Timberline to Town Trail should reflect the increased pressure from the closure of Alpine and Glade to mountain biking.	The Recreation analysis (see Section 3.9) has been updated to describe that closure of Alpine and Glade to mountain biking would increase pressure on the Timberline to Town Trail.
Page 140, paragraph 4 indicates that RLK will provide shuttles from Government Camp as a primary means of reducing demand for parking during bike park events This section should be revised to reflect that shuttles will be evaluated as one way to manage parking – not the primary way.	Rec-5 in Table 3 has been revised in the EA to include" The use of shuttles or other means to bring spectators to the site when the parking lots are full." The Mountain Biking section under the Proposed Action analysis has been updated to include this revision.
I'd like to know more about RLK's precautions to prevent mountain bikers from conflicting with hikers. Describe how a chicane works. How Many people will be on the bike patrol? How often would they patrol the trails?	Chicanes work by creating turns before trail intersection to slow and control the riders speed. The bike park would be patrolled throughout the daily operation, much like ski patrol The number of bike patrol would be determined by RLK dependent on the level of use, the time of day, and other considerations, also much like the ski patrol.
The Preliminary Assessment did not sufficiently address noise impacts on other recreationists. If the Jeff Flood lift is running in the summer, will the lifties be allowed to blast loud music?	RLK would implement their current lift operator standards to the mountain bike park. Currently, loud music is not allowed for the lift operators on the Magic Mile and Palmer lifts.

Public Comment	Response
Looking at the trail map, it seems as if there are places where green and black trails intersect. This will be frustrating to both user groups and is a conflict that should be avoided. I would hate for my child to enter a black trail from a green trail.	Similar to ski trails intersecting, the bike park trails would include signage wherever trails diverge.
The recreation analysis fails to disclose the effects of road closures on hikers, snowboarders or cross-country skiers who currently use the roads.	The road closures in proposed action are service roads used by RLK. These roads provide summer access to the lift terminals and towers. These roads are not part of the forest road system and are not used by hikers, snowboarders or cross-country skiers.
We are specifically concerned with potential direct or indirect effects this new activity and user group may have on the lodge. A few examples: Will adequate measures be designed into the project to restrict bicyclists to the designated trails and to protect the fragile alpine ecosystem in the immediate environs of the lodge? Is there any clothing or equipment associated with this activity that, if introduced into or near the Lodge, would affect the building's historic integrity?	Project design criteria Rec- 2, 3 and 4 (see Table 3) discuss how the mountain bike park would be signed and patrolled for visitors to stay on designated trails. Downhill mountain bikers generally wear shoes that are much like sneakers. Those with cleats are typically recessed cleats that would not affect (i.e., scratch or otherwise mar) the floor of the Lodge, as described in Section 3.8 of the EA.
Socio-economics	
With increased population growth, more recreation is needed.	Thank you for your comment.
Based on visitation at Whistler, there is clearly demand for lift-served mountain biking compared to the supply in the Pacific Northwest.	Thank you for your comment.
Increased year-round operations will help insulate RLK from bad winters and will help stabilize the seasonality of RLK's financials.	Thank you for your comment.
With such a shot short season, it seems that the economic viability of the bike park is questionable.	Table 35 provides an economic analysis of the bike park operation and shows that the bike park would be economically viable.
The preliminary analysis does not address increased employment that will result from the addition of the bike park.	Employment was not raised as a scoping issue and it is therefore not addressed in the EA.
The preliminary analysis lacks information about demand for lift-served, fee-based mountain biking at Timberline.	The EA has been updated to include a market analysis specifically for a bike park at Timberline (see Appendix E).

Public Comment	Response
Local visitation is not enough to be at capacity during weekdays, and the projected visitation relies on regional visitors. The analysis should discuss other regional locations for this bike park based on the reliance on regional visitors.	This environmental analysis responds to a proposal by RLK and company to provide a bike park at Timberline. Thus, any alternative that does not provide mountain biking at Timberline would be outside of the scope of this analysis. There is no expectation that the bike park would operate at capacity during the week, as discussed in the Visitation and Spending analysis of the Proposed Action. An overall utilization of 80% is assumed for the analysis.
The methodology for visitation projections was not provided in the preliminary analysis.	The visitation projections are based on Gravity Logic's initial projections and a pro forma prepared for RLK. The pro forma is summarized in the EA. The Recreation analysis (see Section 3.9) provides a detailed discussion about the capacity of the bike park and projected visitation.
Given competition in the region, PA fails to offer information supporting visitation projections. Don't rely on Gravity Logic report or economic activity at Whistler to project visitation at Timberline.	The EA has been updated to include a market analysis specifically for a bike park at Timberline (see Table 33 and Appendix E).
Visitation projections do not incorporate rain days or PDC Soil-11. 90 days seems like too long of a season given the conditions at Timberline. The EA should use a range of 45 to 75 days with 90 days being the best drought year possibility.	The EA has been updated to include an analysis of how many days the bike park would be shut down due to rain during the summer. 90 days is an appropriate estimation of the number of operating day available in the four-month period from July to October. Based on this analysis, precipitation would affect operations on approximately 8 days per season.
Increased demand for parking will displace traditional visitors of the Lodge. The bike park will result in environment that is not representative of the traditional use of the lodge.	Parking is discussed in the Recreation (Section 3.9) and Socio-Economics (Section 3.10) analyses. It is acknowledged that parking is, and would continue to be an issue at Timberline.
Increase in summer use will drive the development of the 800 spaces in the Master Plan – must be considered in the Cumulative Effects analysis.	The Molly's parking lot envisioned in the Master Plan may or may not be feasible, given restrictions placed on the concept by ODOT. On this basis, RLK must prove the project to be feasible before proposing it to the Forest Service. At this time, the parking lot has not been proven feasible, nor has it been proposed for analysis under NEPA. Therefore, the parking lot is not reasonably foreseeable and therefore is not included in the cumulative

Public Comment	Response
	effects analysis.
The EA should assess the economic viability of building out the bike park more slowly over time after the restoration activities have been completed and monitored to show that they have been effective.	The EA analysis assumes that the restoration projects would be constructed during the construction of the bike park (see Soils and Hydrology analyses).
The economics section should address the projected additional revenues that would go to the county. The county gets 25% of every dollar in fees that the Forest Service generates.	This 25% was not raised as a scoping issue and is therefore not analyzed in the socio-Economics analysis.
The socio-economics analysis fails to analyze the effect of road closure on ski area safety and operations, fire suppression, or subsistence hunters and gatherers.	The restoration projects in the proposed action were developed by the Forest Service and RLK. The roads proposed for closure are ski area work roads along chairlifts. These roads are not used for operation or fire suppression, and they are not open to the public. RLK has indicated that these roads are no longer necessary to their operation.

Appendix B: Detailed Descriptions of Trails

Erosion Control

Constructed in-slope turns with sediment traps for run-off

Installation of PVC or steel pipe underneath the tread from drainage basin to sediment trap.

Erosion Control (cont.)

Rock fortify drainage basins and place pipe minimum 3 inches above bottom of drainage basin to allow for silt to drop.

Rock fortify sediment trap at end of pipe and ensure depth of sediment trap is sufficient to remain underwhelmed during a minimum of 2 significant rain events

Erosion Control (cont.)

In-slope turns that are designed for higher speeds to keep riders on trail to reduce trail braiding.

Incorporate grade reversals often throughout trail to improve drainage and guest experience.

Erosion Control (cont.)

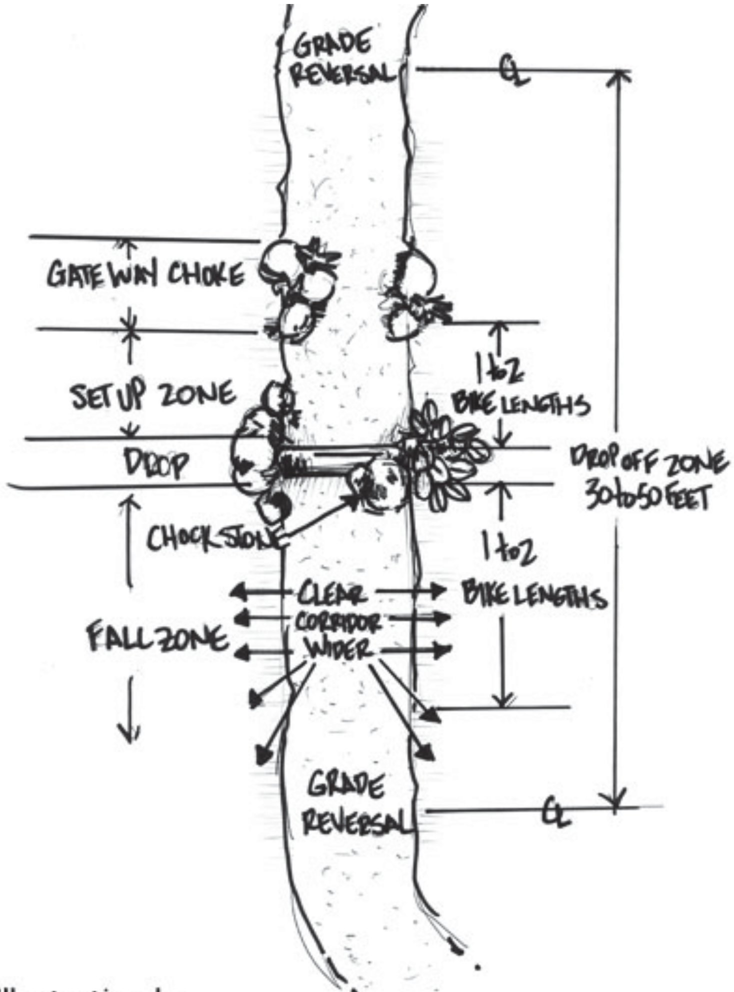
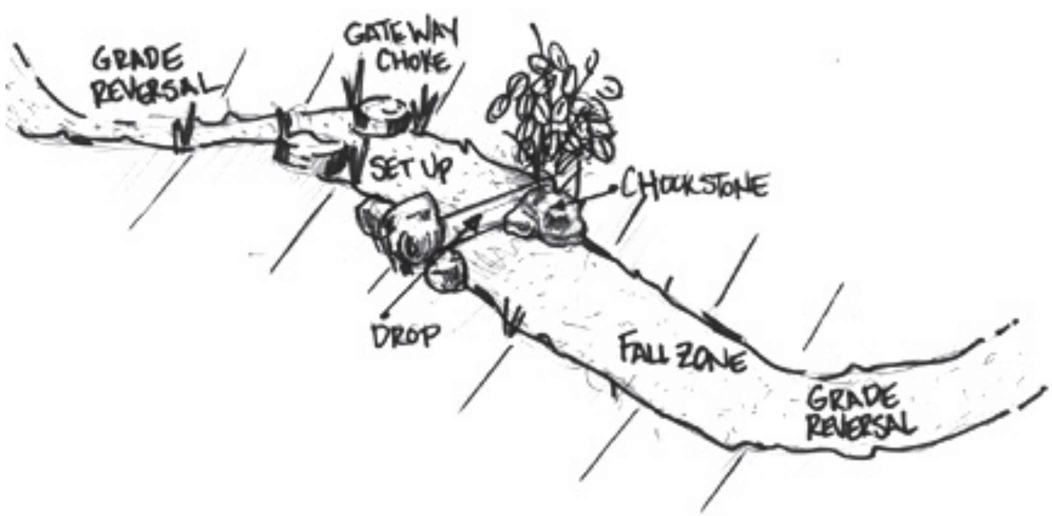


Illustration by
Mark Schmidt



Trail Armoring



Incorporate rock armoring or other tread elevating features if trail grade is greater than 10% and where a trail segment that is showing signs of excess erosion or wear.

Well-placed rock armoring can fit in with the natural environment and provide needed structure to prevent excess erosion.

Trail Armoring (cont.)

Rock armoring can be utilized on both trail surfaces and trail edges to stabilize critical areas and prevent erosion.

Appendix C: ARP Analysis

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TO:	Bill Granger
FROM:	Todd Parker
CC:	Timberline Express EIS project folder
DATE:	October 21, 2004
RE:	ARP ANALYSIS FOR THE TIMBERLINE EXPRESS EIS

This assessment was completed using the Aggregate Recovery Percent model (ARP). The ARP model was developed for use in the transient snow zone (2400-4800 feet). It provides a methodology for indexing the susceptibility of a watershed to increased peak flows from rain-on-snow events associated with management created openings in the canopy. This method assumes that the greatest likelihood for significant, long-term cumulative effects on forest hydrologic processes is caused by created openings in the canopy (from both timber harvest and from the existence of roads) that impact snow accumulation and snowmelt.

The ARP model was used to assess the proposed management alternative's potential affects on peak streamflows. This methodology was selected because:

- Some of the alternatives will create openings in the canopy that will affect snow accumulation and melt.

- Mt. Hood Forest Plan Standards and Guides are tied to this methodology.

The ARP model measures the percent of watershed hydrologic recovery based on managed stand age and a recovery curve developed for the Mt. Hood National Forest. This Forest recovery curve is a generalization of the percent of canopy cover and tree diameter expected at different ages of tree harvest plantations. The model assumes that a plantation has fully recovered its snow handling capabilities at 35 years of age. Because it does not predict the increase in peak flows, the ARP model is most useful when utilized in conjunction with information on watershed condition and sensitivity.

For this analysis it was assumed that activities that would reduce canopy closure below 70% in stands greater than 8 inches diameter at breast height (DBH) would have an affect on the ARP values. Harvest activities that did not reduce canopy closure of stands greater than 8 inches DBH below 70% were considered "ARP neutral."

A 35-year recovery curve was used to "grow" a plantation from seedlings to 8 inches DBH and 70% canopy closure.

Landscape areas analyzed included the affected subwatersheds and the fifth field watersheds as specified in the Mt. Hood Forest Plan Standards. The ARP values were calculated twice for each land area: for all lands within an area, and for lands available for harvest within an area. Lands available for harvest include Forest Service Lands that are not classified as Wilderness.

Table 1
ARP Calculated Using All Lands Salmon River Watershed Index Year 2005

Area (All lands)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Salmon River 5th Field Watershed	94.2	94.2	94.2	94.2	94.2
Upper Salmon 6th Field Subwatershed	91.0	91.0	91.0	91.0	91.0

Table 2
ARP Calculated Using All Lands Zigzag River Watershed Index Year 2005

Area (All lands)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Zigzag 5th Field Watershed	97.2	97.0	97.0	97.0	97.1
Camp Creek 6th Field Subwatershed	93.7	93.7	93.6	93.6	93.7
Zigzag Little Zigzag Canyon 6th Field Subwatershed	99.2	99.2	99.1	99.1	99.2
Still Creek 6th Field Subwatershed	98.1	97.7	97.8	97.7	97.9

Table 3
ARP Calculated Using Lands Available for Harvest Salmon River Watershed Index Year 2005

Area (Lands Available for Harvest)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Salmon River 5th Field Watershed	89.2	89.2	89.2	89.2	89.2
Upper Salmon 6th Field Subwatershed	90.5	90.5	90.5	90.5	90.4

Table 4
ARP Calculated Using Lands Available for Harvest Zigzag Watershed Index Year 2005

Area (Lands Available for Harvest)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Zigzag 5th Field Watershed	96.9	96.7	96.7	96.7	96.8
Camp Creek 6th Field Subwatershed	95.4	95.3	95.3	95.3	95.4
Zigzag Little Zigzag Canyon 6th Field Subwatershed	99.2	99.2	99.1	99.1	99.2
Still Creek 6th Field Subwatershed	98.1	97.7	97.8	97.8	97.9

On a Forest-wide basis, ARP values above 65% have been recommended to prevent adverse effects associated with increased peakflows. Much of the available literature that discusses the relationship between harvest/road disturbance and peak flows implies a threshold of concern of 25% -- or ARP value of 75%. (Mt. Hood National Forest Process Paper -- Special Emphasis Watersheds and Cumulative Effects, 1990.)

As detailed by Tables 1 through 4 all of the affected watersheds and subwatersheds for all the alternatives are well above either the 65% or 75% threshold of concern.

ASSESSMENT OF COMPLIANCE WITH MT. HOOD FOREST PLAN STANDARDS

APPLICABLE STANDARDS

Mt. Hood Forest Plan Standards for Cumulative Watershed Effects

- Vegetative management activities on National Forest System lands should be dispersed in time and space to minimize cumulative watershed effects. No more than 35 percent of an area available for vegetative manipulation should be in a hydrologically disturbed condition at any one time. (FW-061, FW-062)

- Within the 15 major drainages on the Forest, watershed impact areas shall not exceed 35 percent. (FW-063)

- Watershed impact areas at the subbasin or area analysis level should not exceed 35 percent. (FW-064)

- Within selected "Special Emphasis Watersheds", watershed impact areas should not exceed the "thresholds of concern" (TOC) established for those individual watersheds (for this project Still Creek is the associated subwatershed with a TOC of 25%). (FW-065)

- Cumulative effects analyses of management activities on water quality and stream channel stability (such as watershed impact analyses) shall include all lands in all ownerships within the watershed. (FW-066)

- Where land ownerships are intermingled, timber harvest scheduling should be coordinated to prevent adverse cumulative effects. (FW-067)

Results of Analysis

For this analysis activities considered included Timberline Express, Tamarack Pit Expansion, Government Camp Activities (i.e. Collins Lake development), and Salmonberry 5 Timber Sale.

Table 5
Watershed Impact Area Salmon River Watershed (Lands Available For Vegetative Manipulation)

Area (Lands Available for Harvest)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Salmon River 5th Field Watershed	10.8	10.8	10.8	10.8	10.8
Upper Salmon 6th Field Subwatershed	9.5	9.5	9.5	9.5	9.6
General Forest Plan Standard	35.0	35.0	35.0	35.0	35.0

Figure 1
Watershed Impact Area Salmon River Watershed (Lands Available For Vegetative Manipulation)

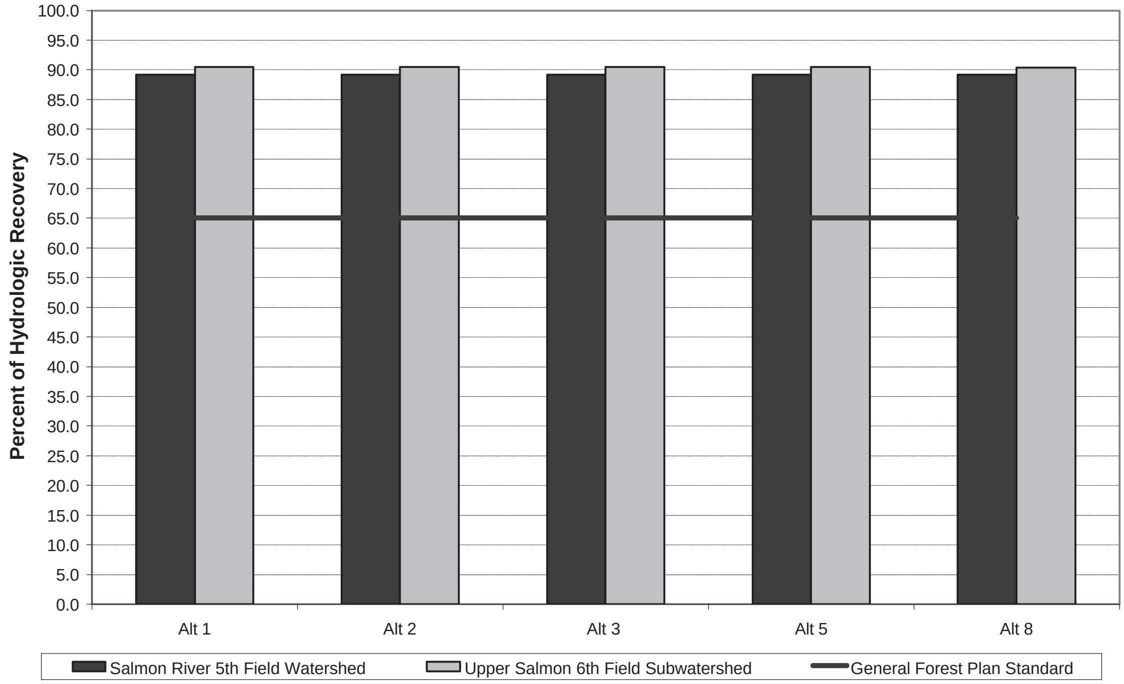
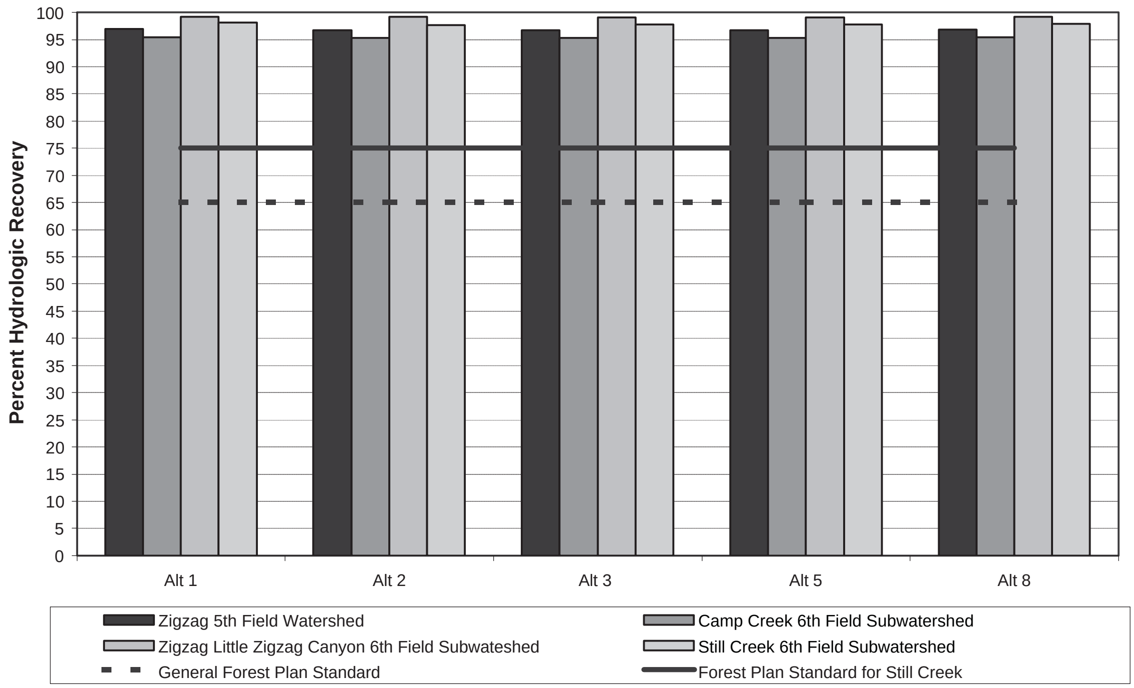


Table 6
Watershed Impact Area Zigzag Watershed (Lands Available For Vegetative Manipulation) – Index Year 2005

Area (Lands Available for Harvest)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Zigzag 5th Field Watershed	3.1	3.3	3.3	3.3	3.2
Camp Creek 6th Field Subwatershed	4.6	4.7	4.7	4.7	4.6
Zigzag Little Zigzag Canyon 6th Field Subwatershed	0.8	0.8	0.9	0.9	0.8
Still Creek 6th Field Subwatershed	1.9	2.3	2.2	2.2	2.1
General Forest Plan Standard	35	35	35	35	35
Forest Plan Standard for Still Creek	25	25	25	25	25

Figure 2
Watershed Impact Area Zigzag Watershed (Lands Available For Vegetative Manipulation) – Index Year 2005



As detailed in Table 5,

Table 6, Figure 1, and Figure 2 all the associated watersheds and subwatersheds for all alternatives are well above the Forest Plan Standards for Watershed Impact Area (no more than 35 percent of an area available for vegetative manipulation should be in a hydrologically disturbed condition at any one time). FW-061, FW-062, FW-063, FW-064.

Still Creek Special Emphasis Watershed is also well above the established threshold of concern for watershed impact area of 25% with values ranging from 1.9 to 2.3%. FW-065

Table 7
Watershed Impact Area (All Lands) Salmon River Watershed – Index Year 2005

Area (All lands)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Salmon River 5th Field Watershed	5.8	5.8	5.8	5.8	5.8
Upper Salmon 6th Field Subwatershed	9.0	9.0	9.0	9.0	9.0

Figure 3
Watershed Impact Area (All Lands) Salmon River Watershed – Index Year 2005

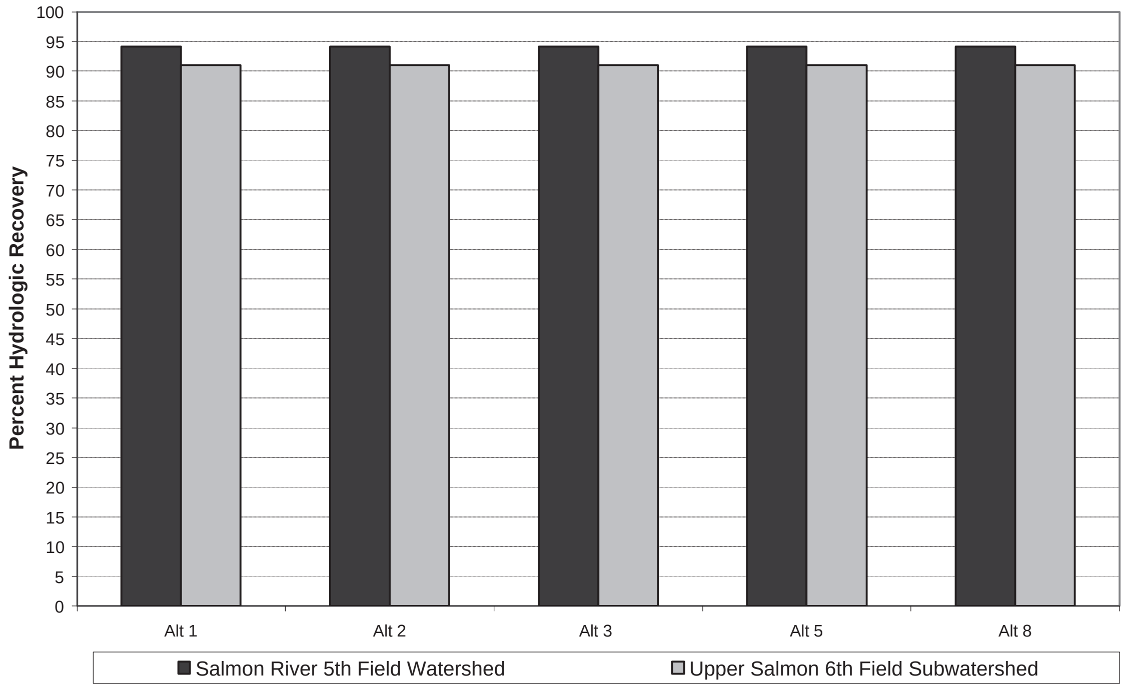
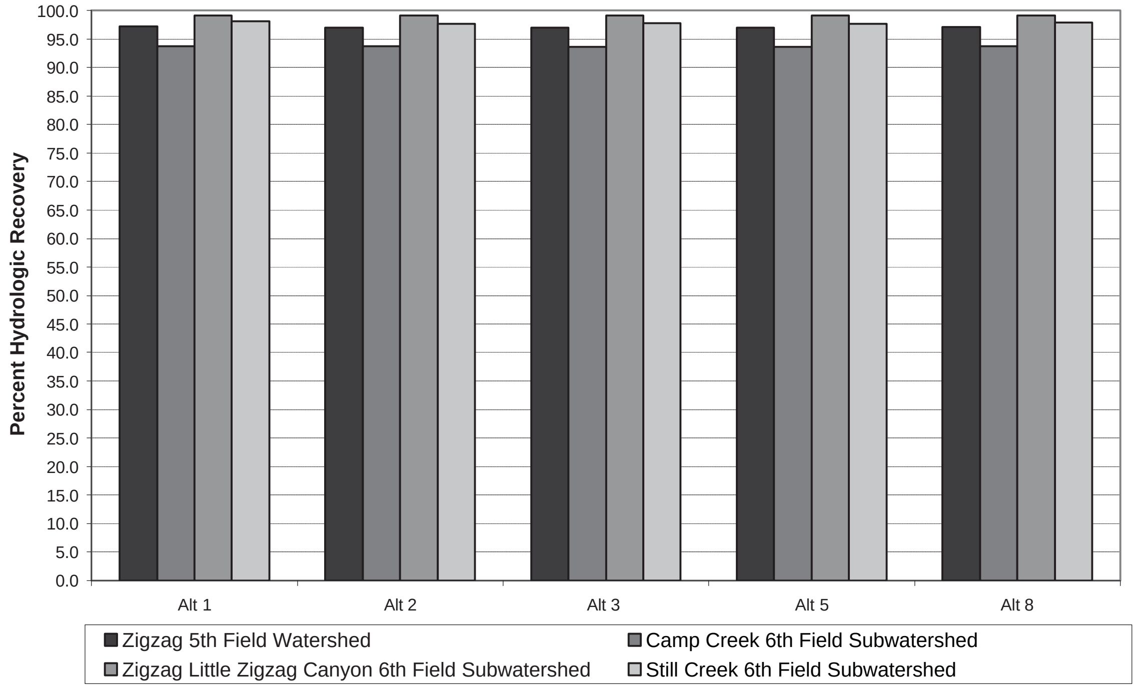


Table 8
Watershed Impact Area (All Lands) Zigzag Watershed – Index Year 2005

Area (All lands)	Alt 1	Alt 2	Alt 3	Alt 5	Alt 8
Zigzag 5th Field Watershed	2.8	3.0	3.0	3.0	2.9
Camp Creek 6th Field Subwatershed	6.3	6.3	6.4	6.4	6.3
Zigzag Little Zigzag Canyon 6th Field Subwatershed	0.8	0.8	0.9	0.9	0.8
Still Creek 6th Field Subwatershed	1.9	2.3	2.2	2.3	2.1

Figure 4
Watershed Impact Area (All Lands) Zigzag Watershed – Index Year 2005



As detailed in Table 7,

Table 8, Figure 3, and Figure 4 the watershed impact area for all the associated watersheds and subwatersheds for all alternatives is very low (0.8% to 9.0%). This indicates that the associated watersheds and subwatersheds are not at risk for adverse cumulative affects associated with increased peak streamflows associated with rain on snow events.

In addition to potential increases in peak streamflows channel sensitivity was examined for the associated watersheds and subwatersheds to assess any affects in increased peak streamflows may have on the stream channel. For this analysis the Rosgen Channel types from the most recent stream surveys were used to assess channel sensitivity (Rosgen 1996). The results are presented in Table 9.

Table 9
Stream Channel Sensitivity

Area	Associated Stream Reach	Sensitivity to Disturbance	Sediment Supply	Streambank Erosion Potential
Salmon River Subwatershed	Salmon River @ Linney Creek	Low	Low	Low
Salmon River Watershed	Salmon River @ confluence with Sandy River	Low	Low	Low
Zigzag River Subwatershed	Still Creek @ confluence with Zigzag River	Low	Low	Low
Zigzag River Watershed	Zigzag River @ confluence with Sandy River	Low	Low	Low

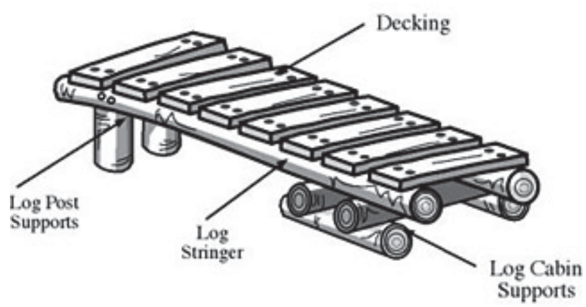
All the associated stream channels have a low sensitivity to disturbance, a low sediment potential, and a low streambank erosion potential.   With the associated watersheds and subwatersheds being over 90% hydrologically recovered with respect to increased peak streamflows from rain in snow events and the associated stream channels having a low sensitivity to disturbance the potential for adverse cumulative effects is low. (FW-066).

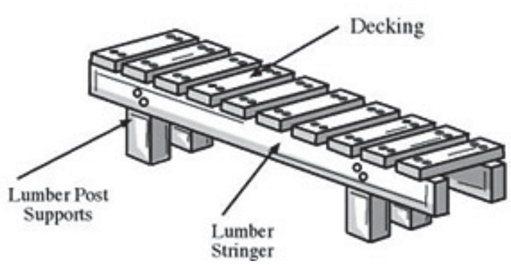
This conclusion is consistent with the associated Watershed Analyses that concluded that peak streamflows for the associated watersheds and subwatersheds are below the threshold of concern for adverse effects from peak streamflows associated with rain on snow events.

Mud Creek subwatershed does show up as being above the threshold of concern, however, for this analysis the Mud Creek, Upper Salmon, and W and E Forks Salmon subwatersheds were combined to form the subwatershed used for this analysis. This was done to have a similar sized subwatershed as Still Creek that was used for the analysis subwatershed in the Zigzag Watershed. Mud Creek subwatershed does not have a surface water connection to activities associated with the Timberline Express project so if it was analyzed by itself the project activities would show no affect. Both the Upper Salmon and W and E Fork Salmon subwatersheds are well below the threshold of concern for adverse affects associated with increased peak streamflows from rain on snow events so it is assumed that when the three subwatersheds are combined they would be below the threshold of concern.

Technical Trail Features Utilizing Native Materials

Ladder Bridge





Wooden bridges can be constructed to bypass sensitive areas with minimal impact to surrounding terrain.

Technical Trail Features Utilizing Native Materials (cont.)

Wooden TTFs can also provide access to exciting terrain that would otherwise go un-experienced by guests.

Technical Trail Features Utilizing Native Materials (cont.)

Wooden TTFs can solve simple re-direction issues, as well as complex ones.

Area Signage

Signs should be placed to communicate rules and regulations, appropriate selection of trail difficulty, advise of temporary trail conditions, highlight partnerships, and support positive trail ethics and etiquette.

Skills Park

The continual evolution of mountain biking has led to a recent boom in the popularity of bike skills parks. These venues can be a terrific community component that provides a managed arena for beginners and experts alike.

Appendix D: Visual Analysis

Appendix D – Visual Analysis

On November 1, 2010, Steve Kruse of RLK and Company and Mike Teems of the US Forest Service conducted a field investigation to determine the visibility of the proposed Timberline Bike Park, including the Skills Park, from the historic Timberline Lodge.

Methodology: In order to simulate a mountain biker in the Skills Park, the team estimated the height of a rider on a bike using a 5’ 9’ person on a medium adult Mt bike. They measured from the ground to the highest point of the person in a standing position on the bike, which is a normal position when riding a bike in a skills park. This resulted in a height of 66” so they rounded up to 6’ or 72”. By design, no terrain feature in the Skills Park will be higher than 3 feet above the ground. As a result, a 6’ mountain biker on a bike, on top of a 3’ terrain feature makes a total of 9’. Again, they rounded up to 10’ to ensure adequate coverage. A 10’ piece of conduit with a length of survey flag at the top was used to simulate the maximum height of a rider in the Skills Park (Photo 1).

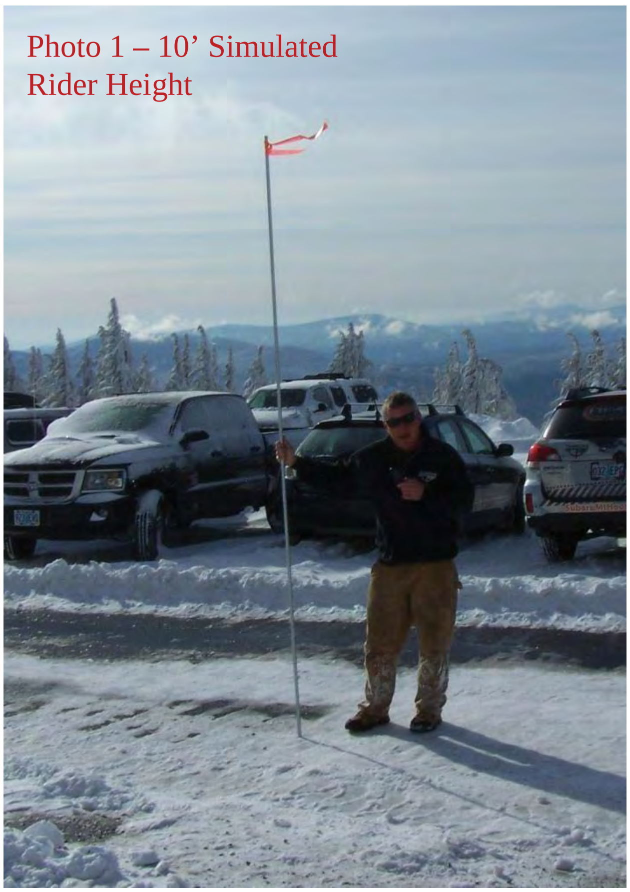


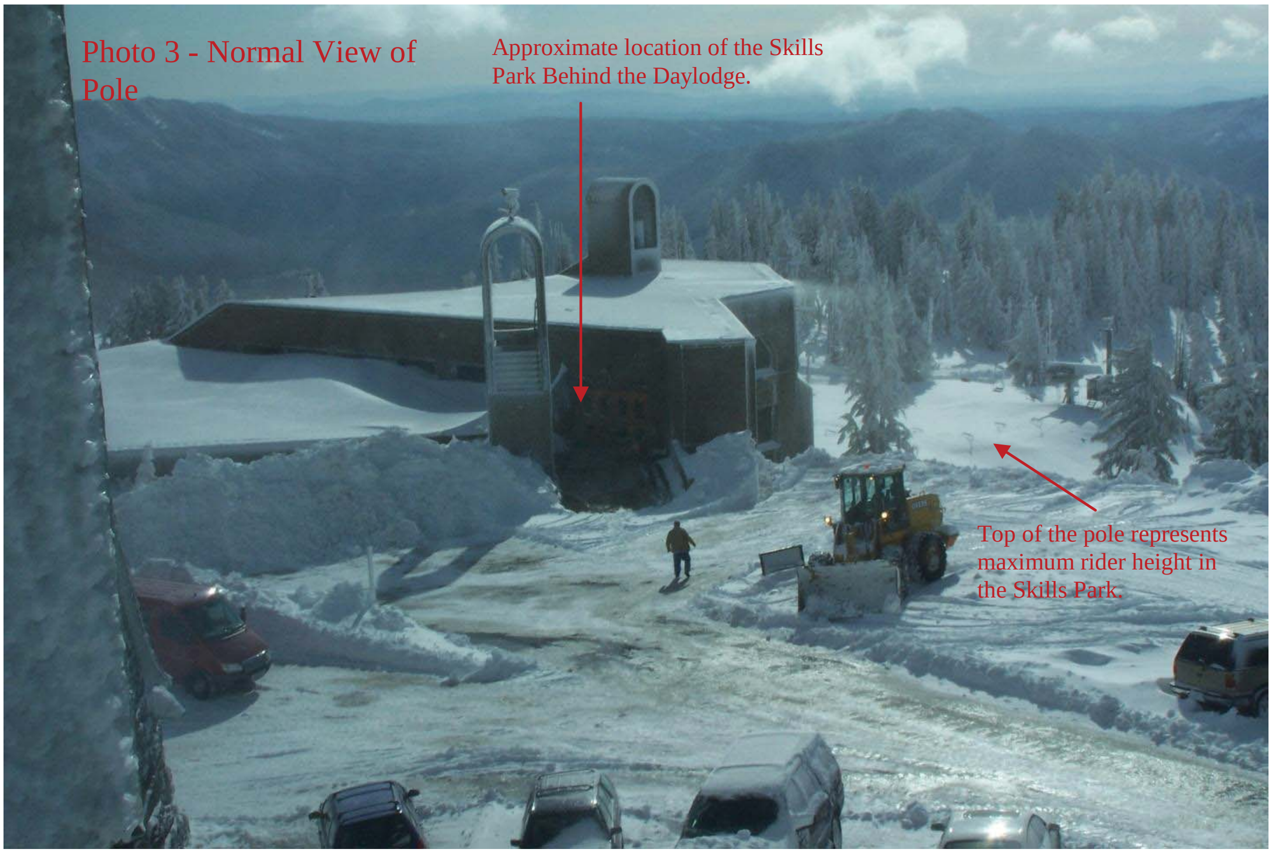
Photo 1 – 10’ Simulated Rider Height

Photo 2 – Zoomed-in View With Pole Raised

Photos were taken from the south window in the Mezzanine level and the Roosevelt terrace to evaluate the visibility of the 10-foot pole and flagging from Timberline Lodge.

Photo 2 is a zoomed in photo of Steve holding the conduit as high as he could reach and in a location that is approximately 100 feet west of the westernmost edge of the skills park. This photo is provided as a control – a zoomed in image from the Mezzanine level.

Photo 3 is the same shot as Photo 2 using a normal vision lens and with the pole on the ground. This represents the actual height of a mountain biker on a terrain feature in the Skills Park. The Skills Park would be located to the left of this picture, behind the Wy'East Daylodge and under Bruno's chairlift, whose bottom terminal is visible in the photo. This image includes the edge of the southwest window, near the Ram' Head Bar on the Mezzanine level.



Given that the Mezzanine level represents the view from the upper-most floor of Timberline Lodge, these photos show that the Skill Park and its riders would not be visible from the lodge due to the topography of the site and the placement of the Skills Park behind the Wy'East Daylodge.

Appendix E: IMBA Market Analysis

OVERVIEW

Timberline Lodge proposes to develop a lift-accessed mountain bicycle trail system ("Timberline Bike Park") in conjunction with its facilities on the Mt. Hood National Forest. This report analyzes various aspects of the proposed bike park as well as provides context to the intended use and target audience.

The International Mountain Bicycling Association (IMBA) is a non-profit organization dedicated to the creation, preservation, and enhancement of high-quality mountain bicycling experiences, with over 33,000 members worldwide. As part of its work, IMBA leads the industry in the development of sustainable, enjoyable, risk-managed trail systems. IMBA works with bicycle industry partners, professional trailbuilders, advocates, and local, state, and federal land management agencies in the pursuit of its mission.

I. MARKET AND DEMAND ANALYSIS

Economic Impacts

IMBA works to assist local communities, primarily rural ones, with increasing mountain bicycling tourism as a sustainable, renewable source of economic development. To support this effort a variety of studies and research have been aggregated to create a model that estimates mountain bicycle-related tourism expenditures. The sources for inputs into this model include reports by the Outdoor Industry Alliance ("Outdoor Recreation Participation Report – 2009" and "Special Report of Youth"), the Western Canada Mountain Bicycling Tourism Association ("Sea to Sky Mountain Biking Economic Impact Study"), US Census data, tourism studies from across North America (including the state of Michigan's Tourism Economic Impact Calculator), and IMBA's own proprietary information about its approximately 33,000 members.

In consideration of the specific Timberline Bike Park proposal and the information cited above, it is estimated that the Timberline Bike Park will generate between 3.3 million – 4.9 million dollars USD annually in local economic activity. The majority of this money will come from outside the community, particularly the Portland and Salem metropolitan areas. This projection assumes full build-out of the bike park and will probably not be achieved in the first several years of operation.

Trends in Bike Park Development

A bike park is defined as a distinct, identifiable area that contains at least two primary mountain bicycle-oriented trails or tracks. Bike parks can be public and available free of charge, public and available for a fee, or private.

The development of bike parks at ski resorts started in the 1990s, but poor investment and lack of market understanding led to the demise of most sites. In the early 2000s, Whistler Resort began creating a bike park that, supported by a burgeoning mountain bicycle scene in nearby Vancouver, B.C., grew substantially over the decade.

The success of the Whistler Bike Park model reinvigorated the industry, and other ski resorts entered the market or reactivated their existing efforts. As a region, Canada leads the way with the most bike parks per capita, and ski resorts in Europe have begun to follow suit, although they lag behind their colleagues in North America. Other international markets have seen forays into the development of bike parks, particularly in Asia and Australia, although many of these are smaller ventures or community endeavors.

Within the Pacific Northwest, the bike parks in British Columbia, Canada, dominate the market, although it is a full day's drive from the Portland metropolitan area to the nearest Canadian bike park. Steven's Pass, in the Washington Cascades, is currently under development and will likely see significant use by customers from the Seattle metropolitan area.

In Oregon, Willamette Pass has had a bike park for many years but offers limited facilities and is difficult to access. Ski Bowl, across from Government Camp, Oregon, has also had a bike park for several years, including use of their downhill mountain bicycling courses for races. Ski Bowl's terrain and trails are considered quite difficult and provide opportunities primarily for advanced and expert riders. Several community bike parks exist in Oregon, most notably Falls Creek outside Salem, although none of the community parks have uplift options.

Market research undertaken by IMBA indicates that the demand for managed, lift-accessed, bike-specific tracks and trails is unmet in every surveyed location. Without exception there does not exist sufficient facilities to meet the needs of the riding community, with the primary barrier to the development of more bike parks being the capital cost of such an endeavor.

In general, the trend in bike parks is two-pronged: smaller community parks (>1 – 5 acres) are developing much as skateparks did in the past two decades, and larger gravity-focused parks continue to be established at ski resorts. For the latter, the focus has moved away from catering to highly skilled riders and towards providing a more well-rounded experience for beginner and intermediate riders.

II. ANALYSIS OF MOUNTAIN BICYCLING MARKET SEGMENTATION

Mountain Bike Market Segmentation

In the years since the late-1970s when the first mountain bicycles were put to use the market has matured and diversified. The following riding styles and bicycles currently exist:

Cross-country (XC)

Characterized by the lightest-possible bicycles with a focus on pedaling efficiency over comfort or control, XC riding is primarily the domain of racers who compete on less-technical trails and for whom physical fitness is more important than riding skill.

Trail

Utilizing bikes with increasing amounts of front and rear suspension (4” – 5”), pedaling efficiency is marginally sacrificed for more stability and comfort. Riders in this category frequently endeavor themselves to long backcountry rides where solitude, challenge, and self-sufficiency are key.

All Mountain (AM)

Typically sporting between 5” – 6” of suspension travel in both the front and the rear of the bicycle, the AM category rider prizes descending but expects to use his or her own power to gain all or some of the necessary elevation. The trails most frequently used by AM bicyclists include both multi-use trails and bike-specific trails that optimize the fun and efficiency of a bicycle, particularly the ability to dynamically release kinetic energy. This is currently the largest portion of the mountain bicycle market by volume of sales.

Freeride (FR)

With growing amounts of front and rear suspension, typically between 6” – 8”, freeride mountain bikes focus on control and maneuverability in technically challenging conditions, including man-made and natural jumps, drops, rocky areas, and steep terrain. Almost all of the trails ridden with FR bikes are gravity-fed as the bikes are not designed for uphill trail riding efficiency. Riders frequently wear more protective gear than those riders in previous categories, including full-face helmets, goggles, and body armor.

Downhill (DH)

A longer wheelbase and up to 10” of suspension provide downhill bikes with stability at high speeds. Used in the most technically challenging and fastest terrain, downhill riders and racers also typically wear full-face helmets, goggles, and body armor. Terrain can be naturally occurring or man-made.

Other categories

Other styles of mountain bicycling with varying degrees of participation include dirt jumping, slopestyle, four-cross, dual slalom, mountain-cross, and enduro. The continued evolution of the sport ensures that categories will combine and as well as mutate, driven by the symbiotic combination of improved technology, bicycle-specific trails, and athletes pushing the boundaries of what is possible on a bicycle.

Skill level

The ridership within each category can be divided into the following groups: novice, beginner, intermediate, advanced, and expert. Using a basic bell curve distribution it can be assumed the majority of mountain bicyclists in any category and as a whole are intermediate riders.

Projected use of the Timberline Bike Park

The proposed bike park at Timberline will focus on trails that can be ridden by bicycles that span between the All Mountain and Freeride categories, in particular that aspect of the categories that focus on descending and releasing the stored kinetic energy for a unique experience. The trails will be lift-accessed, but the grades will be relatively shallow, necessitating pedaling on the part of the user. The bicycle-centric design of the trail will allow more-experience users to unlock additional momentum by “pumping” the trail, while less-experienced riders will naturally ride at a slower pace.

The bike park proposal will therefore serve the needs of beginner and intermediate riders in the aforementioned All Mountain and Freeride categories. Considering that there are few options in the region for this type of riding, and that such use can be difficult to implement on mixed-use trails, the bike park’s proposed design is appropriate and does not duplicate existing facilities.

III. SUSTAINABLE TRAILS

Sustainability

The National Park Service defines a sustainable trail as one that meets the current and reasonably foreseeable needs of the users and does not have a negative impact on the environment assuming routine maintenance.

In the past 15 years IMBA has invested hundreds of thousands of dollars in the research, design, and testing of trail sustainability. Because of this investment IMBA has become the internationally recognized specialist on the matter, and has published two books on the matter. IMBA is also an active member in the Professional Trailbuilders Association, which as an organization promotes sustainable trail development.

Environmental sustainability

The proposed trail design incorporates sustainability concepts promoted by IMBA, including trail grades less than one-half the prevailing sideslope grade, bench-cut tread, frequent grade reversals, and trail geometry appropriate for a bicycles (e.g., wider, insloped turns). These features, when properly installed and maintained, will keep water from coursing down the trail tread, which can lead to erosion. Instead, the trail will become "invisible" within the watershed and flow patterns will not be changed to a noticeable degree.

Social sustainability

Currently, mountain bicyclists seeking the opportunity to maximize their trail riding experience with descending routes have limited options. On the vast majority of mixed use trails, including all of those within the Mt. Hood National Forest, mountain bicyclists must yield to all other users when descending. When this does not occur it can cause conflicts. Developing a lift-accessed, bicycle-only, descending-direction trail will provide this experience in a managed manner while removing cyclists seeking gravity riding from shared use trails elsewhere.

Item		Value		Source/notes
Market total population (2 hr drive)		2,739,910		Wikipedia
% of total population that is mountain bicyclists (3.4%		93,157		Outdoor Industry Association - Outdoor Recreation Participation Report 2009
% of MTBr population that would use a bike park (22%		20,495		IMBA member survey (completed in Spring 2010 by Leisure Trends)
40% of bike park users will not come at all		0		# of visits
40% of bike park users will do 2 visits per year		16,396		# of visits
10% of bike park users will do 5 visits per year		10,247		# of visits
5% of bike park users will do 10 visits per year		10,247		# of visits
5% of bike park users will do 20 visits per year		20,495		# of visits
Total number of sameday (local) visitors		57,385		
Sameday day ticket expenditures per person per trip		$ 70.19		Everyone except 5% season pass holders (20 visits per year)
Accommodation	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Restaurant/pub	$ 27.47		$ 38.64	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Groceries	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Bike park (lift ticket)	$ 36.00			From Timberline
Recreation & Entertainment	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Bike shop	$ 4.29		$ 6.03	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Other shopping	$ 1.31		$ 1.84	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Owned vehicle expense	$ 1.12		$ 1.57	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Rental vehicle	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Local transportation	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Other spending	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Sameday season's pass expenditures per person per tri		$ 56.69		Season pass holders (20 visits per year)
Accommodation	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Restaurant/pub	$ 27.47		$ 38.64	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Groceries	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Bike park (lift ticket)	$ 22.50			From Timberline (season's pass price / 20 visits avg)
Recreation & Entertainment	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Bike shop	$ 4.29		$ 6.03	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Other shopping	$ 1.31		$ 1.84	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Owned vehicle expense	$ 1.12		$ 1.57	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Rental vehicle	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Local transportation	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Other spending	$ -		$ -	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Sameday expenditures total		*$ 2,609,753*		
Total number of overnight (non-local) visitors		2,869		5% of sameday visits, assumes two nights stay
Overnight expenditures per person per trip		$ 193.35		
Accommodation	$ 50.85		$ 71.52	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Restaurant/pub	$ 50.35		$ 70.81	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Groceries	$ 13.64		$ 19.18	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Bike park (lift ticket)	$ 36.00			From Timberline
Recreation & Entertainment	$ 6.47		$ 9.11	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Bike shop	$ 16.01		$ 22.52	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Other shopping	$ 7.00		$ 9.84	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Owned vehicle expense	$ 2.93		$ 4.12	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Rental vehicle	$ 5.10		$ 7.17	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Local transportation	$ 0.83		$ 1.16	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Other spending	$ 4.18		$ 5.88	From Sea-to-Sky. Converted from CAN to USD and then devalued by 20% for inflated Whistler prices.
Overnight expenditures total		*$ 554,776*		
Total direct expenditures per year		$ 3,164,529		
Multiplier for tourism revenue (1.3x)		$ 949,359		Michigan Tourism Economic Impact Calculator
otal local expenditures per year LOW		$ 3,291,110		
otal local expenditures per year AVG		$ 4,113,888		
tal local expenditures per year HIGH		$ 4,936,666		

Notes
Assumes complete build-out
Note avg income of mtb'rs, so this is feasible

Facts

Mtb'ing has increased by more than 10% from 2008 to 2009. — Outdoor Industry Association - Outdoor Recreation Participation Report 2009
Cyclists take an average of 51 outings per year. — Outdoor Industry Association - Outdoor Recreation Participation Report 2009